



FINAL REPORT

THE
CADMUS
GROUP, INC.

Evaluation of NWWVT's H.E.A.T. Squad

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EXECUTIVE SUMMARY

NeighborWorks of Western Vermont (NWWVT) contracted with The Cadmus Group, Inc., to evaluate its H.E.A.T. Squad program. The evaluation activities informed two main areas of interest: program and market effects, and impact and cost-effectiveness. To inform the evaluation, Cadmus surveyed participant and non-participant homeowners and interviewed program stakeholders.

Program and Market Effects

Key findings of the Program and Market Effects evaluation included:

- H.E.A.T. Squad's program design leveraged NWWVT's existing organizational capabilities.
- Communication and collaboration between NWWVT and Efficiency Vermont (EVT) have been less effective than both organizations had hoped.
- H.E.A.T. Squad's focus on customer service is perceived to be a strength by most stakeholders, contractors, and participants.
- Word-of-mouth and print media seem to be the most effective means of informing homeowners of the H.E.A.T. Squad program offerings.
- Participants in the H.E.A.T. Squad program are very satisfied with the program.
- The program's cost and their own time constraints appear to be the biggest barriers preventing homeowners from enrolling in the program.
- H.E.A.T. Squad participants found both the audit report and the information from the energy advisor to be helpful in the decision-making process.
- H.E.A.T. Squad participants (including those who only received an audit) report a high likelihood of installing further energy-efficiency measures in the future.
- The H.E.A.T. Squad program has been particularly effective at enrolling low-income participants.

Impact and Cost-Effectiveness

Key findings of the Impact and Cost-Effectiveness evaluation included:

- H.E.A.T. Squad increased retrofit uptake in Rutland County, compared to Efficiency Vermont's program alone. As shown in Table 1, customers who received NWWVT messaging are 46% more likely to install measures.

Table 1. Estimated H.E.A.T. Squad Program Effect

Respondent Group	Odds Ratio	Percentage in Sample
Higher Income (above 80% AMI)	1.10	77%
Lower Income (below 80% AMI)	2.64	23%
All Respondents (Weighted average)	1.46	100%

- Lower-income households (those earning below 80% of average median income) that received H.E.A.T Squad messaging are 164% more likely to install measures.
- The H.E.A.T. Squad program is cost-effective with a Societal Cost Test ratio of 1.72.

Conclusions and Recommendations

Key Program Components and NWWVT Organizational Capacities

Conclusions

- NWWVT's history of programming in Rutland County positioned it well to implement the H.E.A.T. Squad program. As a small, flexible, community-based organization, NWWVT contributes a specific set of capabilities to the statewide thermal efficiency community, and is particularly effective with traditionally hard-to-reach customers, such as those who earn less than 80% of average median income. .
- As a result of differing organizational cultures, communication and collaboration between NWWVT and EVT have been weaker than both organizations had hoped. Both organizations have been successful in implementing their respective programs, but stronger communication between the two could help them more effectively achieve their common goal of furthering Vermont's thermal efficiency
- The H.E.A.T. Squad program offers a strong model for reaching Vermont's lower-income customers.

Recommendations

- NWWVT and EVT should continue their efforts to collaborate through program activity, the Thermal Energy Taskforce, and other avenues.
- Future program plans should formally recognize both organizations' capabilities, contributions, goals, and requirements.
- NWWVT and its funders should consider expanding the H.E.A.T. Squad model to reach lower-income customers in other Vermont counties.

Marketing and Outreach

Conclusions

- NWWVT used the H.E.A.T Squad program to experiment with many different marketing and outreach strategies, and has developed strong awareness of H.E.A.T. Squad in

Rutland County.

- Both traditional marketing channels and community-based outreach have been important for increasing program awareness.

Recommendation

- As NWWVT continues to market H.E.A.T. Squad, it should take steps to measure the effectiveness of specific marketing and outreach efforts. These steps may include developing and following an annual marketing and outreach plan to allow for clearer measurement of the impact of various activities; such measurement will provide a concrete basis upon which to make decisions about future marketing and outreach investments.

Homeowner Responses

Conclusions

- H.E.A.T. Squad's customer service helps participants make decisions. H.E.A.T. Squad participants are very satisfied with the program, and found both the audit report and the information from the energy advisor to be helpful in the decision-making process.
- H.E.A.T. Squad appears to have a more substantial effect on changing participant *attitudes* than does EVT's program alone. H.E.A.T. Squad participants, including those who only received an audit, reported a higher likelihood of installing further energy-efficiency measures in the future.
- Participants and nonparticipants have similar demographic and housing characteristics, indicating there are more homeowners in Vermont that could benefit from the program, and NWWVT should pursue continuation and expansion of the program after their current grant.

Recommendations

- H.E.A.T. Squad participants' reported intention to install additional energy-efficiency measures indicates potential for additional savings; both NWWVT and EVT should work together to capture that savings.
- Since H.E.A.T. Squad appears to succeed at educating homeowners and changing their attitudes about energy-efficiency, but a substantial number of audit participants decide not to pursue retrofit measures, the program should consider offering a low-cost package of direct-install measures for homeowners to purchase from the contractor at the time of the audit. This option would increase overall energy savings, while also increasing engagement with those homeowners who are not ready to pursue full-scale retrofits.

Impact and Cost-Effectiveness

Conclusions

- The H.E.A.T. Squad program has increased Rutland County homeowners' energy-savings measure installation, thus increasing Rutland County participation in EVT's Home Performance with ENERGY STAR program. This effect strongest among

households earning below 80% of average median income.

- H.E.A.T. Squad on its own is cost-effective, and it is also cost-effective combined with EVT's Home Performance with ENERGY STAR program.
- The H.E.A.T. Squad program's ability to reach lower-income households can help Vermont reach its goal of weatherizing 80,000 homes by 2020. H.E.A.T. Squad has been able to reach Rutland County residents who may not have otherwise weatherized their homes.

Recommendation

- NWWVT and EVT stakeholders should increase collaboration, as they continue to expand their combined program offerings.

METHODOLOGY

This section provides an overview of Cadmus' research agenda, data collection, and analysis that informed this report. The Impact Evaluation section provides details on specific impact-related analyses.

Research Agenda

In developing a research plan for the evaluation, Cadmus and NWWVT agreed to address the following researchable questions and sub-questions. We address these questions in two broad categories, although there is considerable overlap between the two.

Program and Market Effects

1. To what extent is the customer service-based delivery approach responsible for the program's success to date?
 - a. How do homeowners learn about the program?
 - b. What factors encourage or discourage participation?
 - c. How effectively do the program offerings drive demand for home and building energy retrofits?
 - d. How (and to what extent) does the program delivery structure impact contractors and the home energy retrofit market?
 - e. What organizational capacities are essential to NWWVT's ability to deliver the program as it is currently structured?
 - f. Does the program delivery approach reach customers who might not otherwise participate in this program?

Impact and Cost-Effectiveness

2. Is the program's customer service-based approach cost-effective?
 - a. What energy savings can be attributed to program interventions?
 - b. What non-energy benefits, such as improvements in health and safety, can be attributed to program interventions?
 - c. What are the program costs?
 - d. How is the loan program performing?
3. Is the program approach sufficiently cost-effective to serve as a model for other Vermont retrofit programs?
 - a. How cost-effective are alternative program delivery channels in Vermont?
 - b. Does NWWVT's approach have added benefits?

These questions guided Cadmus' research and shaped data collection instrument development.

Data Collection

Cadmus designed the survey sample to gather information about various groups of homeowners in Rutland County and in other Vermont counties. We constructed survey data collection protocols to produce high-quality data with minimal bias, while also minimizing inconvenience to the homeowners contacted.

Sampling and Survey Data Collection

Cadmus randomly selected respondents from NWWVT's program records for phone surveys. We identified nonparticipant homeowners using random digit dialing (RDD) and an initial set of screening questions at the beginning of each survey.

The baseline reflects the naturally occurring adoption of efficiency measures and the EVT program influence. The evaluation needed to survey homeowners who were unaware of the H.E.A.T. Squad program to establish a baseline against which to measure program impacts. Cadmus purchased contact data for these non-participant homeowners through our subcontractor, The Center for Research and Public Policy (CRPP).

Cadmus developed survey instruments based on the H.E.A.T. Squad evaluation researchable questions. We initially planned to survey six distinct customer segments:

1. Homeowners who received NWWVT messaging, an audit, and installed measures.
2. Homeowners who received NWWVT messaging and an audit, but did not install measures.
3. Homeowners who received NWWVT messaging, but did not proceed with an audit.
4. Homeowners who did not receive NWWVT messaging, but received an audit and installed measures through Efficiency Vermont.
5. Homeowners who did not receive NWWVT messaging, received an audit, but did not install measures.
6. Homeowners who did not receive NWWVT messaging, did not receive an audit, and did not install measures.

Cadmus contracted with CRPP, a Vermont-based market research firm, to pretest and conduct the survey. To minimize non-response bias, CRPP made up to six attempts to contact each individual in the sample before that sample record was considered exhausted. These call attempts spanned different times of day and included both weekends and weekdays.

CRPP was able to complete surveys for all of the above groups except those who received an audit outside of the H.E.A.T. Squad program. We were unable to identify this group because EVT only tracks those audits that lead to the installation of incented measures. Furthermore, program stakeholders estimated that few homeowners conduct audits outside the EVT or H.E.A.T. Squad programs, meaning an RDD effort to reach these people would not be cost-effective.

We planned to complete 100 surveys in each of the remaining groups, to report survey results with relative precision of 8% or better at 90% confidence. Table 2 compares the initial sample quotas to the final completed counts for each group. As shown, the survey met or exceeded all quotas except for those households that received audits outside of the H.E.A.T. Squad program.

Table 2. Homeowner Survey Sampling

Customer Type	Targeted Number of Completes	Achieved Number of Completes
Messaging Only	100	104
HEAT Audit Only	100	103
HEAT Upgrade	100	101
No Messaging	100	102
EVT Audit Only	100	0
EVT Upgrade	100	100

Interview Data Collection

Cadmus interviewed program stakeholders and contractors by phone, using an interview guide to ensure the collection of appropriate information relevant to the researchable questions specified. We used interview guides as a roadmap, which provided the flexibility to pursue relevant topics occurring in conversation that may not have been adequately covered otherwise.

After obtaining interviewee contact information from NWWVT, we scheduled phone interviews. Program staff interviews required approximately one hour of each interviewee's time, while external stakeholder and contractor interviews required approximately 30 minutes. Table 3 shows completed counts for each category of interviewee. Because neither group of interviewees comprised a representative sample of that population, we report the results as anecdotal findings rather than statistically representative findings.

Table 3. Stakeholder and Contractor Interviews

Interviewee Category	Achieved Number of Completes
NWWVT H.E.A.T. Squad Staff	6
H.E.A.T. Squad Participating Contractors	5
Efficiency Vermont Home Performance with ENERGY STAR Staff	2
Representatives of Funding Agencies	2
Related Vermont Organizations (No official affiliation with H.E.A.T. Squad)	2

Overview of Contractor Respondents

To encourage honest, comprehensive responses, Cadmus assured contractors their identities would be protected to the extent practical. Therefore, we did not list the specific contractors who participated in the interviews. However, to understand the context of the responses, it is important to have a general sense of the interviewees and their businesses, as indicated in this list:

- Of the five businesses contacted, four have been with the program approximately since its inception in late 2010.

- The fifth has been with the program for about one year.
- The ages of the businesses varied: three were three years old or less, one was nearly four years old, and the other was seven years old.
- Two of the contractors had five or fewer years of experience.
- Three had more than five years in the construction business (one had 38 years).
- Most started working in energy efficiency within the past five years.
- Most contractors conducted all (or nearly all) of their business in Rutland County.
- All were active only in the state of Vermont.

FINDINGS: PROGRAM AND MARKET EFFECTS

The key objectives for the Program and Market Effects evaluation activities were to:

- Examine the program's implementation, response, and market to assess program sustainability; and
- Identify opportunities to increase success.

This section organizes interview and survey findings as they pertain to the researchable questions specified in the Methodology section.

Program Overview

NWWVT, a nonprofit housing organization with a focus on sustainable home ownership, implements the H.E.A.T. Squad program in Rutland County. H.E.A.T. Squad is supported with grant funding from the U.S. Department of Energy (DOE) Better Buildings Neighborhood Program.¹ DOE awarded the grant to NWWVT in June 2010, and the first H.E.A.T. Squad audit and retrofit project activity occurred in September 2010.

H.E.A.T. Squad is designed to be a one-stop-shop for Rutland County residents who want both to save money on heating fuel and to have a more comfortable and healthful home. The program does not target specific income groups, so all Rutland County homeowners are eligible to participate.

H.E.A.T. Squad participation begins with a Home Energy Checkup audit. NWWVT assists participants in finding contractors to perform the audit and any subsequent retrofit work. NWWVT also provides project management assistance through its in-house construction specialists (called "energy advisors"). Energy advisors are available to assist participants in making decisions after they receive their audit, and can coordinate with contractors. Project management assistance is available for participants making use of the loan program.

Contractors send each participant an audit report showing the results of the Home Energy Checkup (which consists of a comprehensive energy audit and includes blower-door testing). This report contains recommended energy-saving upgrades. Commonly recommended retrofit measures include: (1) heating system upgrades; and (2) improvements to insulation, air sealing, and other thermal shell options.

NWWVT refers participants to the incentives available from the EVT Home Performance with ENERGY STAR[®] program. The EVT program has offered up to \$2,500 of incentives to homeowners who conduct comprehensive energy-saving retrofits.² NWWVT also offers financing to assist with out-of-pocket expense.

¹ The Better Buildings Neighborhood Program is part of the Better Buildings Initiative—a program within the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy that aims to lower barriers to energy efficiency in buildings.

² EVT recently lowered its cap on incentives per household to \$2,000.

Program History, Design, and Approach

NWWVT created H.E.A.T. Squad's program design in response to the DOE's request for Better Buildings grant proposals. NWWVT's executive director and senior staff members were the key players in designing the program; they solicited assistance from a consultant, and collaborated with Efficiency Vermont.

The legislative goal of weatherizing 80,000 homes in the state of Vermont by 2020 was one driver behind the program concept. Upon recognizing that the state was not on track to meet this goal, NWWVT and EVT identified the DOE grant as an opportunity to experiment with new approaches for promoting weatherization and accelerating weatherization efforts in Rutland County.

In keeping with NWWVT's mission of making homeownership secure and affordable, the H.E.A.T. Squad program emphasizes energy-efficiency as a means to help people achieve affordable homeownership. The program concept grew out of two existing NWWVT programs:

- A lending program that enables homeowners to make health- and safety-related repairs to their homes; and
- A program for low-income households that includes energy-efficiency improvements.

The existing NWWVT housing rehabilitation program, operating since 1986, had three main components: education, construction management, and lending. The H.E.A.T. Squad program built on that model by focusing on energy-efficiency and expanding the targeted client base to all income levels.

The H.E.A.T. Squad program design also leveraged EVT's statewide Home Performance with ENERGY STAR program, which has offered incentives to homeowners for energy-saving retrofits since 2005. Homeowners who received audits and retrofits through H.E.A.T. Squad also had access to these incentives to help offset the retrofit costs.

Both EVT and NWWVT staff reported that H.E.A.T. Squad was originally intended to run as a close partnership between EVT and NWWVT. However, once the grant was awarded, the two organizations experienced what each described as a breakdown in communication. This breakdown led to NWWVT taking charge of H.E.A.T. Squad, with less collaboration from EVT than originally expected.

Key Program Components and NWWVT Organizational Capacities

When asked what made H.E.A.T. Squad different from other Better Buildings grant-funded programs, most stakeholders agreed that H.E.A.T. Squad's focus on customer service was the difference. H.E.A.T. Squad's energy advisors assist participating homeowners in navigating the full process, from engaging contractors through the audit and subsequent retrofits.

NWWVT staff members and the funding organization representatives also noted that, in their view, the focus on customer service was the key to H.E.A.T. Squad's success. In contrast, EVT

staff members said that the customer service focus was not essential; they attributed H.E.A.T. Squad's success to NWWVT's community-based marketing approach and lending program.

In general, contractors had very positive things to say about the H.E.A.T. Squad program. Most of the contractors interviewed offered few, if any, recommendations to improve the program. While one contractor suggested that NWWVT improve its relationship with EVT, because both programs are equally useful; another contractor mentioned that coordinating with the EVT program was a H.E.A.T. Squad strength.

Several contractors mentioned that having NWWVT marketing the program was important since it added credibility. Overwhelmingly, the contractors felt NWWVT excelled at marketing. Respondents said that not only is NWWVT good at "getting people in the door," it also engages in marketing that contractors would not necessarily be able to achieve on their own. Other NWWVT strengths mentioned by contractors included these:

- Providing scheduling and logistical services,
- Serving as a credible source of information, and
- Helping contractors grow and improve.

Contractors felt the marketing and incentives—in particular, the up-front reduction in audit cost—were the key elements that made the program work.

Organizational and Staff Capabilities

Many interviewees identified both the organizational capacities of NWWVT and the personal capabilities of program staff as key factors contributing to the program's success. Contractors also gave NWWVT a much of the credit for the program's success and smooth operations.

Many interviewees (both inside and outside NWWVT) noted that the organization is small, flexible, and able to experiment. One EVT staff member pointed out that NWWVT had fewer restrictions than EVT, since EVT is a regulated utility and must maintain equity and meet other regulatory requirements. In fact, many interviewees mentioned that one of the most valuable results of the DOE grant was the ability to use the H.E.A.T. Squad program for experimentation with various outreach and delivery methods.

Furthermore, nearly every interviewee mentioned that the program staff members at NWWVT were extremely dedicated and hardworking. The H.E.A.T. Squad program manager, Melanie Paskevich, was mentioned by name several times as a key contributor to the program's success. Ms. Paskevich's professional experience includes years of working in construction management, and several interviewees mentioned that her familiarity with the industry and with contractors and her skills in project management were crucial to her ability to manage the program.

Some interviewees mentioned that the role of the energy advisor required an uncommon combination of skills: technical knowledge of building science, ability to work with contractors, and the ability to communicate with homeowners. However, one contractor said that although having the support of the non-profit was critical for gaining customer trust, he felt the energy advisors engaging at the project level did not add much value.

Marketing and Outreach

NWWVT has developed a diverse array of marketing materials and approaches for H.E.A.T. Squad. Overall, the marketing materials and outreach activities appear to present a strong, clear, actionable message to drive customers into the program.

Marketing and Outreach Approaches

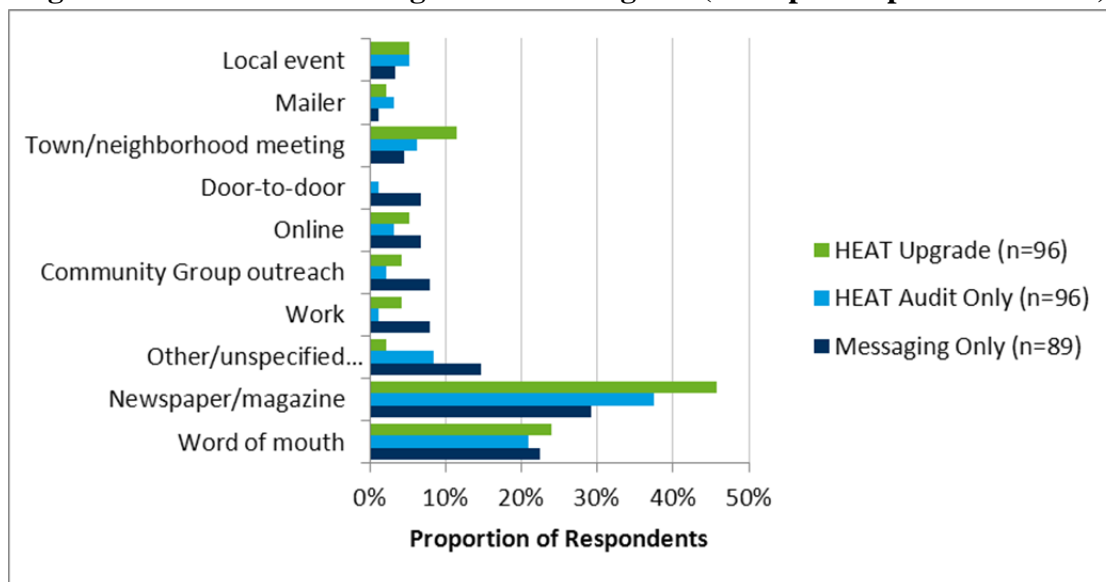
Interviewees described H.E.A.T. Squad's ability to experiment with a variety of approaches to program marketing and outreach. Indeed, NWWVT has used a broad range of methods for reaching prospective participants, and the methods mentioned in interviews included the following:

- Phone-a-thon focused on one town to kick off the program
- NWWVT Website and Facebook page
- EVT Website
- Newspaper advertising focused on particular target audiences (elderly, rural, environmentalists, etc.)
- Broad-spectrum awareness created with yard signs, bus signs, and posters
- Door hangers distributed by contractors
- Bill inserts created in partnership with fuel dealers
- Electric utility bill inserts
- "Energy Parties" for sharing participant experience with friends and neighbors
- Coupons for \$20 for referring a friend
- Cooperative advertising with contractors

Staff members at NWWVT noted that some approaches have been more successful than others. For example, one staff member called the \$20 referral award "an epic failure" after only two people participated. Conversely, other staff members pointed to the phone-a-thon effort that kicked off the program in Shrewsbury as a successful example of H.E.A.T. Squad's community-oriented intensive outreach strategy. The phone-a-thon took place before the development of program materials or marketing collateral, and NWWVT regarded it as a quick way to engage one community. Staff described this approach as tackling a "breakthrough goal"—a small, focused piece of the overall program goal. It allowed NWWVT to learn how best to communicate about the program without investing extensive resources in developing a marketing strategy or plan. One program staff member described this model as "go, set, ready," emphasizing that the organization was able to swiftly react to results and lessons from the field.

Customer Responses

Customers in Rutland County reported learning about the program through various channels, as shown in Figure 1.

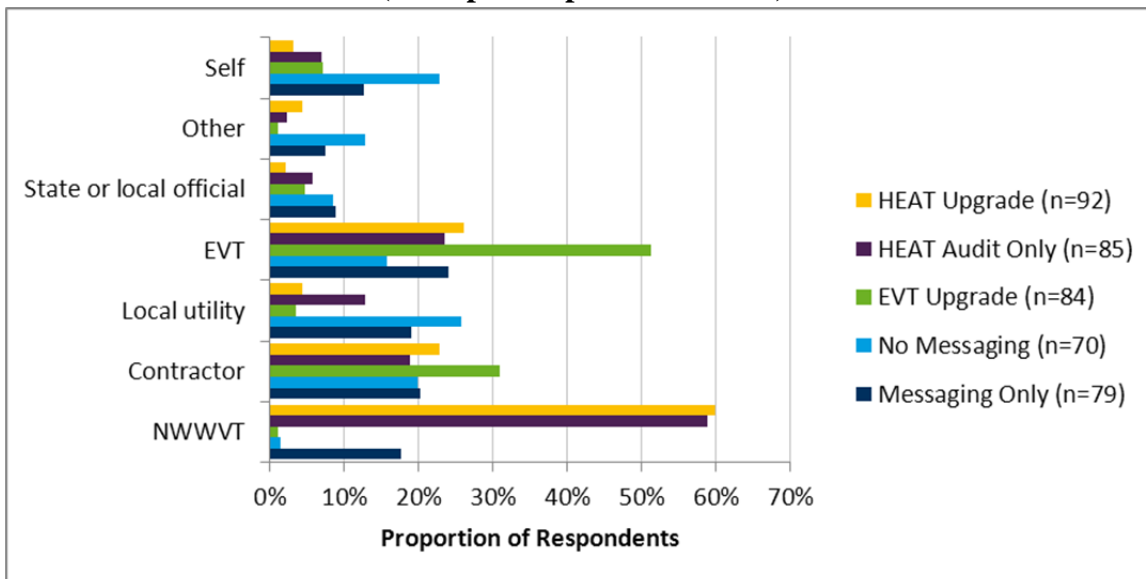
Figure 1. Method of Learning about the Program (Multiple Responses Allowed)

In summary:

- Word-of-mouth and print media represented the most frequently cited method of learning about the program.
- Approximately four out of 10 customers who signed up for the Home Energy Checkup cited newspaper or magazine advertisement, while one in five cited word-of-mouth.
- Approximately one in 10 enrollees reported hearing about H.E.A.T. Squad through a local neighborhood or town meeting.
- Door-to-door and telephone outreach were infrequently cited.

When homeowners were asked where they go for energy savings advice, participants in both H.E.A.T. Squad and the standard EVT program overwhelmingly cited either program staff or contractors. Of note, however, is that between 15 and 20% (roughly one in five) of households not participating also cited these sources. This indicates that a substantial portion of households look to NWWVT and its partners for information on energy savings opportunities.

**Figure 2. Reported Sources of Information on Energy Savings
(Multiple Responses Allowed)**



Marketing Materials

H.E.A.T. Squad has a clearly recognizable logo that reinforces its community-based nature. On all promotional materials, the logo and color scheme are attractive and consistently presented. Overall, the print materials have a simple design, focus on providing informative, and drive their audience to a concrete action, such as signing up for an energy party or calling to schedule an audit. On most of the print materials, the call to action is to contact NWWVT by calling a phone number; however, some materials also direct customers to the Website.

In reviewing the marketing materials, Cadmus noted that most H.E.A.T. Squad materials make no mention of EVT. Also, the materials contain little detail about the Home Performance with ENERGY STAR program. Interviewees at EVT thought this represented a lack of recognition of the EVT program’s role in H.E.A.T. Squad’s success, and they mentioned that the lack of coordinated branding between the two organizations could be confusing to participants. Similarly, NWWVT staff mentioned that EVT did not initially add H.E.A.T. Squad program information to the EVT Home Performance with ENERGY STAR program Website.

Contractor Involvement in Outreach

NWWVT staff reported that many homeowners come into the program because they hear about it from a contractor. Contractors did not indicate they had an active role in marketing the H.E.A.T. Squad program; however, they were overwhelmingly positive about NeighborWorks’ marketing efforts. Regardless of what portion of their business resulted from the H.E.A.T. Squad program, contractors reported doing little, if any, marketing on their own. One contractor explained, “EVT and NWWVT provide fairly steady work.” In general, contractors valued the advertising that NWWVT does and felt NWWVT was a more trusted messenger than they could be on their own.

Despite their perceived lack of marketing effort, all contractors reported engaging in word-of-mouth advertising, and all reported talking to their customers about energy efficiency. About half

reported using the NWWVT materials such as door-hangers and lawn signs. One had been reluctant to do so until "...a customer wondered why he didn't get a yard sign like his neighbors." To support more expensive media (such as radio and TV), one contractor suggested NWWVT look into a cooperative advertising program, where contractors would share part of the cost.

Enrollment Decisions

Surveyed customers who participated in the H.E.A.T. Squad program cited a number of factors influencing their decision to enroll, and they ranked these factors from "not at all important" to "very important." These results are summarized graphically for audit-only and audit-and-retrofit participants in Table 4, with "not at all important" at the left end of the bar graphs and "very important" at the right end.

Table 4. Ranking of Various Factors' Importance on the Enrollment Decision (Four-Point Scale from "Not at All Important" to "Very Important")

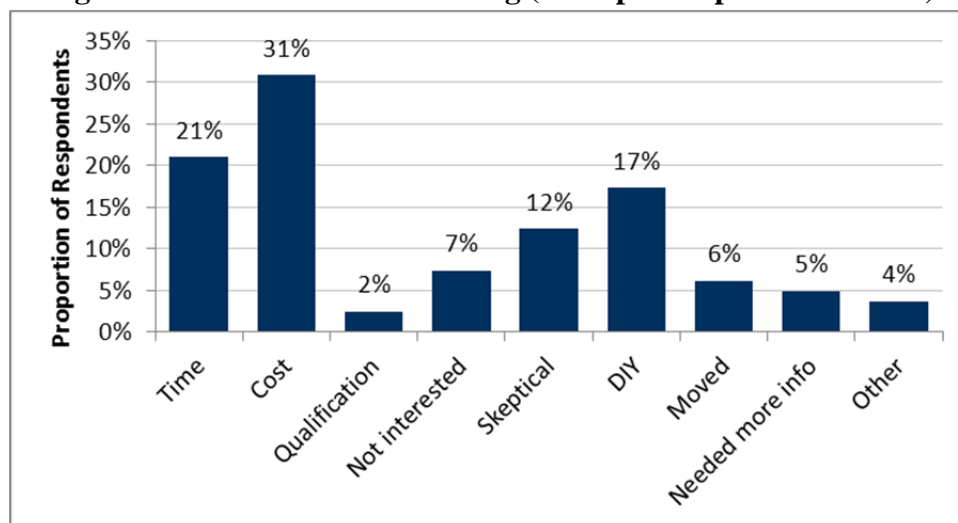
Factor	EVT Upgrade	HEAT Audit Only	HEAT Upgrade
Learn how to lower my energy bills and save money			
Learn how to save energy			
Learn how to protect the environment			
Learn how to make my home more comfortable, warmer, or less drafty			
Learn how to improve health or indoor air quality			
Receive free products like CFLs (compact fluorescent light bulbs), pipe wrap, etc.			
Learn what incentives exist for improvements			
Receive incentives			
Replace old or broken equipment			
Get a loan for improvements			
A friend or family member recommended it			

Enrollees seemed to sign up for the program primarily to: (1) save energy, (2) lower their bills, and (3) make their homes more comfortable. The loan component did not appear to be a big factor for most participants.

As the table shows, there were no dramatic differences between the motivations of audit-only and full participants. This seems to indicate that audit-only participants did not drop out of the program due to a misunderstanding of the program's purpose, but for some other reason. Of those Rutland County households that did not enroll in the program, the reasons cited most

frequently where: cost (30% of respondents) and time constraints (21%). Also, a sizable number of households chose to conduct repairs on their own. These results are shown in Figure 3.

Figure 3. Reason for Not Enrolling (Multiple Responses Allowed)

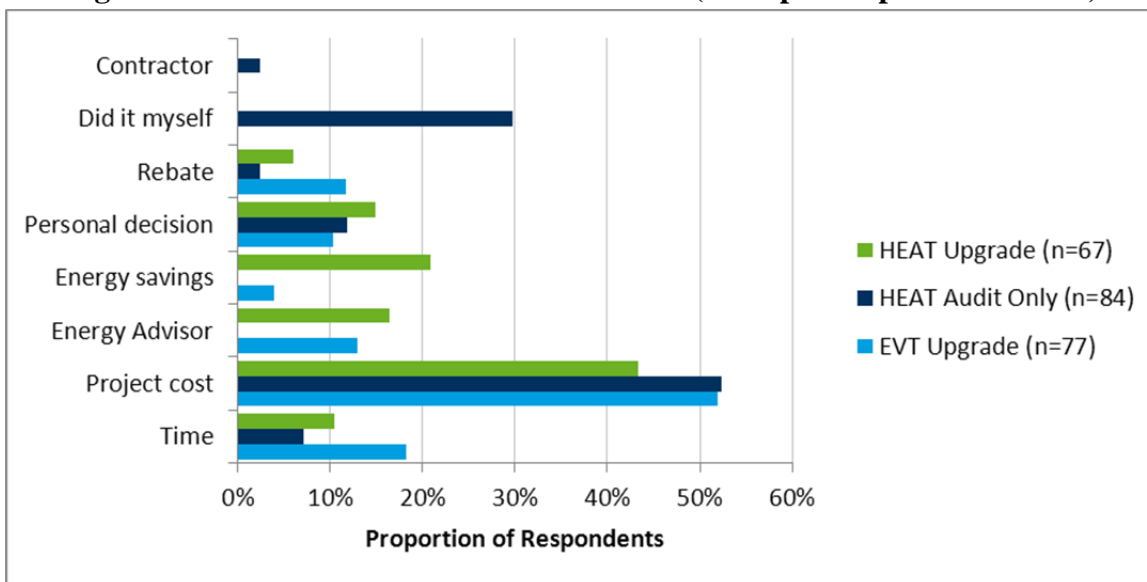


Measure Installation Decisions

Participants in both the EVT and the H.E.A.T. Squad programs were asked to list their criteria for making decisions on installing measures. As shown in Figure 4, the responses varied considerably between groups.

- More than one-quarter of EVT program participants cited not having enough time as an issue; however, this was much less commonly mentioned by H.E.A.T. Squad enrollees, even among those who did not install measures.
- Project cost played a substantial role across the board, with nearly half of all groups reporting it as an issue.
- Of those who only had an audit, nearly a third said they subsequently installed the measures themselves.

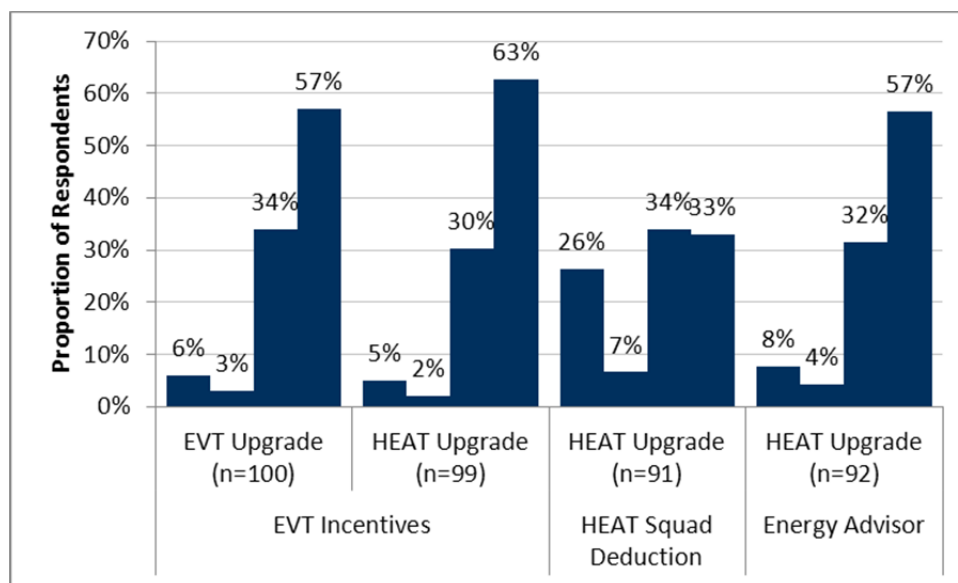
Figure 4. Motivation for Installation Decision (Multiple Responses Allowed)



When asked how influential the incentives were on the decision to install measures, both the audit-only and full participants cited a high degree of influence (Figure 5). Of audit-only participants, 90% said that while the EVT incentives were at least somewhat influential, these incentives were not sufficient to influence them to proceed with the retrofit.

Meanwhile, 93% of full H.E.A.T. Squad participants said the incentive played a role in their installation decisions. Full participants were somewhat split on the influence of the \$250 H.E.A.T. Squad up-front audit cost deduction; however, a large majority (89%) noted that the energy advisor influenced them to install measures.

Figure 5. Degree of Influence of Marketing and Costs on Decision to Install Measures



Contractor Participation

As NWWVT staff interviewees noted, developing the contractor workforce has been an area of focus for H.E.A.T. Squad, and this effort has required more staff time than anticipated. H.E.A.T. Squad has developed a collaborative style for its close work with approximately 12 contractors. Program staff reported that, initially, the contractors considered themselves to be competitors, but over time they became more willing to learn from one another.

In response to observed contractor needs, NWWVT has provided various resources, including professional development in the form of a Dale Carnegie sales training course. NWWVT has also offered its participating contractors extensive one-on-one support for creating and submitting timely, consistent audit reports. Furthermore, NWWVT spearheaded an *ad hoc* labor pool called LaborWorks for NeighborWorks: a trained group of hourly laborers who contractors can call on in times of high demand. Although utilization of this resource has been low, NWWVT believes it is a valuable tool to help contractors manage their variable workloads. Finally, NWWVT offers its contractors the option of a loan to finance any major equipment needs.

NWWVT staff members reported having greatly increased the workload for many of their participating contractors. Further, they reported that at least four new audit-and-weatherization contracting businesses have been established in Rutland County as a result of the H.E.A.T. Squad program driving an increase in demand for services.

Contractor Satisfaction

All of the contractors Cadmus interviewed were satisfied that the program had met their expectations.

- All said they joined the program in hopes of increasing their business, although none had set quantitative targets.
- Some were also motivated to join because they wanted to do more of the thing they loved or because they felt good about being part of what they considered to be a beneficial program.
- One contractor wanted to change his business to be more focused on a single area so that he could reduce his travel time.

Contractors also reported that the program provided a significant part of their business, estimating that H.E.A.T. Squad accounted for from 20% to 100% of their workload. Table 5 shows the level of program involvement by the contractors interviewed.

Table 5. Estimated Contractor Participation in 2012*

Respondent	# Audits Completed	# Retrofits Completed	Conversion Rate	# Employees	H.E.A.T. Squad as % of Overall Business
Contractor 1	200	64	32%	5	85%
Contractor 2	25	10	40%	1	100%
Contractor 3	Unknown	50	Unknown	3	40%
Contractor 4	180	65	36%	4	70%
Contractor 5	Unknown	25	Unknown	11 (4 are EE)	20% (40% of HP business)

*Contractors estimated the number of audits and retrofits to the best of their recollection. While these may not align with program records, they provide a general picture of the relative volume performed by contractors interviewed. Contractors 3 and 5 did not recall how many audits they had performed.

All contractors saw additional benefits to joining the program beyond the increase in sales. Specifically:

- Several contractors mentioned access to training and being able to network and share best practices with other contractors.
- One contractor cited the equipment loan program for contractors as a benefit.
- One mentioned his crew benefitted by becoming more efficient as they became more experienced doing retrofits.
- Another contractor noted that he had been able to diversify his workforce; he was able to hire someone to handle paperwork, which enabled him to could focus on other things.

Only one of five contractors saw an increase in his focus on overall home performance, while the remaining four felt their businesses were already 100% focused on home performance when they started the program. All, however, felt that the profile of energy efficiency was growing in the area. Several mentioned that area retailers had begun offering discounts on supplies and equipment for energy efficiency. One contractor estimated prices had dropped about 10% in some cases.

Contractor Relationships: NWWVT Program Staff and Other Partners

All contractors described their relationship with NWWVT as generally being very good. Nevertheless, when speaking about the relationship, some contractors said that they value certain parts of the program more than others. In particular, contractors had mixed reactions when asked about the energy advisor role:

- One felt that their energy advisor “goes above and beyond,” and another stated that the energy advisors were “important to help facilitate work.”
- However, one contractor noted he does not understand the energy advisors’ role and that customers never mentioned them.
- Another contractor thought he spent as much time educating the advisors as he did the homeowners and that having the advisors serve as communicators with the homeowners occasionally caused confusion. He suggested that the program could be improved if the advisors’ role were more contractor-focused—having a single advisor assigned to each contractor and focused on streamlining that contractor’s projects.

When asked about EVT, most contractors responded positively. One contractor said the EVT database is useful for calculating savings. They also said they value EVT for working with them "...since the utilities aren't involved in any programs." One contractor felt that there was friction between EVT and NWWVT, but he had good relationships with both.

While relationships with EVT were generally good, all contractors reportedly had stronger relationships with NWWVT.

Incentives and Loans

NWWVT program staff and other stakeholders reported that one of the assumptions underlying the design of the H.E.A.T Squad program was that homeowners could be convinced to pursue energy-saving retrofits through customer service and education. This model contrasts the more traditional utility program theory that focuses on monetary incentives to drive retrofits. However, several interviewees mentioned that it is difficult to distinguish between the effects of the various elements of the program: H.E.A.T. Squad's customer service, the availability of loans, and the availability of monetary incentives from EVT all work together to drive participation.

Although the contractors' overall opinion of EVT was positive, several of them expressed disappointment that the rebate levels had been reduced recently ("just foolish" said one respondent).³ One noted that rebates were critical for sales and cited the fact that the additional \$500 being offered by NWWVT to make up the lost coverage by the EVT rebates was very popular. Other contractors felt the rebates were "still generous" and that the reduced incentive level would help the program be more sustainable.

While all contractors thought the financing was good for customers, they did not indicate being substantially involved with the financing options available through NWWVT. Some contractors had no desire to be more involved in the loan program details, with one stating that the loan "doesn't affect me."

One contractor estimated that about 25% of his customers used the financing, and another estimated that from 35% to 40% of his customers used the financing. One contractor thought the interest rate should be reduced, since some area lenders offer better rates. Another contractor said it would be helpful from a sales perspective if he could discuss the loan option in greater detail with customers, but that NWWVT had requested he not do so to avoid confusing customers, in the event that package details changed.

Homeowner Response

Contractors said customers responded very well to the H.E.A.T. Squad program. They noted various benefits to the customer including: (1) energy savings, (2) incentives, (3) information, and (4) logistical assistance. One contractor said "the program provides a roadmap" for customers. Contractors also reported that customers see the loan program as a benefit of participating.

³ EVT reduced the maximum incentive for Home Performance with ENERGY STAR projects from \$2,500 to \$2,000. EVT staff members reported this change was due to budget constraints.

According to contractors, customers who have participated in the program report an immediate increase in comfort, and they perceive that their homes and appliances “work better.” Customers also report seeing savings in their energy bills over time.

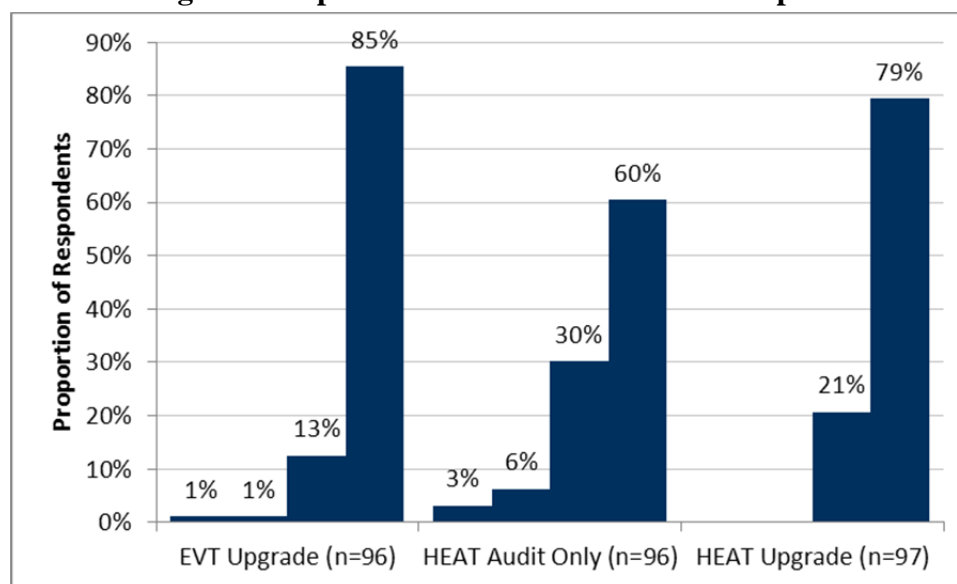
These reports from contractors are corroborated in early findings from Cadmus’ homeowner surveys. Of the H.E.A.T. Squad participants surveyed, 89% said that since making the energy-efficient improvements to their homes, their homes are more comfortable. Furthermore, when we asked survey respondents (including H.E.A.T. Squad participants and nonparticipants) to tell us what they would consider to be an important motivation for getting a home energy audit, 81% said making their home more comfortable was “very important.”

One contractor said the program helped him reach customers in a lower income bracket than he normally would, although several contractors felt that they still weren’t able to serve people who most needed this kind of work done.⁴

Customer Experience

All surveyed H.E.A.T. Squad upgrade participants and nearly all EVT participants (98%) said the reports were at least somewhat useful. As shown in Figure 6, the majority of audit-only participants found the audit reports useful. Among the audit-only participants who did not find the report useful, most reported that the information was either confusing or that they did not believe the results.

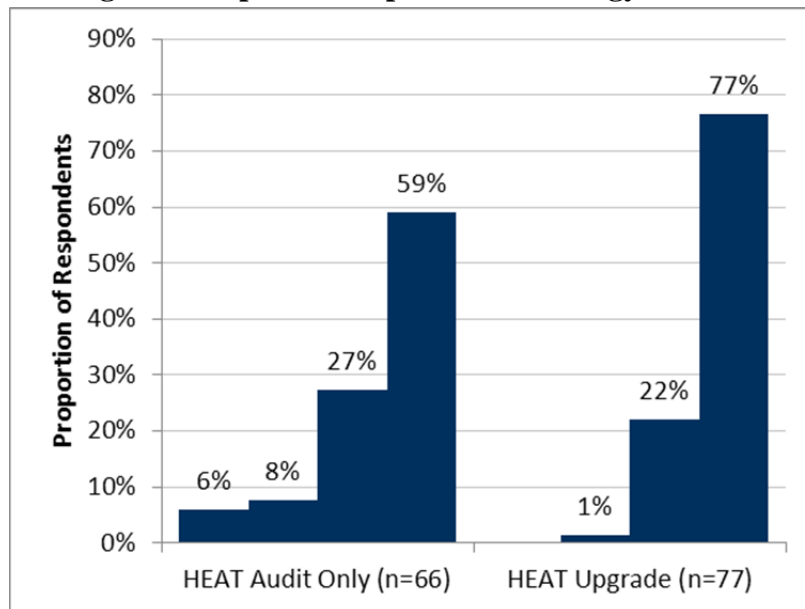
Figure 6. Reported Usefulness of the Audit Report



Overall, participants reported positive feedback about the help received from the energy advisors. Of the audit-only customers, 86% found the advisors at least somewhat helpful, and virtually all of the nonparticipants found them helpful.

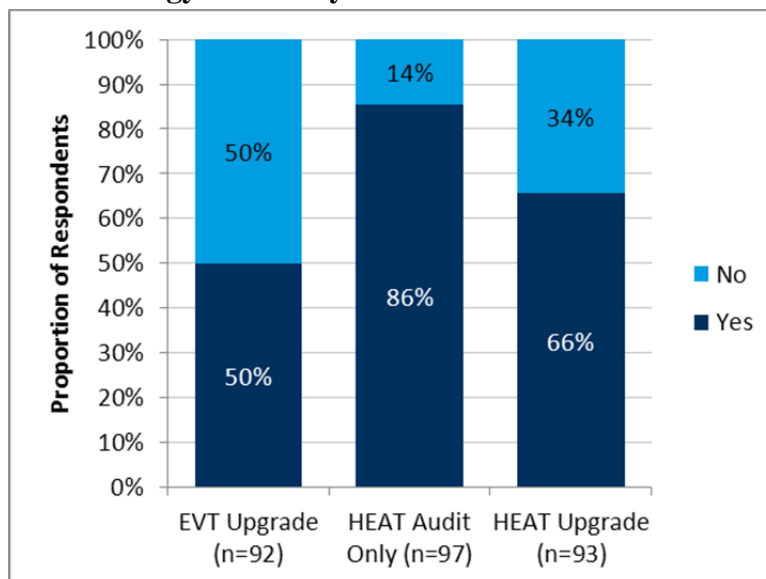
⁴ Although other weatherization programs target low-income homeowners, the H.E.A.T. Squad does not specifically target this segment.

Figure 7. Reported Helpfulness of Energy Advisor



H.E.A.T. Squad participants—both those who received only an audit and those who installed measures—were more much likely than EVT participants to report plans to install energy-efficiency measures in the future (Figure 8). Specifically, two-thirds of full participants and 86% of audit-only participants reported the intent to make further energy-efficiency upgrades.

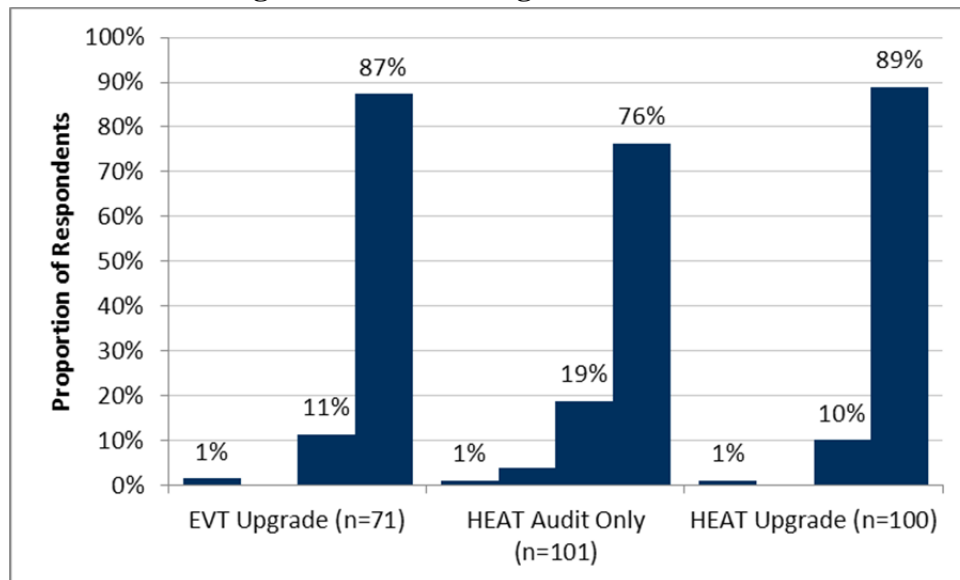
Figure 8. Do You Plan to Install Energy-Efficiency Measures in the Future?



Overall, participants in the H.E.A.T Squad program were very satisfied with their program experience. As shown in Figure 9, only 5% of audit-only participants expressed any dissatisfaction with the program.

Of full participants, 89% reported being very satisfied with the program, with only one respondent expressing any dissatisfaction. This rate of satisfaction was consistent with the EVT participants.

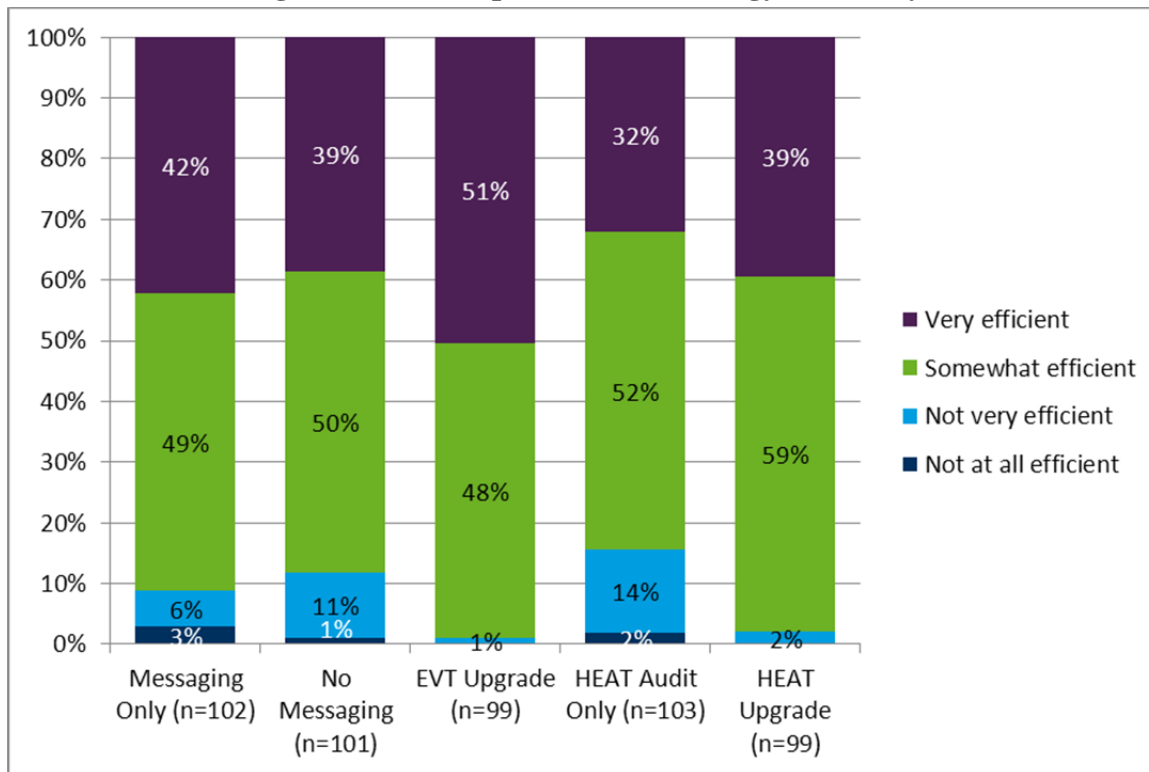
Figure 9. Overall Program Satisfaction



Perception of Energy Use

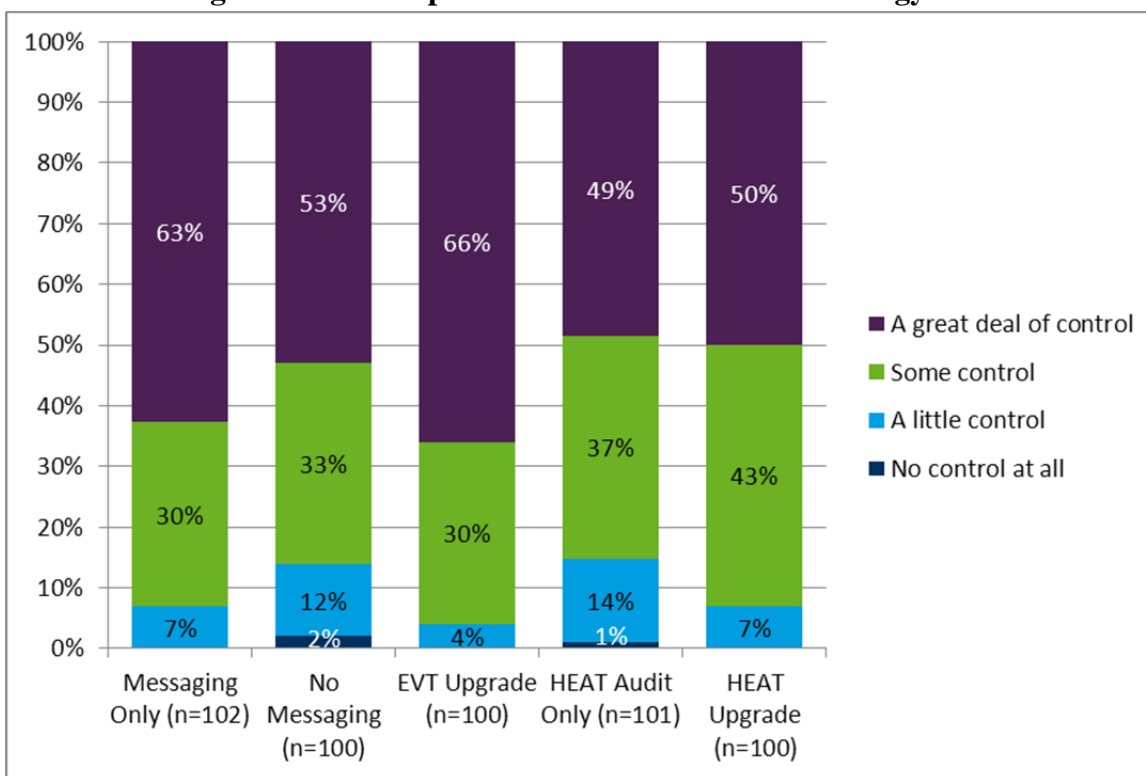
The upgrade participants of both the H.E.A.T. Squad and EVT programs were more likely to report that their homes are energy efficient. That said, the majority of nonparticipants also reported having efficient homes.

Figure 10. Self-Reported Home Energy Efficiency



Full-upgrade participants were also more likely to report feeling in control of their energy use. Interestingly, those households receiving only audits were less likely to feel in control. This may be due to the increased awareness of energy inefficiencies in the home, as reported from the audit.

Figure 11. Self-Reported Level of Control over Energy Use



Attitudes and Demographics

The environmental attitudes, education, income, and socioeconomic status of customers tend to play a role in the likelihood that an individual will participate in energy-efficiency programs. The state of the current housing stock in the population can also influence customer decisions to participate, as regions with older, less-efficient homes are likely to benefit more from the program.

Attitudes

Customer attitudes about energy and the environment did not vary considerably between different types of participants and nonparticipants. Table 6 shows reported levels of agreement (shown left to right from “Strongly Disagree” to “Strongly Agree”) respondents reported to different statements. All groups agreed on the importance of energy conservation and its impact on the environment. This may indicate that there is still a good deal of potential to recruit from the general public, as they have similar views to those held by past participants.

Participants (both H.E.A.T. Squad and EVT) were slightly less likely to strongly agree with the statement, “Using whatever energy is needed to keep my home comfortable is important to me,” which may reflect energy education received in the programs.

Full H.E.A.T. Squad participants were somewhat more likely to disagree with the claim that energy-efficient products were too expensive.

Table 6. Level of Agreement with Views on Energy and the Environment (Four-Point Scale from “Strongly Disagree” to “Strongly Agree”)

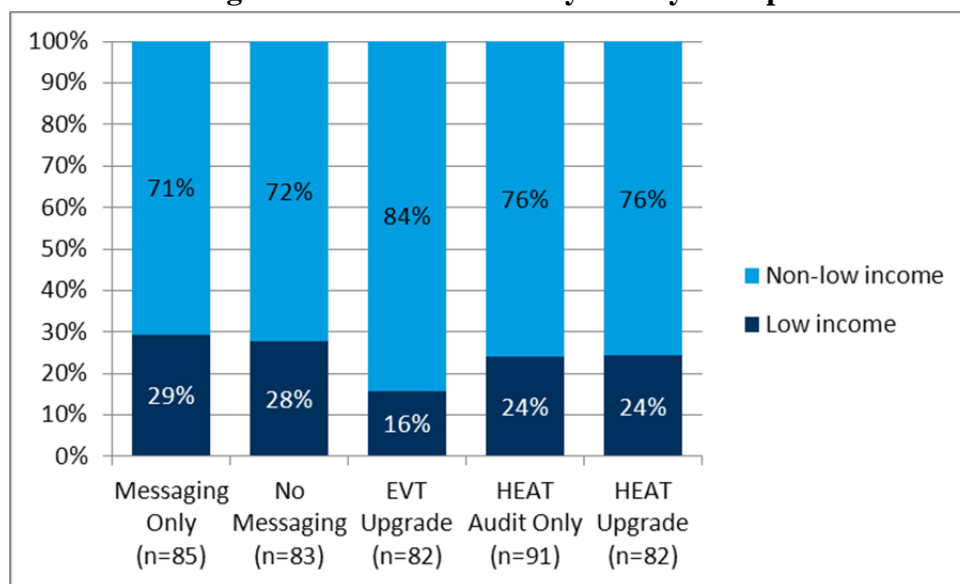
Statement	Messaging Only	No Messaging	EVT Upgrade	HEAT Audit Only	HEAT Upgrade
It is important to conserve energy as much as possible					
Using whatever energy is needed to keep my home comfortable is important to me					
Saving energy helps the environment					
I would like to save more energy but do not know where to start					
I have already done as much as possible to save energy in my home					
Energy-efficient products are too expensive for me					
I actively look for ways to reduce my carbon footprint					

Demographics

As with attitudes to energy and the environment, overall demographics appear to be relatively similar to the general population. An average of 2.3 people occupied the surveyed household, and these occupants had resided in the home for from 10 to 20 years. The key differences in demographics involved income and educational attainment.

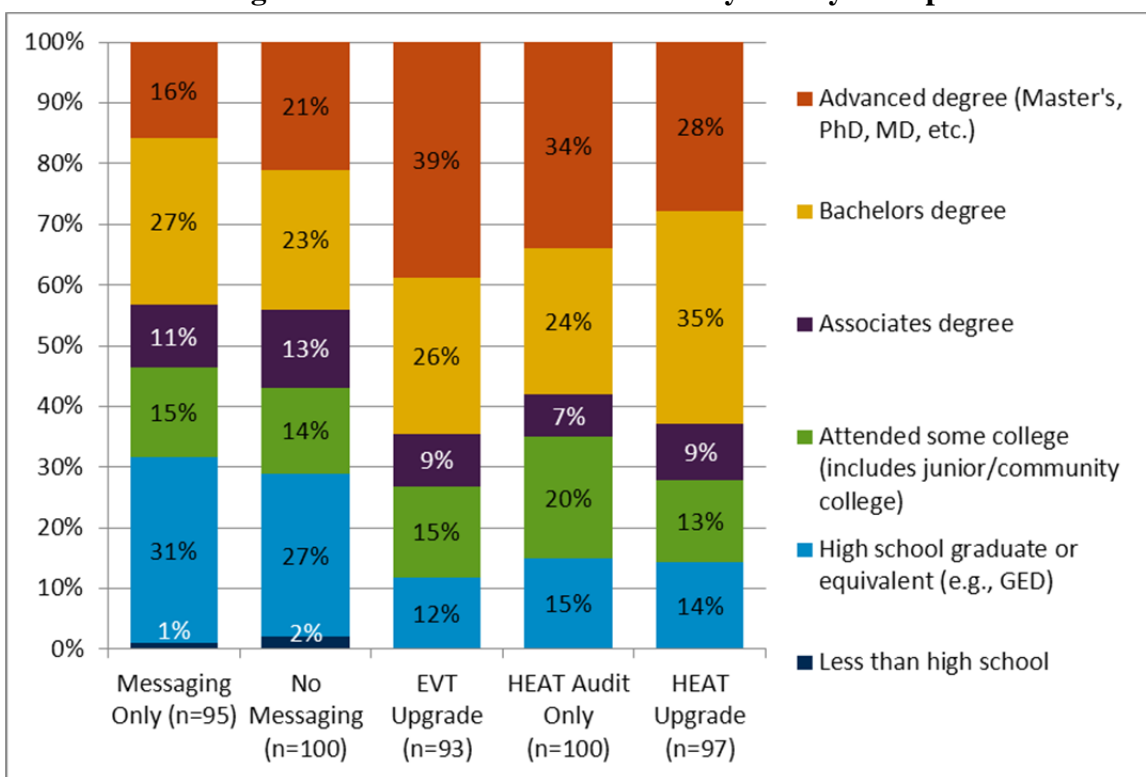
Survey respondents were asked whether their gross annual income was above or below the Low-Income Home Energy Assistance Program (LIHEAP) designated level, based on their geographic region and household size. As shown in Figure 12, EVT upgrade participants—those receiving upgrades without assistance from H.E.A.T. Squad—were less likely to report being low income when compared to either nonparticipants or H.E.A.T. Squad participants. In fact, H.E.A.T. Squad participants were much closer to nonparticipants (24% low income for participants vs. 29% for nonparticipants). This seems to indicate that the H.E.A.T. Squad program is reaching a more representative segment of the population. (Interestingly, there was no difference between those only receiving audits and those installing upgrades.)

Figure 12. Income Status by Survey Group



The key difference between participants and nonparticipants appears to be in educational attainment (Figure 13). Both EVT and H.E.A.T. Squad participants were much more likely to have received a bachelors’ degree or higher, as compared to nonparticipants.

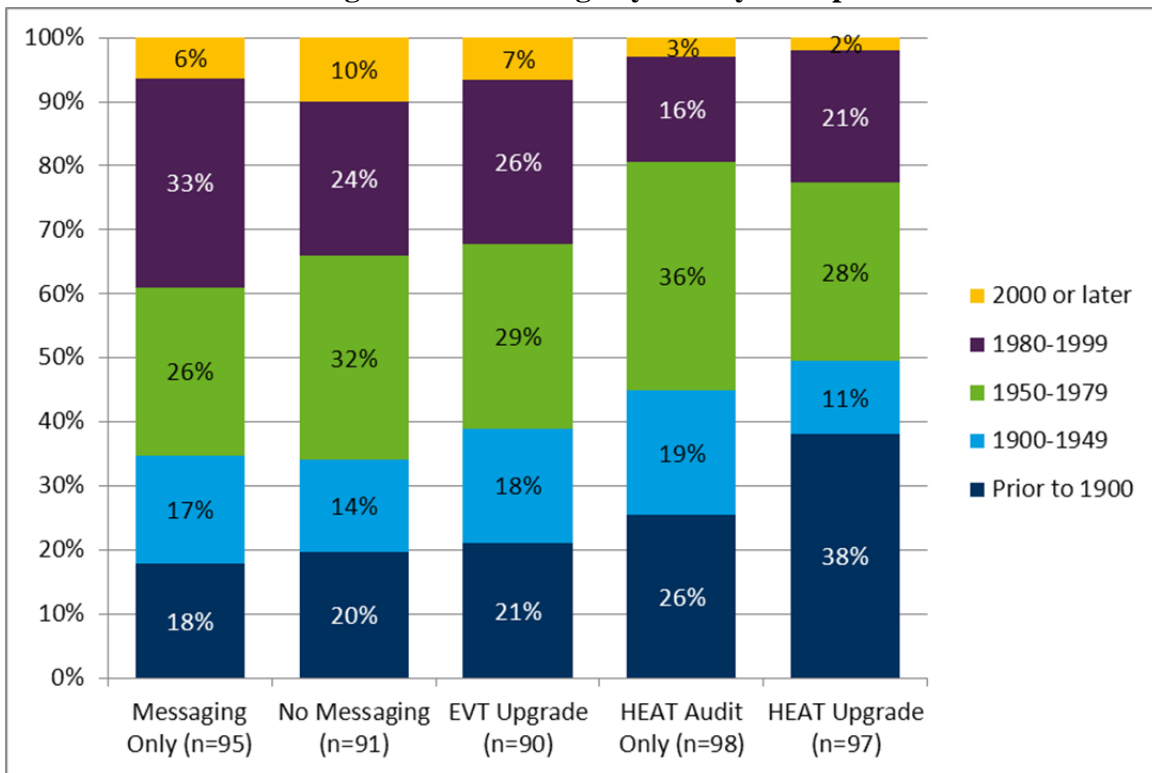
Figure 13. Educational Attainment by Survey Group



Home Characteristics

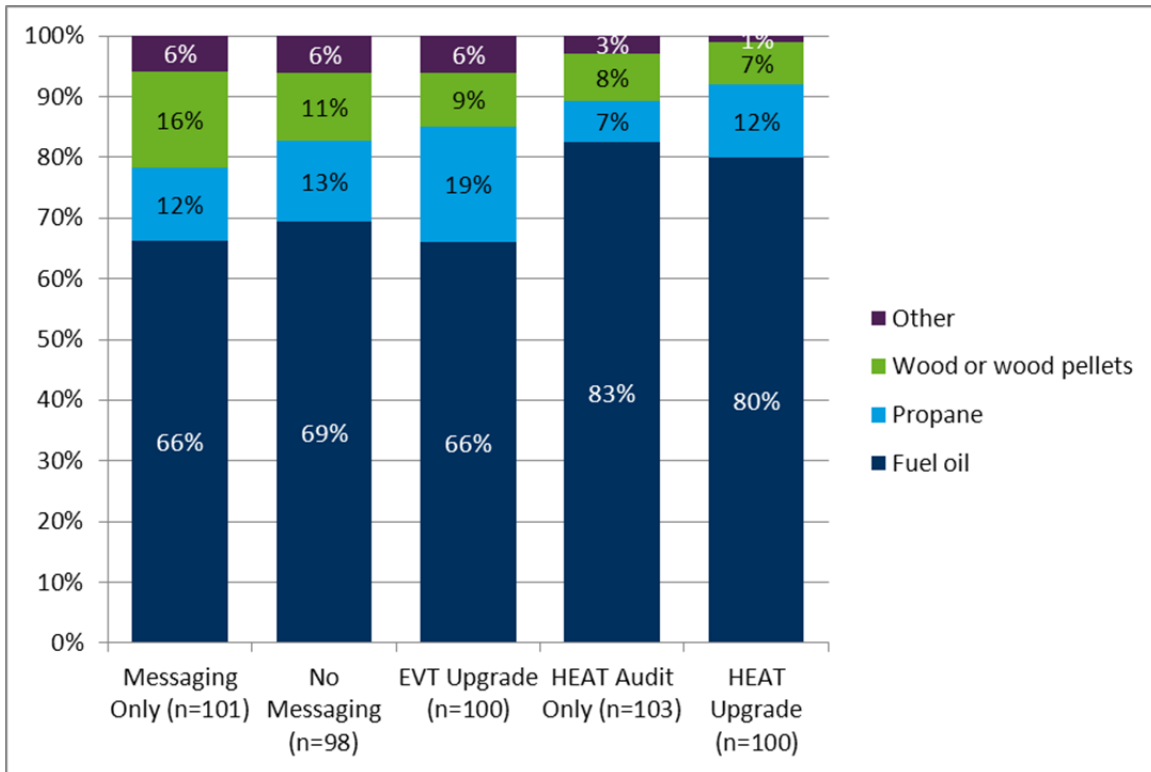
In terms of home characteristics, a major difference between groups was that homes upgraded through the H.E.A.T. Squad program tended to be older than the homes in other groups (Figure 14). Given that the demographics are similar between audit-only customers and the H.E.A.T Squad upgrade customers, this is most likely because older homes are more in need of upgrade. Given the other similarities in building stock, nonparticipants are likely to be eligible for upgrades through the program, indicating remaining market potential.

Figure 14. Home Age by Survey Group



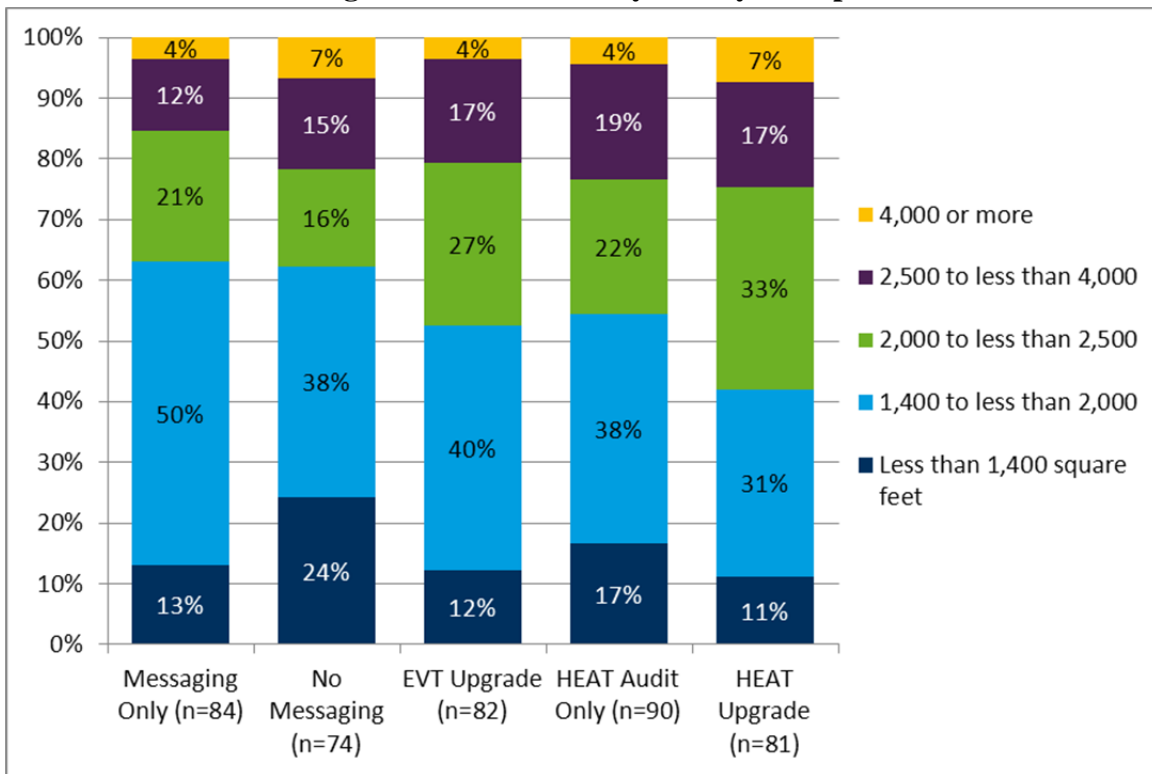
H.E.A.T. Squad participants were much more likely to have a home heated with fuel oil, as compared to the other groups (Figure 15). Specifically, approximately four out of five participating households heat their homes with fuel oil.

Figure 15. Primary Heating Fuel by Survey Group



As shown in Figure 16, the homes of nonparticipants tend to be somewhat smaller than those of participants, while the homes of H.E.A.T. Squad and EVT program participants were similar in size homes.

Figure 16. Home Size by Survey Group



This implies that, in general, those with larger homes are more likely to invest in energy-efficiency improvements. There is no significant difference between audit-only and upgrade participants.

FINDINGS: IMPACT AND COST-EFFECTIVENESS

The key objectives for the impact and cost-effectiveness evaluation were these:

- Assess the audit and retrofit participation and program savings, based on discrete choice analysis of survey and participation data; and
- Assess the program's cost-effectiveness.

Cadmus conducted a statistical analysis of the decisions made by Rutland County households to undertake energy audits and install energy-efficiency measures. This analysis revealed the program's impact on audit and retrofit participation. Building upon the impact analysis, we also assessed whether the program's current delivery approach is cost-effective relative to other forms of delivery.

Database Review

Cadmus reviewed NWWVT's program tracking database to assess its completeness and evaluability (that is, to assess whether the data needed for an accurate evaluation are being collected and maintained). The database extract file we reviewed contained detailed information on the timing and nature of recruitment, financing, and measures installed under the program. These data—which are critical to evaluating the program delivery and verifying energy savings—appear to be sufficiently complete. The data file also contained the needed customer identification information and the appropriate contact fields to facilitate a successful evaluation (such as conducting participant surveys).

Although the data currently tracked were sufficient for Cadmus' evaluation purposes, many program staff members mentioned that an improved data tracking system would help them streamline operations. They reported that the program would benefit from developing a fully-integrated web-based system that allowed all parties to access information as needed. This would reduce the paperwork burden for both NWWVT and contractors, minimize the opportunity for data entry error, and facilitate more effective client management and reporting.

Impact Analysis

Cadmus used an econometrics approach to estimate the impact of NWWVT's H.E.A.T. Squad program on participation. We used a discrete choice model as the primary tool to estimate this impact, and we supplemented these findings with a panel data analysis of all census tracts in the Vermont. We then used final output from the discrete choice model as an input in the cost-effectiveness calculation.

Methodology

Discrete Choice Model

As mentioned, Cadmus employed a discrete choice analysis of the installation decisions of the participants and the nonparticipants to estimate the NWWVT program impact. In essence, the impact evaluation estimates the effect that receiving—or not receiving—the NWWVT message has on an individual's decision to install energy-efficient measures.

Discrete choice models assume that individuals base their decisions on a desire to maximize their personal utility functions. Broadly interpreted, a utility function may not only consider economic benefits and costs, but may include more idiosyncratic concerns, such as aesthetics or conservation ethics.

To account for such a wide variety of factors, each individual's utility function—with respect to a given set of choices ($j = 1, 2, \dots, J$)—is composed of these two distinct parts:

$$U(j) = V(j) + \epsilon(j)$$

The first part, $V(j)$, represents the portion of the individual's utility function that is known to the researcher. In other words, it is a function of traits the researcher has observed. For instance, an individual's decision about whether to install insulation may be represented as a function of the following:

- Demographics (e.g., age of customer, homeownership status);
- Home characteristics (e.g., age of home, heating fuel type);
- Attitudes about energy efficiency;
- Dollar value of insulation incentives; and
- Program awareness and influence.

The second component of the individual's utility function, $\epsilon(j)$, is considered the portion researchers cannot account for, so it is modeled as random. Different types of discrete choice models can be largely distinguished by their different assumptions regarding the joint distribution of $\epsilon(j)$.

For a given specification of explanatory variables believed to influence a customer's decision, Cadmus estimated the utility function's parameters via maximum likelihood methods. Based on the fitted parameters, we then estimated the probability of an individual choosing one option or another (that is, installing a measure or not) as a function of the individual's explanatory variables. We then used the model to estimate the NTG adjustment factor, which equals:

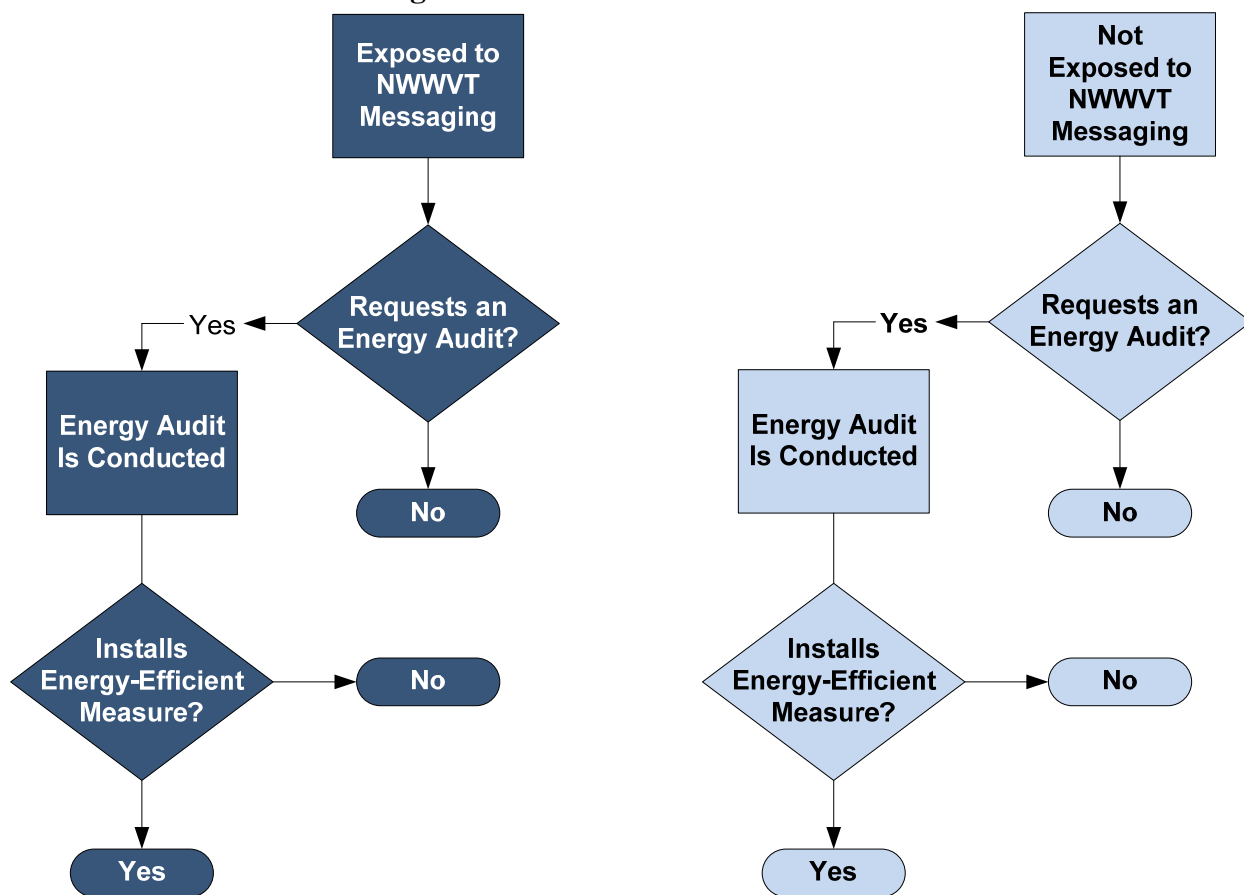
$$NTG = \frac{\{P(\text{Install} | \text{Receive Messaging}) - P(\text{Install} | \text{Not Receive Messaging})\}}{P(\text{Install} | \text{Receive Messaging})}$$

where “|” means “conditional upon.”

Note that here, the NTG is defined as the net of freeridership, where freeriders are defined as households that would have installed EVT measures in absence of the H.E.A.T. Squad program.

Figure 17 depicts the HEAT Squad Program installation decisions. This tree has two sets of decisions: the decision to receive and audit *and* the subsequent decision to install measures. Cadmus primary discrete choice analysis used for the impact evaluation conflates these into a single decision. We chose to conflate these decisions because EVT does not track households that only receive audits. However, to estimate the factors influencing the installation decision, we conducted a secondary analysis of H.E.A.T. Squad participants receiving audits and not installing measures.

Figure 17. Installation Decision Tree



The telephone survey data described in the data collection section served as the primary source for the impact analysis. The initial evaluation plan called for six distinct customer segments that reflected whether or not the homeowner received message, requested an audit, and installed a measure. The population and the sample size for the six groups are shown in Table 7. Due to the high saturation of messaging in Rutland County, Cadmus sampled the population not receiving NWWVT messaging from other Vermont counties.⁵

Table 7. Planned Discrete Choice Analysis Groups

Group	Received NWWVT Messaging	Requested an Audit	Installed EVT Measures	Sample Size	Group Population	County Population
1	Yes	No	No	104	17,035	18,147
2	No	No	No	102		21,679
3	No	Yes	No	N/A	21,404	21,679
4	No	Yes	Yes	70		275
5	Yes	Yes	No	103	724	18,147
6	Yes	Yes	Yes	101	388	18,147

⁵ Cadmus excluded Chittenden County from its sample, because this county was demographically distinct from the rest of the state.

Because EVT does not have complete tracking data for those households receiving an audit but not installing measures, we confined the study to one level decision and then modeled the probability that a customer who received messaging subsequently installed a measure.

Table 8 shows the alternative grouping that was adopted to perform the discrete choice analysis, as explained above.

Table 8. Augmented Discrete Choice Analysis Groups

Received NWWVT Messaging	Installed EVT Measures	Sample Size	Population Size	County Population
Yes	No	207	17,759	18,147
Yes	Yes	101	388	18,147
No	No	102	21,404	21,679
No	Yes	70	275	21,679

Table 9 shows the variables from the survey response data used in the discrete choice analysis.

Table 9. Discrete Choice Analysis Variables

Category	Variable	Description
Program Impact Variable	Message	Received a message (1=yes, 0 = no)
Home Characteristics	Home age	2012 minus the year the house was built
	Bedrooms	Number of bedrooms
	Fuel oil	Primary heating fuel. (1=Fuel oil, 0 = Not fuel oil)
	Propane	Primary heating fuel. (1=Propane, 0 = Not propane)
	Wood	Primary heating fuel. (1=Wood, 0 = Not wood)
Customer Demographics	Income	Income subsistence level (1=Below, 0 = Above)
	Education	Six levels of education, ranging from 1 (less than high school) to 6 (having an advanced degree)
Interaction Term	Message*Income	Interaction term = 1. This models the below subsistence-level income group members who received NWWVT messages.

Supplementary Analysis

In addition to the discrete choice analysis described above, Cadmus used the survey data from Rutland County residents to model the audit choices of the individuals receiving NWWVT messaging and making the subsequent installation decisions. This model was not used to estimate inputs to the cost-effectiveness, but simply to understand the drivers of a decision to install measures after receiving an audit.

We estimated a two-step model, assuming the NWWVT messaging reached all Rutland county residents:

1. Estimate the probability of having an audit as a function of the demographic and housing characteristics of the individuals in Rutland County who received the NWWVT message.
2. Estimate the probability of installing a measure as a function of the estimated probabilities of having an audit and meeting specific demographic and housing characteristics of the individuals in the Rutland County. (This step provides the

probabilities of measure installation given the probability that a person in Rutland County has had an energy audit.)

Cadmus performed supplementary analysis to provide further evidence of the program impacts in Rutland County. We estimated a linear regression model based on census observations and on a dataset created from the Statewide Home Performance with ENERGY STAR Program.

EVT provided the statewide data on the Home Performance with ENERGY STAR Program. The dataset contained information on 3,171 home weatherization projects that were completed during the period 2009-2012 YTD.

We excluded some of the homes from our analysis for the following reasons:

- The address could not be matched to a Vermont census tract.
- The completed project was in Chittenden County, because this county was demographically distinct from the county under study.
- The building type was not residential or was not a single-home residence.
- The project completion date was missing.

After we omitted these homes from our dataset, we had 1,023 homes for the panel data analysis. Table 8 provides a frequency count (by year) of the homes that were weatherized.

Table 10. Statewide Home Performance with ENERGY STAR Participants by Year

Project Completion Year	Frequency	Percent
2010	429	18%
2011	703	30%
2012	1,216	52%

Cadmus used 2010 American Community Survey (ACS) five-year estimates to obtain detailed up-to-date information on housing, education, and income of the population in each of 184 census tracts. The variables used in our analysis are described in Table 11.

The independent variables on housing are expressed as percentage of the total housing units in a particular census tract. The variables on population characteristics (such as income and education) are percentages of the total population of the census tract.

Table 11. Panel Data Variables

Category*	Name	Description
Program	Dependent Variable	Weatherization projects in a given year
	Rutland	Rutland County (1=yes,0 = no)
	Rutlandyr2012	Rutland County in 2012 (1=yes,0 = no)
	Rutlandyr2011	Rutland County in 2011 (1=yes,0 = no)
Time	Yr2012	Percentage of weatherized homes built in 2012
	Yr2011	Percentage of weatherized homes built in 2011.
Housing characteristics	Bdr1	Homes with one bedroom
	Bdr2	Homes with two bedrooms
	Bdr3	Homes with three bedrooms
	Bdr4	Homes with four bedrooms
	Bdr5	Homes with five or more bedrooms
	Coal	Homes with coal as primary heating fuel
	Electricity	Homes with electricity as primary heating fuel
	Fuel Oil	Homes with fuel oil as primary heating fuel
	Solar	Homes with solar heating.
	Tank	Homes with oil tank as primary heating fuel
	Wood	Homes with wood as primary heating fuel
	Built1940_49	Homes built between 1940 and 1949.
	Built1950_59	Homes built between 1950 and 1959.
	Built1960_69	Homes built between 1960 and 1969.
	Built1970_79	Homes built between 1970 and 1979.
	Built1980_89	Homes built between 1980 and 1989.
	Built1990_99	Homes built between 1990 and 1999.
	Built2000_04	Homes built between 2000 and 2004.
	Builtafter2005	Homes built after 2005.
	Builtbefore1939	Homes built before 1939.
Education and Income	Bachelor Or Higher	Proportion of population with Bachelor's degree or higher
	HS Or Higher	Proportion of population with high school graduation or higher
	Families Below Poverty	Proportion of families below poverty level
	People Below Poverty	Proportion of population below poverty

*All variables expressed as a proportion of total housing units in that census tract unless otherwise specified.

We estimated a regression model for the panel dataset consisting of census tract information and the year the measure installation project was complete. The dependent variable used in the analysis was the percentage of total housing units—by year and tract—that were weatherized. To correct for the variance from the variation in each census tract, we used census tracts as the primary sampling unit.

Results

Discrete Choice Model

The fitted model's mean coefficient estimates are shown in Table 12. The estimable portion of each respondent's utility for the alternatives, whether to weatherize or not, is obtained from these estimated parameters. The dependent variable is the probability of installing measures, and the model estimates the probability of selecting this alternative.

The nominal values of the coefficient estimates are not easily interpreted, so those values need to be converted to the log odds ratios. However, the sign of the parameter estimates provides useful information. In particular, the sign on both the Message and the interaction term (Message*Income) indicate that an increase in messaging in general and in messaging that targets low-income households would increase the modeled probability that a respondent chooses to weatherize.

Table 12. Discrete Choice Model Parameters (n= 445)

Parameter	Estimate	Standard Error	Pr > ChiSq
Intercept	-0.37	0.56	0.51
Message	0.09	0.25	0.72
Squared Home Age	0.01	0.01	0.29
Home Age	-0.00001	0.00003	0.58
Bedroom	-0.07	0.12	0.58
Fuel Oil	-0.16	0.32	0.63
Propane	-0.49	0.58	0.40
Wood	0.38	0.28	0.16
Education	0.20	0.08	0.01
Income	-1.09	0.35	0.00
Message*income	0.97	0.54	0.07

Cadmus' key findings are these:

- In the fitted model, holding all the other variables at a fixed value, the odds that those who received a message will install a measure over the odds of measure installation by those who did not receive a message are $\exp(0.0904) = 1.095$. Thus, the odds of installing a measure increase by almost 10% under NWWVT outreach.
- To determine the cost-effectiveness of the NWWVT program by income group, use the weighted odds ratio, where the weights are determined by the percentage of sample individuals in the high- or low-income groups.

As shown in Table 13, the weighted odds ratio for a unit increase in messaging is 1.46. That is, among customers receiving NWWVT messaging, the probability they would install a measure increases by 46%.

Table 13. Weighted Average Program Impact

Respondent Group	Odds Ratio	Percentage in Sample
Higher Income (above 80% AMI)	1.10	77%
Lower Income (below 80% AMI)	2.64	23%
All Respondents (Weighted average)	1.46	100%

Supplementary Analysis

The results of the panel data model are provided in Table 14. The dependent variable is the proportion of housing units weatherized in a given year, and the coefficients for the interaction terms between Rutland County and the year of installation are both significant and positive. This result confirms the findings of the discrete choice analysis, indicating that—all other factors being equal—residents of Rutland County were more likely to participate in the Home Performance with ENERGY STAR program in 2011 and 2012 than residents of other Vermont counties. Furthermore, this supplementary analysis included data from early 2010, before H.E.A.T Squad ramped up program activity. This allowed the analysis to demonstrate that Rutland County's increased participation in the Home Performance with ENERGY STAR program coincided with the advent of the H.E.A.T. Squad program.

Table 14. Panel Data Parameters (n= 549)

Parameter	Estimate	Standard Error	Pr > t
Intercept	0.073	0.155	0.64
Rutland	-0.001	0.000	0.15
Rutlandyr2012	0.008	0.001	<.0001
Rutlandyr2011	0.003	0.001	<.0001
Bdr1	0.007	0.010	0.52
Bdr2	0.010	0.011	0.34
Bdr3	0.007	0.009	0.45
Bdr4	0.008	0.012	0.51
Bdr5	-0.011	0.011	0.35
Coal	0.001	0.029	0.97
Electricity	0.009	0.005	0.08
Fuel Oil	0.007	0.001	<.0001
Solar	-0.051	0.112	0.65
Tank	0.001	0.003	0.65
Wood	0.009	0.002	<.0001
Built1940_49	-0.091	0.158	0.56
Built1950_59	-0.094	0.159	0.55
Built1960_69	-0.084	0.158	0.60
Built1970_79	-0.099	0.158	0.53
Built1980_89	-0.092	0.159	0.56
Built1990_99	-0.100	0.158	0.53
Built2000_04	-0.087	0.158	0.59
Builtafter2005	-0.088	0.161	0.58
Builtbefore1939	-0.090	0.158	0.57
Bachelor Or Higher	0.010	0.003	0.00
Hs Or Higher	0.006	0.005	0.22
Families Below Poverty	-0.005	0.004	0.12
People Below Poverty	0.001	0.003	0.71
Yr2012	0.001	0.000	<.0001
Yr2011	0.000	0.000	<.0001

Cost-Effectiveness Analysis

To allow for comparisons to other existing or potential delivery channels and strategies for energy-efficiency retrofits in Vermont, Cadmus analyzed H.E.A.T. Squad's cost-effectiveness.

Methodology

To align with Vermont's statewide energy-efficiency activities, Cadmus designed the cost-effectiveness analysis using the Vermont Statewide Field Screening Tool for Energy-Efficiency Projects.⁶ Many key underlying data elements supporting the analysis were derived from this tool, including:

- Avoided end-use fuel costs,
- Avoided electric supply, transmission, distribution, and capacity costs,
- Externalities and environmental benefits,
- Load profiles, and
- Societal discount rate (3%).

Measure life was assigned based on the document *Measure Life Report: Residential and Commercial/ Industrial Lighting and HVAC Measures*, which was prepared for The New England State Program Working Group by GDS Associates, Inc.

Cadmus focused our analysis on the Societal Cost Test, one of the standard cost-effectiveness tests applied to utility demand-side management programs.⁷ The SCT recognizes that program benefits accrue to society in general rather than solely to the program administrator, a utility, or the participants. Thus, this test applies a societal discount rate in calculating the net present value of costs and benefits, and it includes externalities such as environmental benefits.

Program Benefit Components

Cadmus determined program benefits for all retrofits conducted in the 12-month period from November 11, 2011, through October 31, 2012, using the savings values recorded in NWWVT's program tracking database.^{8,9} Table 15 shows the components of program benefits in the SCT.

⁶ *Vermont Statewide Field Screening Tool*, Developed by Green Energy Economics Group, Inc. for the Vermont Dept. of Public Service, Version 2012.

⁷ The SCT is equivalent to the Net Social Benefit test used in some Vermont agencies.

⁸ The program tracking database contains electric and other end-use fuel savings. Cadmus monetized all savings according to the cost assumptions in the *Vermont Statewide Field Screening Tool*.

⁹ Cadmus also considered a more conservative scenario, calculating program benefits based on savings associated with participants who received *both* a checkup and a completed retrofit during the analysis period. This scenario is conservative because it does not recognize savings from retrofits that occur during the analysis period if they are associated with checkups performed prior to that period. Under this more restrictive scenario, the B/C ratio for the H.E.A.T. Squad was determined to be 1.22.

Table 15. Program Benefit Components in SCT

	Program Benefit Components
Societal Cost Test	<ul style="list-style-type: none"> • Avoided fuel, supply, T&D, and capacity costs • Externalities and environmental benefits

By applying the results of the discrete choice analysis, we isolated the program benefits directly attributable to the NWWVT H.E.A.T. Squad. We then calculated an adjustment factor based on the weighted average program effect determined through the discrete choice analysis. This adjustment reflects the fact that some participation would have occurred through the EVT program without H.E.A.T. Squad. Table 16 shows this adjustment and the resulting net program benefits.

Table 16. Program Benefits Attributable to H.E.A.T. Squad

	Present Value of Benefits: Gross	Adjustment Factor	Present Value of Benefits: Net
Retrofits 11/1/11 through 10/31/12	\$6,903,822	$1 - 1 \div 1.46 = 0.31$	\$2,161,150

Program Cost Components

Cadmus estimated program costs using both the H.E.A.T. Squad program costs for a 12-month period (provided by NWWVT) and the participant costs recorded in the program tracking database. Table 17 shows the components of program costs in the SCT. Incentive costs are not included in this test because they are transferred from one party to another. (That is, the incentive is a cost to the utility but a benefit to the participant.)

Table 17. Program Cost Components in SCT

	Program Cost Components
Societal Cost Test	<ul style="list-style-type: none"> • Participant out-of-pocket cost • H.E.A.T. Squad program administration costs

To apply the results of the discrete choice analysis correctly to the cost side, Cadmus adjusted only the costs to participants. This adjustment reflects the fact that some participation would have occurred through the EVT program without H.E.A.T. Squad. Table 18 shows this adjustment and the resulting net program costs.

Table 18. Program Costs Attributable to H.E.A.T. Squad

	Present Value of Costs: Gross	Adjustment Factor	Present Value of Costs: Net
Participant out-of-pocket costs	\$2,396,605	0.31	\$750,225
H.E.A.T. Squad program costs	\$502,924	1.0	\$502,924
Total SCT Costs	\$2,899,528	n/a	\$1,253,149

Results

Cadmus calculated an SCT ratio for H.E.A.T. Squad. Table 19 shows the components of the test and the resulting benefit-cost ratio.

Table 19. Cost Effectiveness of H.E.A.T. Squad

	Net Present Value of Benefits	Net Present Value of Costs	B/C Ratio
Elements Included	<ul style="list-style-type: none"> • Avoided fuel, supply, T&D, and capacity costs • Externalities and environmental benefits 	<ul style="list-style-type: none"> • Participant out-of-pocket cost • H.E.A.T. Squad program costs 	PV Benefits ÷ PV Costs
Retrofits 11/1/11 through 10/31/12	\$2,161,150	\$1,253,149	1.72

This analysis shows H.E.A.T. Squad is cost-effective with an SCT ratio of 1.72. However, this result excludes additional costs and benefits occurring in Rutland County that are attributable to the EVT Home Performance with ENERGY STAR program. Thus, to illustrate the H.E.A.T. Squad program's cost-effectiveness in the context of the EVT program, Cadmus performed additional analysis to assess the cost-effectiveness of the combined programs operating in Rutland County.

For this more comprehensive perspective, all underlying data (such as fuel costs and externalities) remained the same, but additional costs and benefits were included in the analysis, as shown in Table 20 and Table 21. In this analysis, benefits reflected EVT's gross-to-net adjustment.¹⁰

Table 20. Program Benefits Attributable to Combined Rutland County Programs

	Present Value of Benefits: Gross	Adjustment Factor (Efficiency Vermont Gross to Net)	Present Value of Benefits: Net
Retrofits 11/1/11 through 10/31/12	\$6,903,822	0.9	\$6,213,440

Using estimated EVT Home Performance with ENERGY STAR program costs provided by NWWVT, Cadmus estimated the portion of EVT's program costs that correspond to Rutland county program activity.

1. We assumed that the percentage of statewide marketing spending reaching Rutland County was equal to Rutland County's percentage of the statewide population (10%).
2. We assumed that the percentage of all non-marketing program expenses corresponding to Rutland County was equal to the percentage of retrofits occurring in Rutland County during the analysis period (20%).
3. We included the participant out-of-pocket costs without any adjustment.

Table 21. Program Costs Attributable to Combined Rutland County Programs

	Present Value of Costs: Net
Participant out-of-pocket costs	\$2,396,605
H.E.A.T. Squad and EVT Rutland County program costs	\$665,415
Total SCT Costs	\$3,062,020

¹⁰ From *Efficiency Vermont 2011 Gross to Net Report*.

Using these costs and benefits, we calculated an SCT ratio for the H.E.A.T. Squad and EVT programs as a combined scenario. Table 22 shows the components of the test and the resulting benefit-cost ratio.

Table 22. Cost Effectiveness of Combined Rutland County Program Activity

	Net Present Value of Benefits	Net Present Value of Costs	B/C Ratio
Elements Included	<ul style="list-style-type: none"> • Avoided fuel, supply, T&D, and capacity costs • Externalities and environmental benefits 	<ul style="list-style-type: none"> • Participant out-of-pocket cost • H.E.A.T. Squad and EVT program costs 	PV Benefits ÷ PV Costs
Retrofits 11/1/11 through 10/31/12	\$6,213,440	\$3,062,020	2.03

This comprehensive scenario demonstrates that the effect of the combined programs is more cost-effective than the effect of H.E.A.T. Squad alone. However, as noted in the discrete choice analysis, H.E.A.T. Squad is reaching lower-income customers who are typically more difficult to reach.

CONCLUSIONS AND RECOMMENDATIONS

Key Program Components and NWWVT Organizational Capacities

Conclusions

- NWWVT's history of programming in Rutland County positioned it well to implement the H.E.A.T. Squad program. As a small, flexible, community-based organization, NWWVT contributes a specific set of capabilities to the statewide thermal efficiency community, and is particularly effective with traditionally hard-to-reach customers, such as those who earn less than 80% of average median income. .
- As a result of differing organizational cultures, communication and collaboration between NWWVT and EVT have been weaker than both organizations had hoped. Both organizations have been successful in implementing their respective programs, but stronger communication between the two could help them more effectively achieve their common goal of furthering Vermont's thermal efficiency
- The H.E.A.T. Squad program offers a strong model for reaching Vermont's lower-income customers.

Recommendations

- NWWVT and EVT should continue their efforts to collaborate through program activity, the Thermal Energy Taskforce, and other avenues.
- Future program plans should formally recognize both organizations' capabilities, contributions, goals, and requirements.
- NWWVT and its funders should consider expanding the H.E.A.T. Squad model to reach lower-income customers in other Vermont counties.

Marketing and Outreach

Conclusions

- NWWVT used the H.E.A.T Squad program to experiment with many different marketing and outreach strategies, and has developed strong awareness of H.E.A.T. Squad in Rutland County.
- Both traditional marketing channels and community-based outreach have been important for increasing program awareness.

Recommendation

- As NWWVT continues to market H.E.A.T. Squad, it should take steps to measure the effectiveness of specific marketing and outreach efforts. These steps may include developing and following an annual marketing and outreach plan to allow for clearer measurement of the impact of various activities; such measurement will provide a concrete basis upon which to make decisions about future marketing and outreach

investments.

Homeowner Responses

Conclusions

- H.E.A.T. Squad's customer service helps participants make decisions. H.E.A.T. Squad participants are very satisfied with the program, and found both the audit report and the information from the energy advisor to be helpful in the decision-making process.
- H.E.A.T. Squad appears to have a more substantial effect on changing participant *attitudes* than does EVT's program alone. H.E.A.T. Squad participants, including those who only received an audit, reported a higher likelihood of installing further energy-efficiency measures in the future.
- Participants and nonparticipants have similar demographic and housing characteristics, indicating there are more homeowners in Vermont that could benefit from the program, and NWWVT should pursue continuation and expansion of the program after their current grant.

Recommendations

- H.E.A.T Squad participants' reported intention to install additional energy-efficiency measures indicates potential for additional savings; both NWWVT and EVT should work together to capture that savings.
- Since H.E.A.T. Squad appears to succeed at educating homeowners and changing their attitudes about energy-efficiency, but a substantial number of audit participants decide not to pursue retrofit measures, the program should consider offering a low-cost package of direct-install measures for homeowners to purchase from the contractor at the time of the audit. This option would increase overall energy savings, while also increasing engagement with those homeowners who are not ready to pursue full-scale retrofits.

Impact and Cost-Effectiveness

Conclusions

- The H.E.A.T. Squad program has increased Rutland County homeowners' energy-savings measure installation, thus increasing Rutland County participation in EVT's Home Performance with ENERGY STAR program. This effect strongest among households earning below 80% of average median income.
- H.E.A.T. Squad on its own is cost-effective, and it is also cost-effective combined with EVT's Home Performance with ENERGY STAR program.
- The H.E.A.T. Squad program's ability to reach lower-income households can help Vermont reach its goal of weatherizing 80,000 homes by 2020. H.E.A.T. Squad has been able to reach Rutland County residents who may not have otherwise weatherized their homes.

Recommendation

- NWWVT and EVT stakeholders should increase collaboration, as they continue to expand their combined program offerings.

Appendix A. Homeowner Survey Instrument

NWWVT HEAT Squad Program Evaluation

Homeowner Survey

Notes

Cadmus has added two fields, TYPE and FLAG, to the survey contact lists to categorize each respondent. The TYPE field is already completed with either PART or NONPART to designate if a contact participated in the HEAT Squad program or not. The FLAG field assigns each respondent to one of 5 groups, depending on whether the respondent was reached by messaging, received an audit, and/or completed any measures. FLAG is already completed for contacts with TYPE = PART, and will be assigned for contacts with TYPE = NONPART based on responses to questions in the Nonparticipant Screening section.

TYPE/FLAG designations are as follows:

NONPART/GRP_1 = Received messaging, No Audit

NONPART/GRP_2 = No messaging, No Audit

NONPART/GRP_3 = No messaging, Audit, No measures

NONPART/GRP_4 = No messaging, Audit, EVT measures

PART/GRP_5 = Received messaging, NWWVT Audit, No measures

PART/GRP_6 = Received messaging, NWWVT Audit, EVT measures

Cadmus/CRPP will complete 100 surveys with each flagged group described above.

INT. Introduction

INT1. Hello, my name is _____ and I am calling from The Center for Research and Public Policy on behalf of NeighborWorks of Western Vermont to do a brief survey about home energy use.

INT2. **[IF TYPE = PART, SAY]** We are calling to get your feedback on the HEAT Squad Program. Are you the person in your household who is most familiar with the energy checkup and any energy efficiency upgrades you made in your home?

[IF TYPE = NONPART, SAY] Are you the person in your household who is most familiar with home improvements and your home's energy use?

1. Yes

2. No

[ASK IF INT2=2, ELSE SKIP TO A1]

INT3. May I please speak with that person?

[IF NEW RESPONDENT, REPEAT INT1, THEN SKIP TO A1]

(ONLY IF NEEDED, SAY) The survey should take about 15 minutes.

A. Nonparticipant Screening

[ASK IF *TYPE* = NONPART, ELSE SKIP TO B1]

A1. Have you heard of NeighborWorks of Western Vermont?

1. Yes
2. No
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

[ASK IF A1=1, ELSE SKIP TO A3]

A2. Have you heard of the energy-efficiency services they offer, such as home energy checkups?

1. Yes
2. No
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

A3. Are you familiar with the program called HEAT Squad?

1. Yes
2. No
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

A4. And are you familiar with Efficiency Vermont's energy-efficiency incentives?

1. Yes
2. No
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

A5. Do you own your home, or rent it?

1. Own
2. Rent
97. Other
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

A6. Have you had an energy audit or energy checkup on your home since January 2010? **(IF NEEDED, EXPLAIN)** A contractor would have examined your home and provided you with information about how to save energy.

1. Yes
2. No
98. **(DO NOT READ)** Don't know

99. **(DO NOT READ)** Refused

[IF A2=1 AND A5=1 AND A6=2, OR IF A3=1 AND A5=1 AND A6=2, ASSIGN FLAG GRP_1]

[IF A1=2 AND A3=2 AND A6=2, ASSIGN FLAG GRP_2]

[ASK IF A6 =1]

A7. Did you do any home improvements after you received the energy audit recommendations?

1. Yes

2. No

98. **(DO NOT READ)** Don't know

99. **(DO NOT READ)** Refused

[IF A1=2 AND A3=2 AND A7=2, ASSIGN FLAG GRP_3]

[ASK IF A7 =1]

A8. What improvements did you do? **(READ LIST, RECORD MULTIPLE)**

1. Added insulation

2. Sealed air leaks or eliminated drafts (IF RESPONDENT ASKS FOR CLARIFICATION, SAY: "Examples include using caulk or foam around windows and doors, interior can lights, or attic spaces.")

3. Sealed heating ducts or insulated boiler pipes

4. Replaced heating system

5. Other energy-saving improvements **[SPECIFY]**

6. None

98. **(DO NOT READ)** Don't know

99. **(DO NOT READ)** Refused

[ASK IF A8<6]

A9. Did you receive an incentive from Efficiency Vermont for your improvements?

1. Yes

2. No

98. **(DO NOT READ)** Don't know

99. **(DO NOT READ)** Refused

[IF A1=2 AND A3=2 AND A9=1, ASSIGN FLAG GRP_4]

[IF TYPE=NONPART AND FLAG IS NOT ASSIGNED, TERMINATE]

Termination: Those are all the questions we have for you. Thank you for your time.

B. Program Awareness

[ASK IF FLAG=GRP_1, GRP_5 OR GRP_6]

B1. How did you first learn about the NeighborWorks of Western Vermont HEAT Squad Program or energy check-ups? **(RECORD ALL MENTIONED, DO NOT READ)**

1. My employer
2. Contests
3. Mailer
4. Door-to-door
5. Newspaper or magazine article
6. Neighborhood meeting or Energy Party
7. Booth or table at local event)
8. Online advertising
9. School, church, or library
10. Social media (Facebook, Twitter)
11. Phone calls/ Telethon
12. Newspaper advertising
13. Utility bill or fuel bill
14. Word of mouth
15. Community Group outreach
16. Neighborworks Website
17. Efficiency Vermont website
18. Lawn sign
19. Contractor
20. Brochure
97. Other **[SPECIFY]**
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

[ASK ALL]

B2. Who do you trust most to provide information or advice about energy saving opportunities?

[MULTIPLE RESPONSE, UP TO 3, prompt by reading list if necessary]

1. NeighborWorks of Western Vermont
2. My contractor
3. Local utility
4. Efficiency Vermont
5. State or local government official
97. Other **(Specify)**
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

[ASK IF FLAG = GRP_1]

B3. You indicated that you have heard of the HEAT Squad program. Why did you choose not to get an energy check-up on your home? **(DO NOT READ, RECORD MULTIPLE)**

1. No time
2. Cost of check-up
3. Did not qualify
4. Not interested
5. Did not believe it would benefit my home
6. Made some improvements myself (DIY)

- 7. Did not trust contractor
- 97. Other (**Specify**)
- 98. (**DO NOT READ**) Don't know
- 99. (**DO NOT READ**) Refused

[ASK IF FLAG = GRP_5 OR GRP_6]

- B4. How influential was the HEAT Squad marketing and outreach on your decision to get the home energy checkup? (**READ LIST**)
- 1. Very influential
 - 2. Somewhat influential
 - 3. Not very influential
 - 4. Not at all influential
 - 98. (**DO NOT READ**) Don't know
 - 99. (**DO NOT READ**) Refused

[ASK IF FLAG = GRP_5 OR GRP_6]

- B5. How influential was the reduced out-of-pocket cost of the audit offered by HEAT Squad on your decision to get the home energy checkup? (**REPEAT LIST IF NECESSARY**)
- 1. Very influential
 - 2. Somewhat influential
 - 3. Not very influential
 - 4. Not at all influential
 - 98. (**DO NOT READ**) Don't know
 - 99. (**DO NOT READ**) Refused

[ASK IF FLAG = GRP_3 OR GRP_4 OR GRP_5 OR GRP_6]

- B6. Now I'm going to read a list of possible reasons you might have decided to get a home energy checkup. Please rate each of them as Very important, Somewhat important, Not very important, or Not at all important in your decision to have the checkup.
- a. Learn how to lower my energy bills and save money
 - b. Learn how to save energy
 - c. Learn how to protect the environment
 - d. Learn how to make my home more comfortable, warmer, or less drafty
 - e. Learn how to improve health or indoor air quality
 - f. Receive free products like CFLs (compact fluorescent light bulbs), pipe wrap, etc.
 - g. Learn what incentives exist for improvements
 - h. Receive incentives
 - i. Replace old or broken equipment
 - j. Get a loan for improvements
 - k. A friend or family member recommended it

[FOR EACH ITEM B6 A-K, CODE AS FOLLOWS]

- 1. Very important

2. Somewhat important
3. Not very important
4. Not at all important
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

C. Home Energy Checkup Satisfaction

[ASK IF FLAG = GRP_3 OR GRP_4 OR GRP_5 OR GRP_6, ELSE SKIP TO E1]

- C1. How satisfied were you with your home energy checkup experience? **(READ LIST)**
1. Very satisfied
 2. Somewhat satisfied
 3. Not very satisfied
 4. Not at all satisfied
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused
- C2. How satisfied were you with the contractor who performed your home energy checkup?
1. Very satisfied
 2. Somewhat satisfied
 3. Not very satisfied
 4. Not at all satisfied
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused

[ASK IF C1 = 3 OR 4 OR C2=3 OR 4, ELSE SKIP TO C4]

- C3. What was unsatisfactory about your experience?
[RECORD VERBATIM]
- C4. Did you receive an audit report explaining what the contractor found in your home?
1. Yes
 2. No
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused

[ASK IF C4=1, ELSE SKIP TO C7]

- C5. How useful was the audit report? **[READ LIST]**
1. Very useful
 2. Somewhat useful
 3. Not very useful
 4. Not at all useful

- 98. **(DO NOT READ)** Don't know
- 99. **(DO NOT READ)** Refused

[ASK IF C5 = 3 OR 4, ELSE SKIP TO C7]

- C6. Why didn't you find it to be useful? **[RECORD MULTIPLE]**
 - 1. I didn't understand what it said
 - 2. It was not thorough enough
 - 3. It arrived too late
 - 4. I already knew everything it said
- 97. **Other [SPECIFY]**
- 98. **(DO NOT READ)** Don't know
- 99. **(DO NOT READ)** Refused

[ASK IF FLAG = GRP_5 OR GRP_6]

- C7. Did you discuss the outcome of your home energy checkup with a HEAT Squad Energy Advisor at NeighborWorks?
 - 1. Yes
 - 2. No
 - 98. **(DO NOT READ)** Don't know
 - 99. **(DO NOT READ)** Refused
- C8. How helpful did you find the Energy Advisor?
 - 1. Very helpful
 - 2. Somewhat helpful
 - 3. Not very helpful
 - 4. Not at all helpful
 - 98. **(DO NOT READ)** Don't know
 - 99. **(DO NOT READ)** Refused

[ASK IF C8 = 3 OR 4, ELSE SKIP TO D1]

- C9. What was unsatisfactory about your experience with the Energy Advisor?
[RECORD VERBATIM]

D. Retrofit Satisfaction and Decisions

[ASK IF FLAG = GRP_3 OR GRP_5, ELSE SKIP TO D2]

- D1. Why did you decide not to make the recommended improvements and receive the incentive from Efficiency Vermont? **(DO NOT READ, RECORD MULTIPLE)**
 - 1. No time
 - 2. Cost of project
 - 3. Did not qualify for rebate
 - 4. Not interested

5. Did not believe it would benefit my home
6. Made some improvements myself (DIY)
7. Did not trust contractor
97. Other (**Specify**)
98. (**DO NOT READ**) Don't know
99. (**DO NOT READ**) Refused

[ASK IF FLAG = GRP_4 OR GRP_6, ELSE SKIP TO D5]

D2. How did you decide which of the recommended energy-efficient home improvements to make, and which to skip? (**DO NOT READ, RECORD MULTIPLE**)

1. Time availability
2. Cost of project
3. Amount of rebate
4. Discussed with Energy Advisor
5. Expected Energy Saved
6. Already knew what I wanted to do
7. Made all improvements recommended by contractor
97. Other (**Specify**)
98. (**DO NOT READ**) Don't know
99. (**DO NOT READ**) Refused

D3. How influential was the Efficiency Vermont incentive on your decision to make these improvements? (**REPEAT LIST IF NECESSARY**)

1. Very influential
2. Somewhat influential
3. Not very influential
4. Not at all influential
98. (**DO NOT READ**) Don't know
99. (**DO NOT READ**) Refused

[ASK IF FLAG = GRP_5 OR GRP_6, ELSE SKIP TO D5]

D4. How influential was the \$250 deduction that NeighborWorks takes out of your Efficiency Vermont incentive on your decision? (**REPEAT LIST IF NECESSARY**)

1. Very influential
2. Somewhat influential
3. Not very influential
4. Not at all influential
98. (**DO NOT READ**) Don't know
99. (**DO NOT READ**) Refused

[ASK IF FLAG = GRP_6, ELSE SKIP TO D10]

D5. How influential was your HEAT Squad Energy Advisor on your decision to make these improvements? (**REPEAT LIST IF NECESSARY**)

1. Very influential

2. Somewhat influential
3. Not very influential
4. Not at all influential
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

D6. How influential were the loan options offered by NeighborWorks on your decision to make these improvements? **(REPEAT LIST IF NECESSARY)**

1. Very influential
2. Somewhat influential
3. Not very influential
4. Not at all influential
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

D7. Did you use the NeighborWorks construction management service to facilitate your improvements?

1. Yes
2. No
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

[ASK IF D7=1, ELSE SKIP TO D10]

D8. How satisfied were you with the construction management service? **(READ LIST IF NECESSARY)**

1. Very satisfied
2. Somewhat satisfied
3. Not very satisfied
4. Not at all satisfied
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

D9. Without the construction management service, do you think you would have made the same energy-efficiency improvements to your home?

1. Yes
2. No
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

D10. Do you plan to make any energy-efficient improvements in the future?

1. Yes
2. No
98. **(DO NOT READ)** Don't know
99. **(DO NOT READ)** Refused

- D11. Now thinking back to all aspects of the HEAT Squad program, how satisfied were you with your NeighborWorks experience overall?
1. Very satisfied
 2. Somewhat satisfied
 3. Not very satisfied
 4. Not at all satisfied
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused

E. Non-Energy Benefits

[ASK IF FLAG = GRP_4 OR GRP_6, ELSE SKIP TO F1]

- E1. Since making the energy-efficient improvements to your home, would you say that your home is... **(READ LIST)**
1. More comfortable to live in
 2. The same
 3. Less comfortable to live in
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused

[ASK IF E1=1 OR 3, ELSE SKIP TO E2]

- E1a. Is your home **[IF E1=1, "warmer" IF E1=3, "colder"]** in the winter?
1. Yes
 2. No
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused
- E1b. Is your home **[IF E1=1, "cooler" IF E1=3, "warmer"]** in the summer?
1. Yes
 2. No
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused
- E1c. Does your home now have **[IF E1=1, "fewer" IF E1=3, "more"]** problems with pests such as mice?
1. Yes
 2. No
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused

- E2. And have you noticed that your energy bills have been... **(READ LIST)**
1. More affordable
 2. The same
 3. More expensive
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused
- E3. Would you say that the improvements to your home have had any effect on your health?
1. Yes **[RECORD DETAIL IF RESPONDENT OFFERS, BUT DO NOT PROBE]**
 2. No
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused

[ASK IF E3=1, ELSE SKIP TO E5]

- E4. Would you say the effect on your health has been positive or negative?
1. Positive
 2. Negative
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused

F. Knowledge of and Attitudes toward Energy Efficiency

[ASK ALL]

- F1. How would you rate your knowledge of the different ways you can save energy in your home?
Would you say you are... **(READ LIST)**
1. Very knowledgeable
 2. Somewhat knowledgeable
 3. Not very knowledgeable
 4. Not at all knowledgeable
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused
- F2. For each of the next statements, please tell me if you strongly disagree, somewhat disagree, somewhat agree, or strongly agree: **[ROTATE STATEMENTS. RECORD 1= STRONGLY DISAGREE; 2=SOMEWHAT DISAGREE; 3=SOMEWHAT AGREE; 4=STRONGLY AGREE; 98= DON'T KNOW]**
- A. It is important to conserve energy as much as possible
 - B. Using whatever energy is needed to keep my home comfortable is important to me
 - C. Saving energy helps the environment
 - D. I would like to save more energy but do not know where to start
 - E. I have already done as much as possible to save energy in my home
 - F. Energy-efficient products are too expensive for me

- G. I actively look for ways to reduce my carbon footprint
- F3. How much control would you say you currently have over how much energy your household uses? Would you say... **(READ LIST)**
1. A great deal of control
 2. Some control
 3. A little control
 4. No control at all
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused
- F4. How efficient is your home? Would you say... **(READ LIST)**
1. Very efficient
 2. Somewhat efficient
 3. Not very efficient
 4. Not at all efficient
 98. **(DO NOT READ)** Don't know
 99. **(DO NOT READ)** Refused

G. Household Characteristics

- G1. Now I have a few questions about your home. These questions are for classification purposes only. In what year was your home built?
[RECORD YEAR]
98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused
- G2. How long have you lived in your home?
[RECORD NUMBER OF YEARS, USE 1 IF LESS THAN 1 YEAR]
98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused
- G3. Is your home... **(READ LIST)**
1. A single-family house
 2. A unit in a building with 2, 3, or 4 units
 3. A condo or apartment in a building with 5 or more units
 4. A mobile home
 97. **(DO NOT READ)** Other **[SPECIFY]**
 98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused
- G4. How many bedrooms are there in your home?
[RECORD NUMBER 0-99]
98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused

- G5. Not counting any garage or basement space, how big is your home? Would you say it is... **(READ RESPONSE CATEGORIES, STOP WHEN RESPONDENT INDICATES THEIR RESPONSE)**
1. Less than 1,400 square feet
 2. 1,400 to less than 2,000
 3. 2,000 to less than 2,500
 4. 2,500 to less than 3,500
 5. 3,500 to less than 4,000
 6. 4,000 to less than 5,000
 7. 5,000 or more
 98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused
- G6. How many people currently live in your home?
[RECORD NUMBER 0-99]
98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused
- G7. Does your home have central or window-unit air conditioning?
1. Yes
 2. No
 98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused
- G8. What type of fuel do you use to heat your home year-round? **(READ LIST IF NECESSARY)**
[RECORD MULTIPLE]
1. Fuel oil
 2. Propane
 3. Kerosene
 4. Natural gas
 5. Electricity
 6. Wood or wood pellets
 97. **(DO NOT READ)** Other **[SPECIFY]**
 98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused

[ASK IF G8=MULTIPLE, ELSE SKIP TO G10]

- G9. Which of those do you consider your primary heating source?
1. Fuel oil
 2. Propane
 3. Kerosene
 4. Natural gas
 5. Electricity
 6. Wood or wood pellets
 97. **(DO NOT READ)** Other **[SPECIFY]**
 98. **(DO NOT READ)** Don't Know
 99. **(DO NOT READ)** Refused
- G10. In what year were you born?

[RECORD YEAR]

- 98. **(DO NOT READ)** Don't Know
- 99. **(DO NOT READ)** Refused

G11. How many people in your household are unemployed and currently looking for work?

[RECORD NUMBER NOT TO EXCEED VALUE RECORDED IN G6]

- 98. **(DO NOT READ)** Don't Know
- 99. **(DO NOT READ)** Refused

[SKIP TO G13 IF G6=98 OR 99]

G12. In 2011, was your total household income above or below **[VALUE FROM TABLE BELOW CORRESPONDING TO HOUSEHOLD SIZE IN G6]**?

Household Size=G6	Read-in Value
1	\$ 35,750
2	\$ 40,850
3	\$ 45,950
4	\$ 51,050
5 or more	\$ 55,150

- 1. Above
- 2. Below
- 98. **(DO NOT READ)** Don't know
- 99. **(DO NOT READ)** Refused

G13. What is the highest level of education you have completed? **(READ LIST IF NECESSARY)**

- 1. Less than high school
- 2. High school graduate or equivalent (e.g., GED)
- 3. Attended some college (includes junior/community college)
- 4. Associates degree
- 5. Bachelors degree
- 6. Advanced degree (Master's, PhD, MD, etc.)
- 97. Other **[SPECIFY]**
- 98. **(DO NOT READ)** Don't know
- 99. **(DO NOT READ)** Refused

G14. **(RECORD GENDER. DO NOT ASK)**

- 1. Male
- 2. Female

FINISH. Thank you very much for your time and cooperation. Have a good day.

APPENDIX B. STAKEHOLDER INTERVIEW INSTRUMENT

NWWVT H.E.A.T. Squad Evaluation

Program Staff and Stakeholder Interview Guide

Thank you for taking the time to talk with us today about the program. The purpose of this interview is to gather information on program processes, operations, and activities. Please note that this is not an audit, and that your comments will be kept as anonymous as practicality allows. Our goal is to create a complete description of the program from all perspectives so that we can identify what is working well and what can potentially be improved. Because of your role in program implementation, your perspective is very important to us. We expect this interview to take about thirty minutes to an hour of your time.

Topic	Interview Questions
About the interviewee	<ol style="list-style-type: none"> 1. What is your role in the program? Describe your tasks. 2. Who do you work closely with on the program? How? 3. How long have you been with the program? 4. What do you want to know most about the program through this evaluation?
Program History, Design, Approach	<ol style="list-style-type: none"> 5. How did the program concept come about? 6. Who designed the program? 7. When was the program launched? Was there a pilot phase? 8. Have there been any program evaluation activities? 9. Can you describe the "value proposition" this program offers the customer? (What does the customer get and in exchange for what)? 10. Can you please describe the steps in the program delivery process? 11. Does this program interact with other programs/services offered by NWWVT? 12. What organizational capacities are essential to NWWVT's ability to deliver the program in this way? (What is NWWVT really good at that makes this program work?) 13. What program components are key to meeting program goals (outreach, education, loans...)? How are they designed to reach the goal? 14. Have there been any design changes to date? Any planned? Why?
Program Goals	<ol style="list-style-type: none"> 15. What are the program's process goals, if any? (e.g. participation of customers, of contractors, market transformation, increase awareness, education of contractors?) 16. What metrics do you use to track goals? 17. Have there been any changes to goals since launch? Why? 18. How many participants have there been to date? In the pipeline?
Target Audience	<ol style="list-style-type: none"> 19. Who is the target audience for this program? 20. Did you use any market analysis to help design your program? Are there things about your market you feel you did or did not understand before launching the program? 21. How successful is the program delivery approach in reaching its target audience? If not, other ideas for reaching the target audience?
Program Partners and Contractors	<ol style="list-style-type: none"> 22. Who do you consider program partners? (e.g., funding providers, Efficiency Vermont, contractors, government, other groups and organizations?) 23. What role do program partners play in program design and implementation? 24. How effective is NWWVT's relationship with program partners? (Probe for details) 25. How are participating contractors chosen? Were they involved in program design?

	<p>26. What is their level of involvement in the program? What are their responsibilities?</p> <p>27. What impact does the program have on contractors' businesses? How do you know?</p> <p>28. How effective is NWWVT's relationship with contractors? Why do you say that?</p>
Program Outreach	<p>29. How does NWWVT reach out to customers?</p> <p>30. Does NWWVT do all program outreach, or are there external marketing partners? (Probe to determine whether Efficiency Vermont does any outreach for this program.)</p> <p>31. Do you have a marketing/outreach plan? A schedule of activities?</p> <p>32. What outreach channels are used? (e.g., phone, mass media, mail, email, social media, peer to peer)</p> <p>33. What marketing collateral is used?</p> <p>34. How do contractors play a role in marketing the program? How are they incented to participate?</p> <p>35. Do you perform any market analysis? (e.g., contractor focus groups, customer surveys?)</p> <p>36. How is marketing effectiveness measured?</p> <p>37. Is your marketing/outreach budget sufficient?</p>
Program Management	<p>38. How many staff members run the program? Should there be more staff members or adjusted roles?</p> <p>39. Is your program budget adequate? Does it fund the program fully, or cover only part of the costs? If the latter, which ones, and how do you cover other costs?</p> <p>40. Do you feel management and administration is effective overall? Areas for improvement?</p> <p>41. Are there barriers to achieving goals related to internal program management? Technical needs not met (software, computer, etc.)?</p>
Customer Response	<p>42. Do you feel the program is meeting customer needs? Why?</p> <p>43. What feedback have you received so far?</p> <p>44. How do you collect, document, track and respond to complaints? How well is that process working?</p> <p>45. What feedback has come back from contractors? What has been the approach to the contractor feedback?</p>
Data Management	<p>46. Can you please describe your Information Management Systems and any databases NWWVT maintains?</p> <ul style="list-style-type: none"> • How do you track participants? Which steps are documented? • How do you track budget and planned vs. actual expenditures? • Do you track customer complaints? What is the process for documentation and follow up? <p>47. To what degree are databases linked?</p> <p>48. Who manages the databases? How is data entered? What is the QA/QC protocol?</p> <p>49. Is it easy to get data extracts and reports?</p> <p>50. How do you use the database?</p>
Final Thoughts	<p>51. What are the biggest challenges you face regarding the H.E.A.T. Squad program? As a program member and as a homeowner?</p> <p>52. What is going particularly well?</p> <p>53. What do you anticipate for the future of the program?</p>