

GOODMAN RESEARCH GROUP, INC.
Program Evaluation • Consultation • Market Research

*Renew Boston Residential
Energy Efficiency
Program*
Evaluation Report

PREPARED BY

Pamela Stazesky, Ph.D.
Markeisha Grant, B.A.
Colleen F. Manning, M.A.

SUBMITTED TO

Amy Vavak, Associate Director
Mass Energy Consumers Alliance

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Finally, our appreciation goes to Amy Vavak, Associate Director at Mass Energy Consumers Alliance, who assisted with the development of the evaluation plan and who provided valuable insights about the potential barriers to home energy efficiency, some of which may be unique to the New England area.

EXECUTIVE SUMMARY

The Renew Boston Residential Energy Efficiency Program was launched in 2010 through Mayor Thomas Menino's office, as a partnership between NSTAR, National Grid, Mass Energy Consumers Alliance, and Next Step Living, with the goal of reducing energy usage city-wide while creating energy efficiency services and jobs. This program, partially funded by the City of Boston's Energy Efficiency and Conservation Block Grant (EECBG), funded by the American Recovery and Reinvestment Act (ARRA), and administered by the Department of Energy, offered middle-income Boston residents (60-120% of state median income) up to \$3,500 in no-cost energy efficiency upgrades.

In May 2012, Mass Energy Consumers Alliance contracted with Goodman Research Group, Inc. (GRG) to conduct an evaluation of specific components of the Renew Boston program. The overarching evaluation goal was to assess the effectiveness, within the target population in Boston, of the strategies used to overcome barriers to implementing home energy efficiency upgrades.

METHODS

GRG's evaluation design included a multi-method approach comprised of three phases, each building on the previous one. First, summarizing analyses of data from the Home Energy Assessments conducted from July 2010 to April 2012 (n=8,415) was completed. To gain a deeper understanding of the results from these analyses, GRG collected data through an online survey from a random sample of Boston residents who had already received a Home Energy Assessment, some of whom moved forward with the recommended weatherization services, about their experiences with increasing the energy efficiency of their home through the Renew Boston program (n=338). The sample selected was stratified to help ensure it was representative of all Boston neighborhoods. Finally, phone interviews were conducted with a random sample of Boston residents living in two- to four-unit structures, who had not implemented all of the recommendations in their Home Energy Assessment, to better understand the obstacles and barriers this cohort of Boston residents face in making their home more energy efficient and to hear their stories in their own words (n=29).

Before commencing analyses of the existing data provided for this study, the amount of missing data was examined. Some missing data are expected in any study. However, large amounts can distort the results of statistical analyses, jeopardizing the validity of the conclusions drawn. The extent of missing data¹ on two key variables, out-of-pocket costs and implementation rates, exceeded fifty percent and thus would likely have significant impacts on the generalizability of this study.

¹ Missing data in this case are data values that were available in paper copy, but were unavailable in electronic format at the time of this study.

KEY FINDINGS

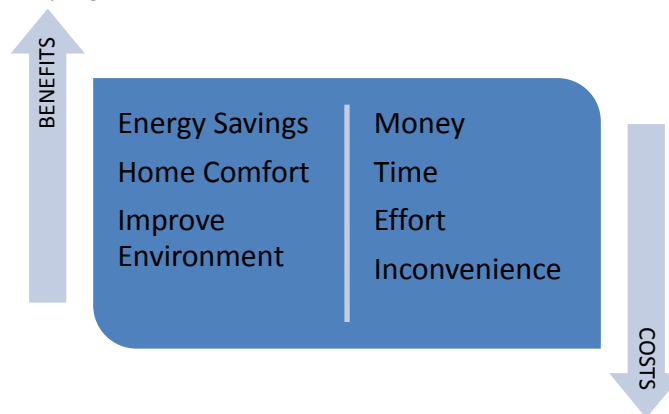
Assessment Experiences were Positive for Many; Varied Greatly Across Some Households

Residents' experiences with the Home Energy Assessment as well as with installation services varied greatly among households. Professional, courteous, competent Energy Specialists and installation contractors are essential to creating a positive experience for Boston residents. Residents will accept some mistakes or mediocre service, but are much more intolerant of poor communication and lack of follow-up.

Benefits Must Outweigh Costs

Residents are likely to implement recommendations if they believe the costs are affordable and perceive that the benefits, such as lower energy bills and improved comfortable living spaces, outweigh the costs. These costs include not only financial ones, but also time, effort, and inconvenience. While there are numerous reasons residents defer implementing recommendations, for most, the costs in terms of financial outlay trumps other obstacles. Thus, rebates were a powerful incentive. Survey results indicate that over two-thirds of residents would not have moved forward with the recommendations if the rebates had not been available. Yet, for some, the rebates were not big enough. Over 80% of residents who did not implement all of the recommendations would have done so if the rebates had been better. Contrasted with rebates, interest-free loans had no impact on implementation rates for many households.

Logic Underlying Balance of Cost and Benefits



Homeowners in Single-Family Homes Implement at Higher Rates

Homeowners living in single family homes implement recommendations at substantially greater rates, and face fewer obstacles, than do those living in multi-unit structures, including condominiums. The stacked nature of these homes creates a domino effect in which a delay in implementation in one unit in a structure precludes implementation in other units. Reaching agreement on a path

forward for the entire structure quickly becomes challenging as the number of units increases. Condominiums associations and rental management companies also become an additional layer in the decision-making process.

Landlords Slightly Less Likely to Implement Recommendations

Because most tenants live in multi-unit structures, they experience these same challenges. In addition, they must deal with their landlords, who, as the ultimate decision-makers regarding upgrades to the structure, may either put up additional roadblocks or pave the path for improved home energy efficiency. Recommendations are implemented in rental units at slightly lower rates, even after controlling for the number of units in the structure.

Pre-Weatherization Creates Additional Hurdles

Pre-weatherization recommendations, such as asbestos removal and knob and tube wiring, created additional hurdles for some residents. When no pre-weatherization work is required, residents are more likely to fully implement insulation or air sealing. Boston residents do seem interested in making their homes more energy efficient, but for some households, pre-weatherization out-of-pocket costs were too big of a hurdle to jump and thus thwart installation upgrades.

Personal Contact Results in Higher Implementation Rates

Personal contact, such as community outreach and door knocking, results in higher implementation rates. Trust in the personal contact is a related factor that influences implementation rates. Residents are much more skeptical of utility companies when it comes to learning about home energy efficiency. This might help explain why the bill insert outreach method does not yield implementation rates as high as those of some other methods.

On the Road to Success

We commend Renew Boston, the City of Boston, and Next Step Living for the positive steps they have already taken to make Boston a more energy-efficient city. In addition, we would like to acknowledge that Renew Boston may already be on the path to implementing some of the recommendations posed later in this report.

INTRODUCTION

RENEW BOSTON PROGRAM

The **Renew Boston Residential Energy Efficiency Program**, launched in 2010 as a partnership among NSTAR, National Grid, Mass Energy Consumers Alliance, and Next Step Living, was designed to demonstrate how to achieve city-wide energy reduction goals. With a focus on Boston renters and homeowners living in 1-4 unit buildings, Renew Boston contracted with Next Step Living, who conducted home energy assessments in approximately 6,500 income-eligible households (60%-120% of the state median income). Renew Boston has identified specific barriers to homeowners and renters implementing the energy efficiency upgrade recommendations that were uncovered through the home energy assessments. These barriers are:

- landlord/tenant split incentive,
- upfront costs for energy efficiency upgrades,
- language barriers, and
- pre-weatherization issues (e.g., asbestos, knob and tube wiring, appliances that emit carbon dioxide/monoxide).

Specific solutions Renew Boston proposed to address these four barriers include:

- a landlord coordinator position,
- a no-cost home energy assessment with instant savings measures (programmable thermostat, water saving devices, efficient light bulbs),
- up to \$3,500 of insulation and air sealing for median income households,
- interest-free loan for heating system replacement, and
- community-based marketing.

To begin the process, Renew Boston used a variety of outreach methods to notify Boston residents about the opportunities available through this program. For Boston residents, the first step in the process involved contacting Next Step Living to schedule a Home Energy Assessment. Most solutions are targeted are to all Boston residents, while others (i.e., landlord coordinator position) are designed for specific populations (e.g., renters and landlords). After the assessment, residents were given the opportunity to decide which recommendations they were interested in implementing through Next Step Living. Some recommendations, however, were dependent on the successful completion of other recommendations such as replacing a boiler before conducting the air sealing on the home.

GRG'S EVALUATION OF THE RENEW BOSTON PROGRAM

Goodman Research Group, Inc. (GRG), a research firm specializing in the evaluation of programs, materials, and services, served as the external evaluator for the Renew Boston Residential Energy Efficiency Program. GRG's aim in this evaluation was to collaborate with Mass Energy to gather data needed to

demonstrate whether and how the program was able to overcome the specific barriers mentioned above in implementing efficiency upgrades.

METHODS

EVALUATION DESIGN

A mixed methods approach was used in this study. A mixed method approach involves collecting and/or analyzing data using more than one method (e.g., surveys, interviews, observations, focus groups) as well as gathering both quantitative (numbers) and qualitative (words) data. To address the first three evaluation questions listed below, analyses of existing data routinely collected by Mass Energy/Next Step Living served as the foundation.

- Several community-based marketing tactics were deployed to advertise the Renew Boston offer. What specific tactics were most effective in general, and within specific populations (demographic and/or geographic)?
- Do any characteristics of households (e.g., number of units in the structure, ownership status, language preference) explain why some eligible households chose not to move forward once they received the home energy assessment?
- Do any characteristics of the program (e.g., rebates, services of the landlord coordinator) explain why eligible households did choose to move forward once they received the home energy assessment?

However, to address other questions of interest as listed below, original data collection efforts (e.g., surveys, interviews) were required:

- For those without pre-weatherization issues who were eligible for Renew Boston no-cost weatherization, what were their reasons for not moving forward once they received a home energy assessment?
- The Renew Boston offer focused on home energy assessments, instant savings measures, air sealing, and insulation. What were the opportunities within the pool of participating households for heating system replacements or other major energy efficiency upgrades?
- What were the relative contributions of the no-cost offer versus the customer service provided by Next Step Living and the landlord coordinator, to the overall achievements of the program?
- Prior to their Renew Boston experience, what were participating households' awareness levels and interest in energy efficiency and in state energy efficiency programs and rebates?

MEASURES AND PARTICIPANTS

In order to assess the impact of the approaches used to overcome the barriers to implementing energy efficiency upgrades, GRG began with the secondary

analyses of the existing implementation and demographic data routinely collected, and stored electronically, by Next Step Living. GRG was provided a data file by Next Step Living that included data on all cases as of mid-June 2012 (n=8,415) on nearly 100 variables, representing a wealth of information. These data included Boston households who had received a Home Energy Assessment, some of which moved on to receive weatherization services. Of the 8,415 households, nearly three-fourths (73%) were qualified as income eligible for the no-cost offer². A few (5%) were determined to be over the state median income limit for the no-cost offer, and slightly more than one-fifth (22%) had not yet completed the income verification, or had self-selected out of the income verification process.

To gain a deeper understanding of the results from the secondary analyses of implementation and demographic data from Next Step Living, GRG collected the following data as shown in Table 1:

- Online surveys of a sample of eligible Boston residents³ in July 2012, and
- Phone interviews in early August 2012 with sample of those who did not move forward with all of the recommendations in their Home Energy Assessment.

Table 1
Participation Response Rates

	Invited	Completed	Response Rate
Online Household Survey	1,379	338	25%
Household Phone Interviews	303	29	--

Note: The response rate for phone interviews is not calculated because the evaluation design capped the number of interviews at 30.

ANALYSIS PLAN

Survey Sample Selection

Boston residents who had completed a Home Energy Assessment and provided an email address comprised the population for the online survey (n=6,519). Any cases with duplicate email address were deleted (n=1,186). Due to the large number of eligible residents, GRG used stratified random sampling to select an appropriate sample to invite to participate in the online survey. Boston residents were selected proportionally based on two factors:

- (1) Boston neighborhood, and

² State median income was defined as household income between 60-120% of the state median income, adjusted for number of people living in the household.

³ Eligible residents included those who received a Home Energy Assessment and lived within the city limits of Boston, regardless of income level.

- (2) Whether they moved forward with all, some, or none of the recommendations in their Home Energy Assessment.

Those who did not move forward with any of the recommendations were over-sampled to ensure adequate representation in the final sample. As shown in Table 2, a total of 1,379 were invited to participate in the online survey in July.

Table 2
Sample of Eligible Boston Residents for Survey Invitation

Neighborhood*	Recommendations Implemented [†]		
	None	Some	All
Allston	7	3	5
Brighton	38	7	20
Charlestown	4	0	3
Dorchester	236	34	85
East Boston	32	4	10
Hyde Park	75	16	37
Jamaica Plain	103	15	28
Mattapan	77	10	39
Roslindale	94	24	37
Roxbury	49	5	10
South Boston	19	4	7
West Roxbury	62	28	31
Not Specified	77	19	25
TOTAL	873	169	337

*Some neighborhoods are not represented here, if they had few or no residents in the original data file of 6,519 households.

[†]Recommendations implemented as of June 2012.

Interview Sample Selection

Boston residents in two- to four-unit structures who had completed a Home Energy Assessment, had provided an email address, and had not moved forward with all of the recommendations comprised the population for the telephone interview. Any cases with duplicate email addresses were deleted. Due to the large number of eligible residents (n=1,273), GRG used stratified random sampling to select an appropriate sample to invite to participate in the interview. Boston residents were selected proportionally based on two factors:

- (1) Boston neighborhood, and
- (2) Whether they moved forward with the some or none of the recommendations in their Home Energy Assessment.

Those who did not move forward with any of the recommendations were over-sampled to ensure adequate representation in the final sample. The purpose of the interview was to gain a deeper understanding of the obstacles and barriers this cohort of Boston residents face in making their home more energy efficient and to hear their stories in their own words. A total of 303 were invited by email, using a Doodle Poll, to participate in a phone interview in early to mid-August. Once 30 phone interviews were scheduled, the Doodle Poll was closed.

Data Analyses

Our approach to analyses of many variables was an independent samples t-test, a statistical method that allows for the assessment of group differences using data measured on a continuous scale. For categorical variables, our approach was Chi-Square, a statistical method that allows the assessment of whether or not there is a relationship between two variables. For qualitative data, comments were analyzed for themes.

Logistic Regression

In order to assess the effects of the various marketing strategies on implementation (implemented recommendations, did not implement recommendations), logistic regression⁴ was used. This method investigated the extent to which each of the following 14 strategies (plus all others, lumped together) as listed in Table 3 explained any differences in implementation:

Table 3
Description of Outreach Strategies⁵

Outreach Strategy ⁵	Description
Bill insert	Informational insert provided in residents' gas, water, or electric bill; invitations from the City of Boston to residents regarding weatherization workshops
Community outreach	Outreach conducted by city staff or one of the community-based outreach partner organizations
Fair	Next Step Living booth at fair or event
Door knocking	Door-to-door canvassing through neighborhood
Email	Received email about energy assessment
Event	Tabling at public event (e.g., Mass Energy, City of Boston, Next Step Living, community outreach organization)
Poster	Flier or poster
Mass Save website	www.masssave.com or call center
MBTA	Informational table or poster near Massachusetts Bay Transportation Authority (MBTA) stop
Member	Referral from a Next Step Living corporate partner
Presentation	Presentation or workshop
Press	Radio or TV public service announcements, newspaper articles, TV story, posters on the MBTA

⁴ Logistic regression is the same as multiple regression; however, it is used when the outcome of interest is categorical (yes, no) instead of continuous (e.g., 0% – 100%).

⁵ These strategies are not mutually exclusive categories.

Web search	Found through web search (e.g., Google, Bing)
Word of mouth	Personal referral (e.g., neighbor, friend, family member, colleague, home repair contractor)

This method also tells us the amount of variation that can be explained by knowing the marketing strategy. In addition, we conducted these analyses separately for renters and home owners. When conducting analyses for renters, we also examined the impact of the landlord coordinator ('used' or 'not used'). This shows us how much of the variation can be explained by the use of the landlord coordinator in addition to the marketing strategies.

Statistical Significance and Effect Size

When the sample size is sufficiently large to ensure adequate statistical power, statistically significant ($p < 0.05$) results are reported in this report. For all statistically significant results, we present a measure of effect size. Statistical significance is a measure of the likelihood that an effect is due to systematic factors rather than to mere chance. The p -value is the likelihood of detecting a false effect by chance; thus, when $p < 0.05$, the chances are less than 5 percent of detecting an apparent effect when there is no "true" effect. Independent of statistical significance, effect size is a measure of the *magnitude* of a relationship or difference. By Cohen's convention⁶, an effect size of less than 0.10 is negligible, 0.11 to 0.35 is small, 0.36 to 0.65 is moderate, 0.66 to 1.00 is large, and greater than 1.00 is very large.

ANALYSES OF MISSING DATA

Before commencing analyses of existing data, frequency counts for each variable were computed to identify any extreme values, indicating possible data entry errors. In addition, these counts were examined to ascertain the amount of missing data. Extreme values and missing data can distort the results of statistical analyses jeopardizing the validity of the conclusions drawn. While no extreme values were found, the extent of missing data on a few variables caused concern.

The amount of missing data for many variables is negligible (<3%) and would likely have no impact on the results of this study. For a few variables, the amount of missing data is slightly more than desired⁷, but again not likely problematic. On the other hand, as shown in Table 4, some data are missing in very large amounts and would likely have significant impacts on the generalizability of this study. Missing data are prevalent in large datasets assembled from several sources; however, the amount of missing data for these particular variables is troublesome because they were needed in order to answer the evaluation questions of interest. For example, knowing the total

Type and amount of missing data jeopardize the validity of conclusions based solely on the secondary data analysis.

⁶ Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

⁷ Missing values of than 5% of the total number of cases

amount of out-of-pocket costs for only about one-fourth of the households in this study seriously limits the conclusions that can be drawn solely from these data about the impact of the rebates on implementation rates.

Table 4
Proportion of Electronic Data Missing by Variable

Variable	Percent Missing
Own/Rent	4%
Number of units	6%
Marketing strategy	18%
Amount of out-of-pocket costs for Boston Resident*	76%
Recommendations implemented/not implemented*	51%

* Households with a current status of “no opportunity” (n=2,007) and “not approved by utilities” (n=52) were removed before computing percentages.

Changes in how these data were collected evolved over time, which is not uncommon, may help explain why some of these data are missing. For example, entering data on the rebates and projected out-of-pocket costs for a particular household is not necessary for the day-to-day operations at Next Step Living if the homeowner made it clear that they will not be moving ahead with any of the recommendations. However, not tracking these data has implications for studies such as this. Because the design of the data system was driven by the day-to-day operational needs of Next Step Living, this data system may not be well-suited for other needs.

If the households with missing data are different in substantial ways from households without missing data (e.g., much more likely not to move forward with recommendations), the findings from these analyses could be distorted. Missing Value Analysis (MVA) helps us to understand the impact of missing data on our findings, especially related to key variables, and to recommend appropriate next steps for dealing with missing data. A more complete discussion of these analyses is provided in Appendix C.

MVA indicate that extreme caution should be exercised when reviewing the results from the secondary data analyses that rely on level of implementation or household out-of-pocket costs. Because of this, triangulation with other data sources, such as the surveys and interviews, are critical in determining if the patterns in the secondary analyses hold true.

RESULTS

Both quantitative and qualitative data were gathered to develop an understanding of the perceptions of Boston residents about their experiences with home energy efficiency services. This section includes the following:

- Profile of participating Boston residents
- Factors that impact implementation rates
 - Household characteristics
 - Program components
- Perceptions of Boston residents about their experiences

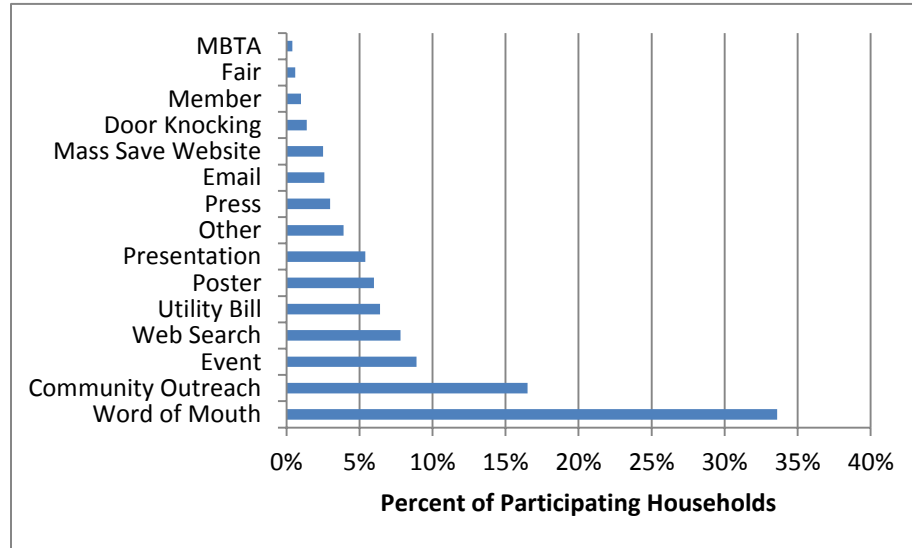
Qualitative data are included throughout the Results section in order to support and enhance the quantitative results.

PROFILE OF PARTICIPATING BOSTON RESIDENTS

Outreach to Boston Households

Many marketing strategies were used to reach Boston residents. As shown in Figure 1, word-of-mouth and community outreach were, by far, the most effective strategies to both reach and motivate the largest proportion of participating households. While these data provide a context for understanding the results about level of implementation of recommendations from the Home Energy Assessment, they do not address questions about the effectiveness of these strategies in terms of simply reaching the targeted population. Some strategies may be extremely effective in getting the word out, but much less effective in creating more energy-efficient homes (i.e., implementing the recommendations from their Home Energy Assessment report). Conversely, some strategies may have been used less often but were more effective in having people implement recommendations.

Figure 1
Proportion of Households by Marketing Strategy



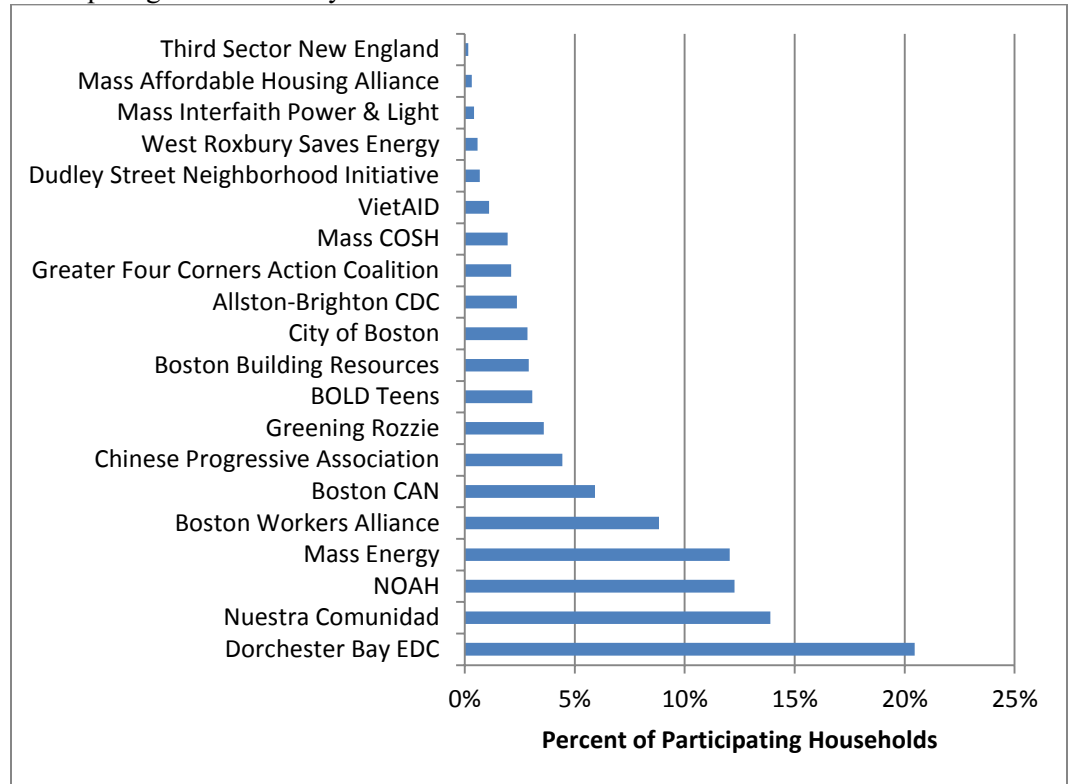
N=6,870

Numerous outreach partners were involved in this initiative. While three-fourths of the participating households did not identify a specific outreach partner, nearly 2,000 households did. As shown in Figure 2, four outreach partners, Dorchester Bay EDC, Nuestra Comunidad, Neighborhood of Affordable Housing (NOAH), and Mass Energy, brought in over half of the participating households.

Some outreach partners received grants (some received large grants while others received smaller stipends) from the City of Boston to provide outreach. In addition, some partners received funding from other sources. Based on the information available to us, we classified partners into four groups: 1) those who received a large grant from the City; 2) those who received a small stipend from the City *plus* funding from another source; 3) those who received *either* a small stipend from the City *or* funding from another source; and 4) those who did not receive any funding. A Spearman correlation⁸ showed that funding for outreach was strongly correlated with successful outreach to participating households (based on household identification of outreach source). While these data provide a context for understanding the implementation results, they do not address questions about reach, i.e., understanding the effectiveness of the strategy in reaching large proportions of the target audience. To address questions about reach, the total number of households that *could be reached* through each partner would be needed.

⁸ Spearman correlation = .83, $r^2=.69$

Figure 2
Participating Households by Outreach Partner



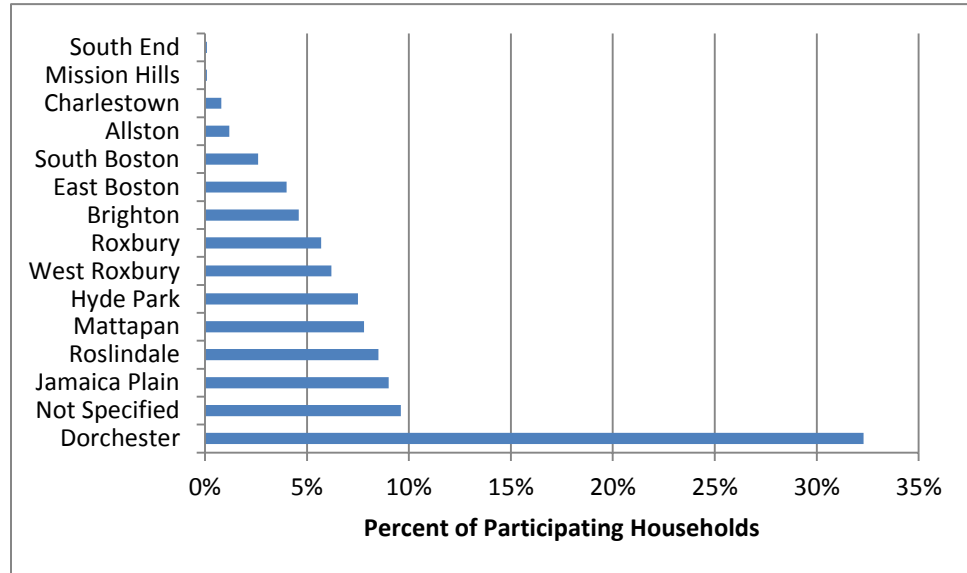
N=1,898

Demographics of Households

Data we analyzed to create the profile of Boston Residents who completed a Home Energy Assessment (n=8,415) were provided by Next Step Living. These data included the demographics (e.g., ownership status, preferred language, number of units in structure) of each participating Boston household as well as various data on status of the household in terms of implementation of their Home Energy Assessment recommendations.

As shown in Figure 3, Boston residents who participated in this program represent households from nearly every Boston neighborhood, with a predominant proportion (roughly one-third) living in Dorchester. Even though Dorchester represents a large area in Boston, size alone does not account for its large participation. It appears that Renew Boston may be doing a better job, through the efforts of the Dorchester Bay EDC, at reaching and motivating the targeted households in Dorchester than in many of the other Boston neighborhoods. On the other hand, participation in proportion to geographic size might not be the desired measurement. With the variability in median income across Boston neighborhoods and the target population for this program (60-120% of median state income), neighborhood participation in proportion to the size of the target population, rather than geographic size, may be a more appropriate indicator for comparing participation rates.

Figure 3
Participating Households by Neighborhood



N=8,267

Note: *Not Specified* represents Boston residents who did not identify a specific neighborhood.

Nearly all of the participating households were English-speaking (97%). Spanish was the preferred language for only a very small proportion of the households (2%). The majority of these Spanish-speaking participating households were located in East Boston, Dorchester, Hyde Park, or Roslindale. In addition, nearly half did not indicate hearing about the program through any of the Renew Boston outreach partners. Of those that did hear about the program through a community group, nearly sixty-percent found out through NOAH, located in East Boston. Renew Boston indicated that NOAH employed a Renew Boston Outreach worker who spoke fluent Spanish.

Since nearly one-third of students (31%)⁹ attending Boston public schools are English Language Learners (ELL)¹⁰, households headed by non-English speakers are likely not adequately represented in the participating households. Although we were tasked with determining how much language barriers are contributing to implementation rates, we were unable to do so because the data file provided to us contained so few people who spoke languages other than English.

As shown in Table 5, the most common type of participating household was a homeowner living in a single family home. Renters comprise about one-third of the households, similar to both national and Massachusetts statistics. Most renters live in two- and three-family structures as opposed to single family homes.

⁹Data retrieved from Massachusetts Department of Education district profiles webpage at <http://profiles.doe.mass.edu/profiles/student.aspx?orgcode=00350000&orgtypecode=5&leftNavId=305&&fycode=2012>.

¹⁰ English Language Learners are students who have a first language other than English and are in the process of acquiring English.

Table 5
Participating Households by Ownership and Structure Size

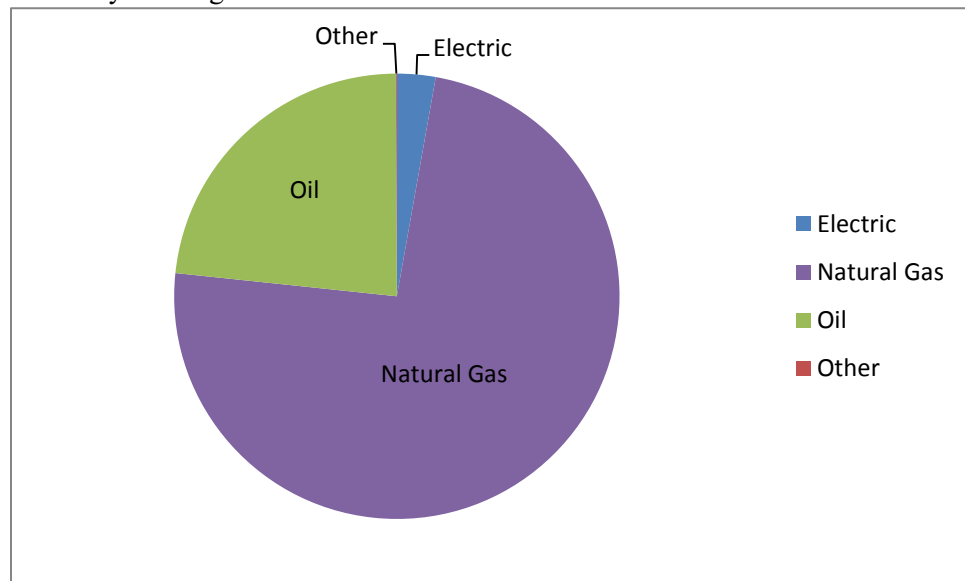
Type of Housing Structure	Ownership Status	
	Own	Rent
Single Unit	33%	1%
Two-family unit	20%	14%
Multi-family unit	15%	18%
TOTAL	68%	33%

N=7,864

Note: Multiple-family unit is defined as a structure with at least three units.

In addition to housing structure and ownership status, the type of primary heating fuel is another variable that may influence implementation rates. Because the cost of heating fuel varies by type, the motivation to create a more energy efficient home may be greater in some homes than in others. As shown in Figure 4, natural gas is the primary heating fuel that comprised slightly less than three-fourths of the participating households. Oil is used by about one-fourth of the population. Few use electric or any other heating fuel. This pattern is similar to what is observed throughout the state as a whole.

Figure 4
Primary Heating Fuel in Home



N=8,219

Supports to Boston Households

As outlined in the introduction, three major supports were made available to Boston residents as a part of the Renew Boston program. One support is the services of the Landlord Coordinator. Only a small proportion (6%) of participating households used the services of this coordinator; however, it

represents a total of 509 households. Approximately half of the residents were tenants and half were homeowners.

Another support available to income-eligible households is a rebate of up to \$3,500 for insulation and/or air sealing. Out-of-pocket costs were computed as the total cost of the air sealing and insulation recommendations minus any rebates. Out-of-pocket costs ranged from a low of zero to over \$3,000. As shown in Table 6, households for whom data were available indicate that 85% incurred no out-of-pocket costs.

Table 6
Out-of-Pockets Costs after Rebates are Applied

Out-of-Pocket Costs	Percent of Households
\$0	85%
< \$100	3%
\$100 - \$599	8%
\$600 +	5%

N=1,496

While these data provide a context for understanding the results about level of implementation of recommendations from the Home Energy Assessment, they do not address questions about the effectiveness of these supports.

UNDERSTANDING WHAT MATTERS IN IMPLEMENTATION RATES IS COMPLEX

Level of Implementation

In general, about half of the households for whom data are available implemented all (33%)¹¹ or some (18%) of the recommendations¹² from their Home Energy Assessment. Air sealing recommendations were implemented at greater rates (nearly two-thirds).

Four household characteristics – ownership status (i.e., rent, own), preferred language, number of units in the structure, and Boston neighborhood – were examined to determine whether they contributed to households’ decisions to complete weatherization as shown in Table 7. There were no significant differences in implementation rates due to preferred language. While there were significant differences for the other three variables, the effect was small. This indicates that while the differences in implementation rates are likely not due to chance, the large sample size permits us to uncover differences that are so small they are undetectable by the naked eye, such as the average difference in

¹¹ All is defined as implementing all of the recommendation in the Home Energy Assessment Report.

¹² Some is defined as implementing at least one of the recommendations in the Home Energy Assessment Report. Most reports contained from one to fourteen recommendations, some of which may have been pre-weatherization recommendations.

heights between 10- and 11-year old girls. The groups differ, but not by very much.

Table 7
Effect of Household Characteristics on Implementation Rates

	Effect Size	Magnitude of Effect Size
Own/Rent*	0.16	Small
Preferred Language	--	--
Number of Units*	0.12	Small
Boston Neighborhood*	0.13	Small

N=2,881- 2,961

Note: Those marked with an asterisk are statistically significant (Chi-Square test for independence) at the $p < 0.01$ level.

Additionally, about half (49%) of the variability in neighborhood implementation rates can be explained by knowing the median household income of the neighborhood. This indicates that a substantial amount of the pattern can be explained by income discrepancies between neighborhoods. No neighborhood is implementing at rates significantly differently¹³ from another neighborhood once median neighborhood income is taken into account.

Three program components – services of Landlord Coordinator, rebates for air sealing and insulation (captured as the out-of-pocket costs to be borne by the household), and community outreach partner – were examined to determine whether they contributed to households’ decisions to complete weatherization. Although there were significant differences in implementation rates for two of the three variables, the effect was negligible as shown in Table 8. This indicates that the difference is so tiny that it is likely not meaningful.

Table 8
Effect of Program Components on Implementation Rates

	Effect Size	Magnitude of Effect Size
Use of Landlord Coordinator*	0.01	Negligible
Amount of out-of-pocket costs*	0.08	Negligible

N=1,486-2,961

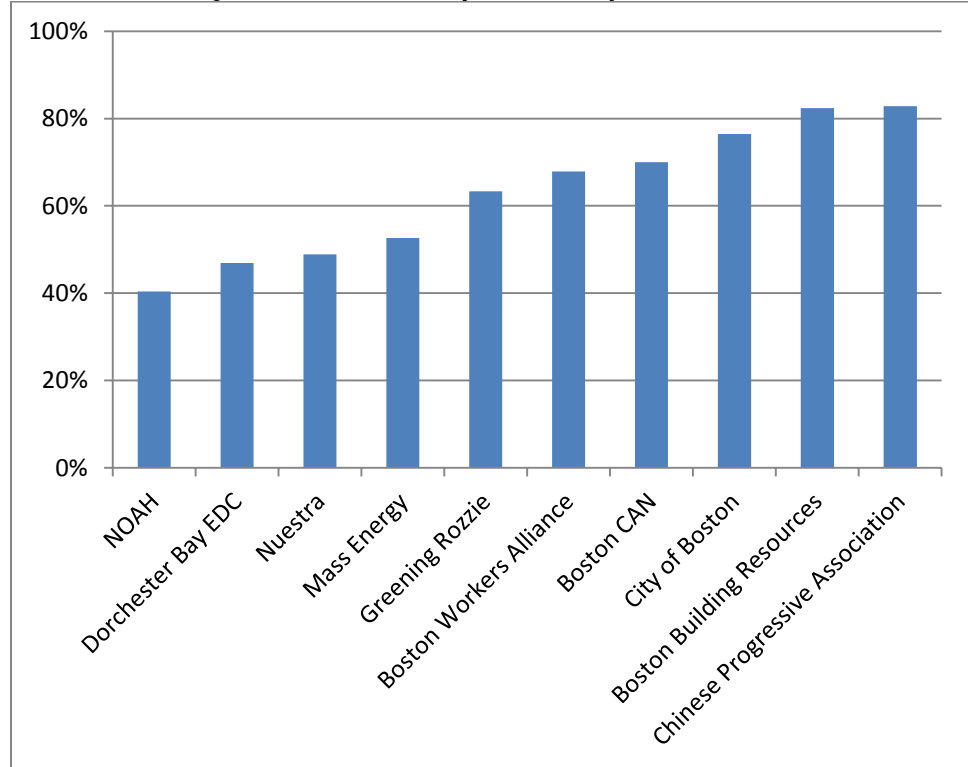
Note: Those marked with an asterisk are statistically significant (Chi-Square test for independence) at the $p < 0.01$ level.

Due to the large number of community outreach partners (n=27) in comparison to the number of households for which we had data (n=672), there were a large number of partners with very small numbers of households (less than 10), so statistical analyses were inappropriate to conduct. However, patterns emerged across the community partners where a reasonable number of households were available. Using a threshold of 15, implementation rates were computed for each community partner. As shown in Figure 5, community partners such as the Chinese Progressive Association and Boston

¹³ All neighborhood means fall within the 95% confidence interval.

Building Resources were very successful. Both had implementation rates exceeding 80%, substantially greater than the average rate of around 50%.

Figure 5
Full or Partial Implementation Rates by Community Outreach Partner



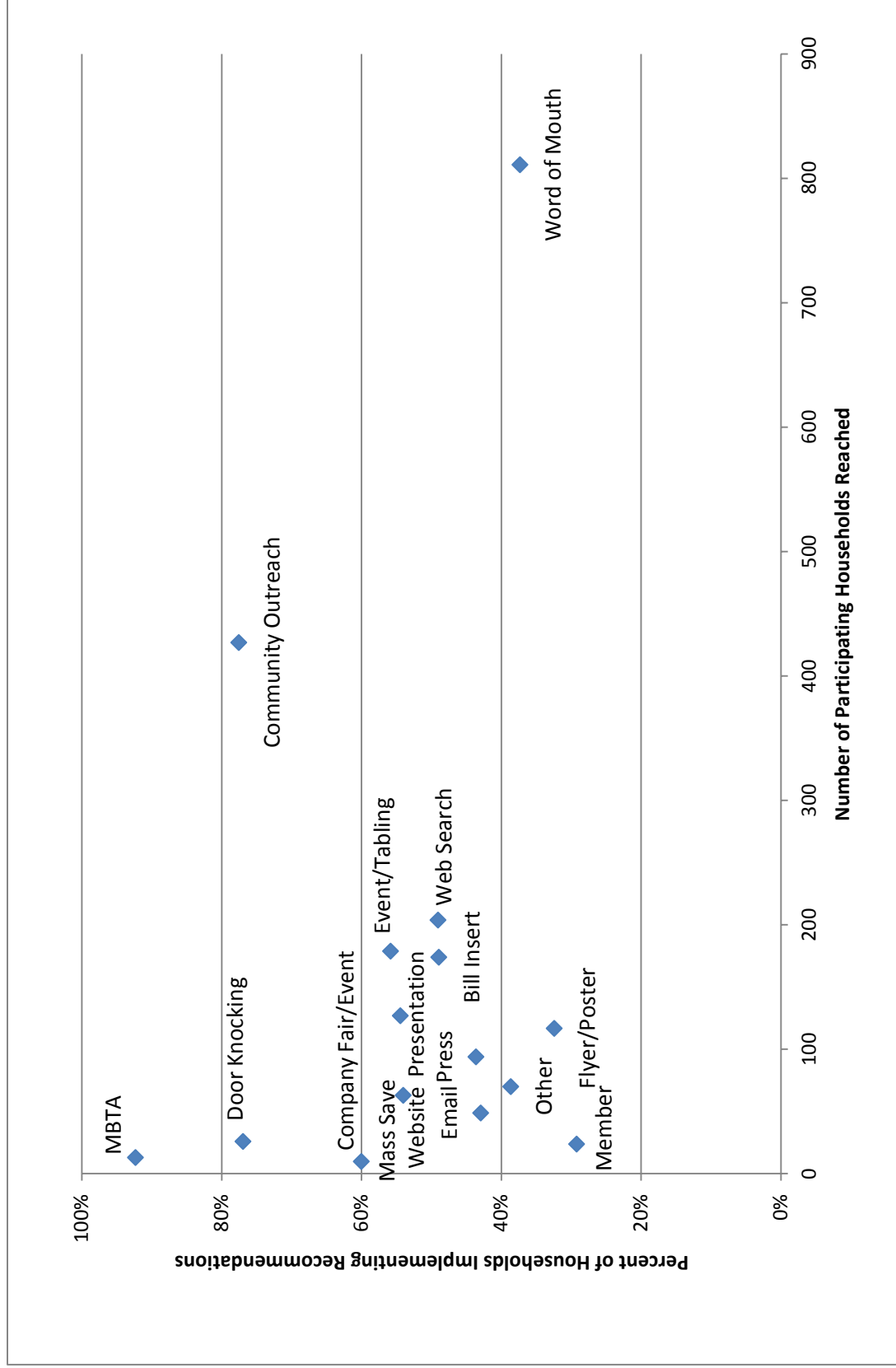
N=2,961

OUTREACH STRATEGY EXPLAINS LITTLE ABOUT IMPLEMENTATION RATES

Fourteen outreach strategies¹⁴ have been employed to varying degrees as part of this program. As shown in Figure 6, some strategies are very successful at reaching hundreds of residents (e.g., word-of-mouth, community outreach) while others are able to capture the attention of only a few residents (e.g., MBTA, company fair/event). In addition, varying implementation rates are achieved from a low of around 25% to a high of about 90%. Understanding why there is such variability in terms of implementation rates as well as the number of households reached is imperative.

¹⁴ These data are collected by Next Step Living. Residents were asked to identify one primary strategy.

Figure 6
Full/Partial Implementation by Marketing Strategy



N=2,318

Logistic regression results indicate that knowing the outreach strategy explains little about the differences in implementation rates across the program¹⁵. In addition, none of the strategies produce statistically better implementation results than community groups¹⁶. However, as shown in Table 9, some strategies achieve comparable results to community groups. Four strategies work as well as community groups for those who own their home as well as for those who rent:

1. Fair
2. Door knocking
3. Mass Save website
4. MBTA

Table 9
Outreach Strategies with Implementation Rates Comparable to Community Groups

Strategy	Homeowners	Tenants
Fair	x	x
Door knocking	x	x
Email		x
Mass Save website	x	x
MBTA	x	x
Member	x	
Presentation		x
Web search	x	

N=5,491 and 2,629, respectively

A couple more strategies seem to work as well as community groups for one group more than the other:

- web search and member for homeowners
- email and presentation for tenants

There are four strategies -- bill insert, flyer/poster, press, and word-of-mouth -- that produce statistically *lower* implementation rates than community groups for both homeowners and tenants.

As one Boston resident explains, the personal contact embedded in some strategies may enhance the strategy's appeal.

I can't speak more highly about our experience! We learned about the program through a neighbor canvassing and I've told families about this opportunity as well. It was so informative, interesting, and helpful. We feel

Outreach strategy alone, however, does not do a very good job of explaining the differences between full implementation and partial/no implementation.

¹⁵ Explain 10-13 % of the variability overall; slightly less for homeowners (9-12%), and somewhat more for tenants (17-23%).

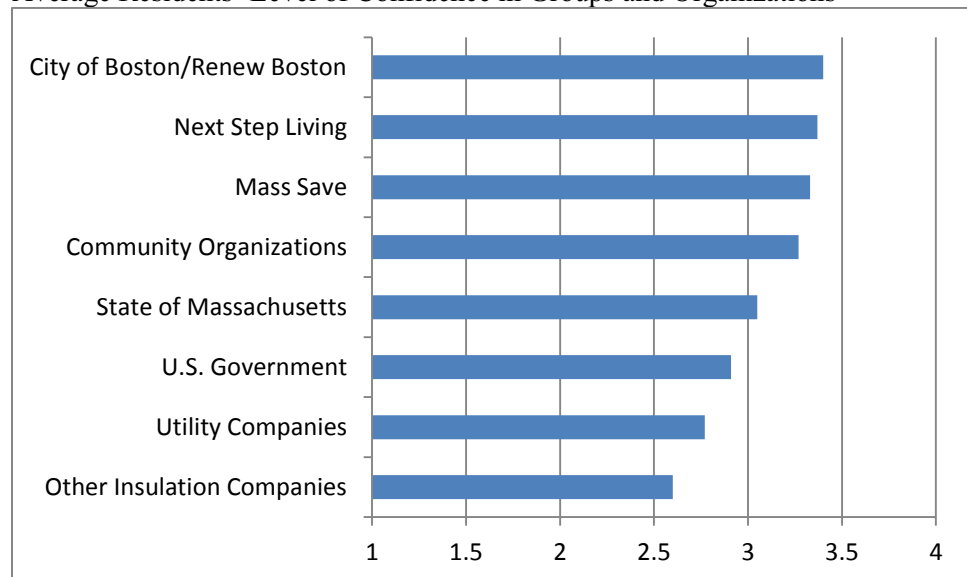
¹⁶ Because community outreach was one of the solutions proposed to address barriers in implementation, each of the remaining 13 strategies was compared to community groups.

the difference having the insulation!! Thank you so much. Great program, hard-working employees, great outcomes.

*“Next Step Living was extremely helpful and went far beyond my expectations...very helpful, courteous, and explained everything to me when I had additional questions.”
-Boston Resident*

However, this comment also highlights/supports that satisfaction with the program and high implementation rates are not entirely dependent on the outreach method. Building trust through a positive experience is a crucial component. Survey results, as shown in Figure 7, indicate that there is some trust already built by Renew Boston, Next Step Living, and Mass Save. Boston residents have *some* to *a lot* of confidence in these groups regarding what they tell the public about home energy efficiency. Furthermore, residents that have implemented some or all of the recommendations from their Home Energy Assessments also rated their confidence in these three groups higher than residents who have no plans to start implementation before October 2012. This indicates that trust is likely a factor that helps explain the differences between full/partial implementation and no implementation rates. Residents are much more skeptical of the utility companies compared to these three groups when it comes to learning about home energy efficiency. This might help explain why the bill insert outreach method does not yield implementation rates as strong as that of some other outreach methods.

Figure 7
Average Residents' Level of Confidence in Groups and Organizations



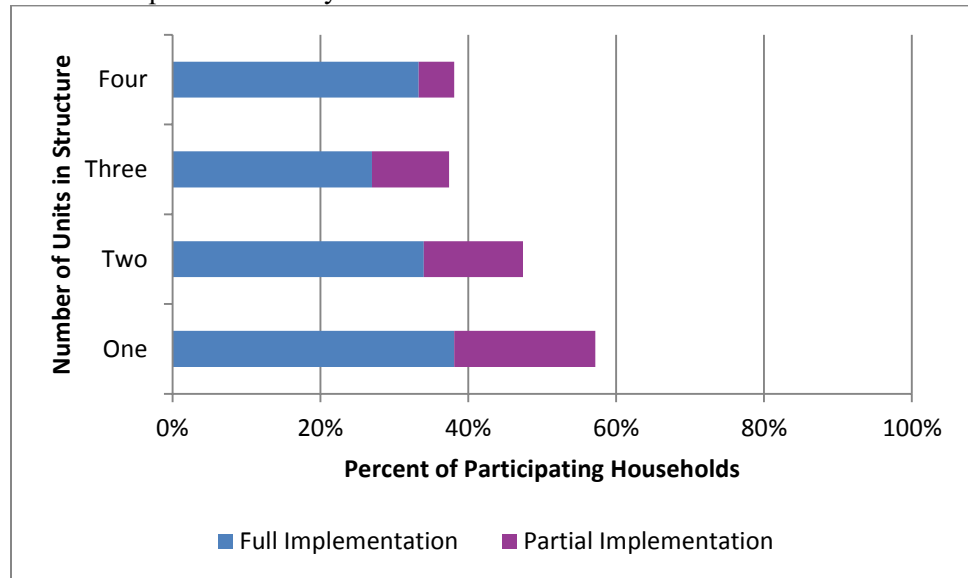
N= 195-330

Response scale: 1 (no confidence), 2 (only a little confidence), 3 (some confidence), and 4 (a lot of confidence)

IMPLEMENTATION RATES GREATEST AMONG HOMEOWNERS LIVING IN SINGLE FAMILY HOMES

Having more than one unit within a structure appears to function as a proxy in measuring case complexity. As shown in Figure 8, residents of single family homes implement recommendations at higher rates than do those living in two- to four-unit structures. Once a structure involves families living in a three- or four-unit structure, the implementation rates drop even further to slightly more than half of the rate of single family homes.

Figure 8
Level of Implementation by Number of Units in Structure



N=2,881

Over half of home owners, 54 out of 100, implemented (full or partial) recommendations, compared to only 38 out of 100 renters. While these differences in implementation rates are statistically significant, the effect is small¹⁷. However, nearly all tenants participating in this program live in two- to four-unit structures, compounding the situation.

Survey and interview results suggest two primary reasons for these differences in implementation rates. The first is that the stacked nature of many of these homes creates a dependency in the implementation rates, that is, the implementation of certain recommendations for the upper levels is dependent on those for the first floor unit. For example, residents living on the second floor of a three-family home cannot have blown-in wall insulation installed if the first floor residents are unwilling or unable to insulate their walls, because gravity will pull the insulation down through the walls. Another example shared during an interview was that the second floor unit could not move forward with air sealing until the first floor

¹⁷ Chi-square test for independence, $p < 0.01$, Cramer's $V = .16$

replaced the boiler; sealing the home with the old boiler would further compromise air quality in the home.

“I live in a triple decker with three different landlord/owners. Because one unit did not want to upgrade their heating unit, the other two units could not move forward with work (our system failed because the other unit failed) and also we would have had to collectively clean out the basement, which wouldn't happen unless every unit was on board.”
-Boston Resident

The second reason shared during the interviews is the sheer number of families that must come to agreement before moving forward. In the case of a three-family stacked home, which is common in Boston, reaching agreement on a path forward becomes more challenging. In addition to three resident families, there might be multiple landlords, and also a rental management company, making a consensus even more elusive. While agreement is sometimes possible, implementation can move at a snail's pace, if at all, as comments by these three Boston residents illustrate.

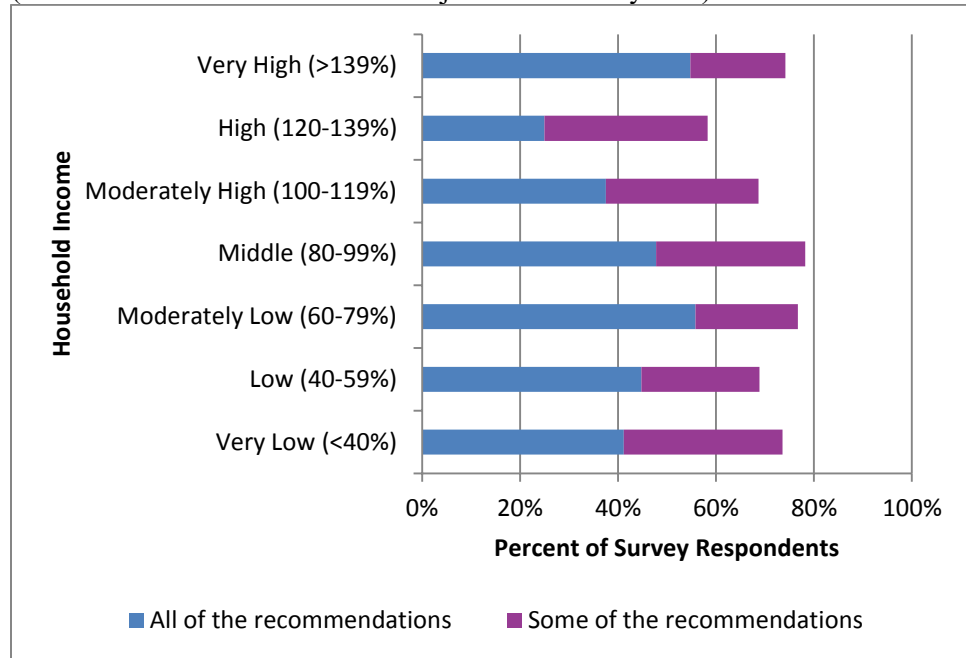
My biggest frustration is that I own a condo and we cannot get information on how attic insulation will affect the units below the second floor (which will clearly benefit.) The Home Energy Assessment does not take into consideration that the Condo Association, representing all owners, will be purchasing the service, and therefore all owners need to be contacted and info shared for the whole membership to decide on how much will be used from the condo fund towards these improvements.

We are tenants and passed along all of the information to our landlord. She is now waiting on the head of the condo association to move ahead with this for our building.

IS IT AFFORDABLE?

Affordability is expected to differ from household to household, and the underlying premise in affordability is that household income is a major factor. However, quantitative survey data suggests that household income – even after adjusting for family size – makes very little difference in implementation rates. As shown in Figure 9, there are some variations in implementation rates. However, there is no statistically significant relationship between income level and implementation level, indicating that these differences are likely random fluctuations that would occur by chance alone.

Figure 9
 Amount of Recommendations Implemented by Household Income Levels
 (Percent of Median State Income Adjusted for Family Size)



N=227

Data Source: GRG Online Survey of Participating Boston Households

Household income makes little difference in perceptions of affordability.

While household income was not available in the NSL data file, we explored the option of using Boston neighborhood as a proxy for income. About half (49%) of the variability in neighborhood implementation rates can be explained by knowing the median household income of the neighborhood (2010 Census). This indicates that a substantial amount of the pattern in implementation rates can be explained by income discrepancies between neighborhoods, suggesting that Boston neighborhood is a reasonable proxy for household income.

While there are statistically significant differences across the Boston neighborhoods with regard to implementation rates, the differences are relatively small (effect size = 0.13). When examining these data for households that own rather than rent their home, we find that a similar pattern – statistically significant, but small, differences between Boston neighborhoods. However, when examining these differences separately for households that rent rather than own their home, we find that there is no relationship between implementation rates and Boston neighborhood. A comment from one Boston resident through the online survey sheds lights on this finding.

It just doesn't make sense to base qualification on household income because renters, no matter what their income may be, have no real incentive to do major energy efficiency improvements to a rental on their own. It would be lost money.

“My fiancée and I both work and make decent salaries, but since he has a child support payment, we don't take home the amount of money it looks like we do.”
-Boston Resident

Thus, these data suggest that affordability is not solely about household income, even when adjusted for family size. Comments from the online survey suggest that using household income levels *without accounting for living expenses* captures only part of the story about affordability.

Now, my husband is working and although we are catching up on 9 years' worth of bills, we will not qualify for assistance [rebate] should we want work done on the house.

I have other financial responsibilities I have to pay first. I am interested in having my house insulated. I need that, but I was looking for a better price and it was still expensive for me.

Therefore, as the comments above suggest, affordability pertains less to total household income and more to *discretionary* income, the amount of income available for spending after the essentials (e.g., housing, food, utilities, insurance, transportation, clothing, child support) are taken care of.

While rebates can bring the costs down, it is unclear at what level the recommendations become affordable. The amount of out-of-pocket costs (total costs minus any rebates) a household would pay varies from one household to the next. Survey comments suggest that the threshold amount of out-of-pocket costs that make it too high vary greatly from household to household. For some, a few hundred dollars may still put the project out of reach.

The assessment was well detailed. However, based on the assessment I needed to pay an addition \$300, which I could not afford.

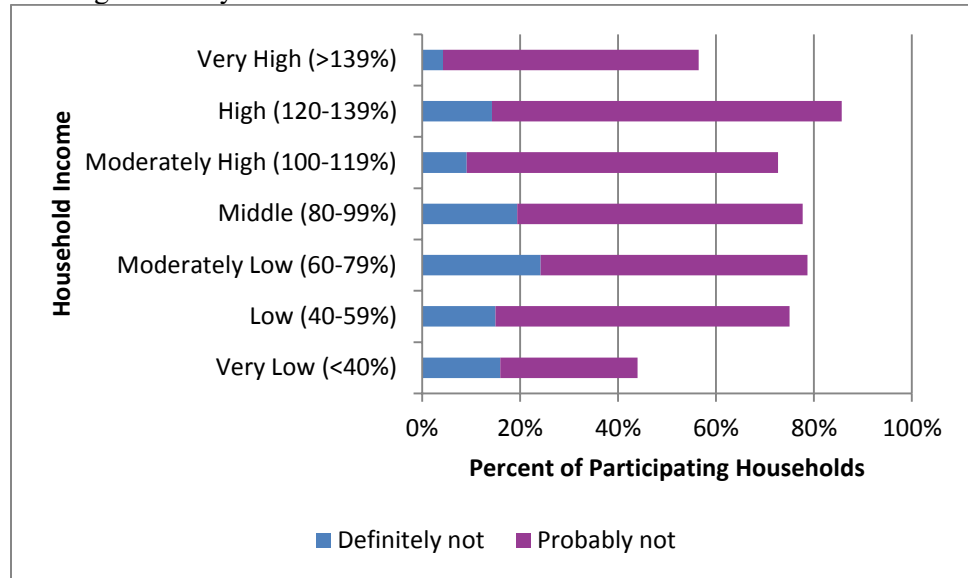
I can't afford to jump at large and costly projects from one day to the other and just drop 6K out of the blue.

As shown in Figure 10, regardless of household income, between 60% and 80% of households that implemented some or all of the recommendations from their Home Energy Assessment would not have moved forward with recommendations if the rebates had not been available. For households at the low end (<40% of state median income) and at the high end (>139% of state median income), the impact of the rebates was less dramatic. However, even for very high income households, rebates can be a powerful incentive.

Rebates also matter for households that implemented none or only some of the recommendations. On average, about 80% of these households would have moved forward if the rebates had been better. As shown in Figure 11, these trends vary little by household income level, even after adjusting for family size.

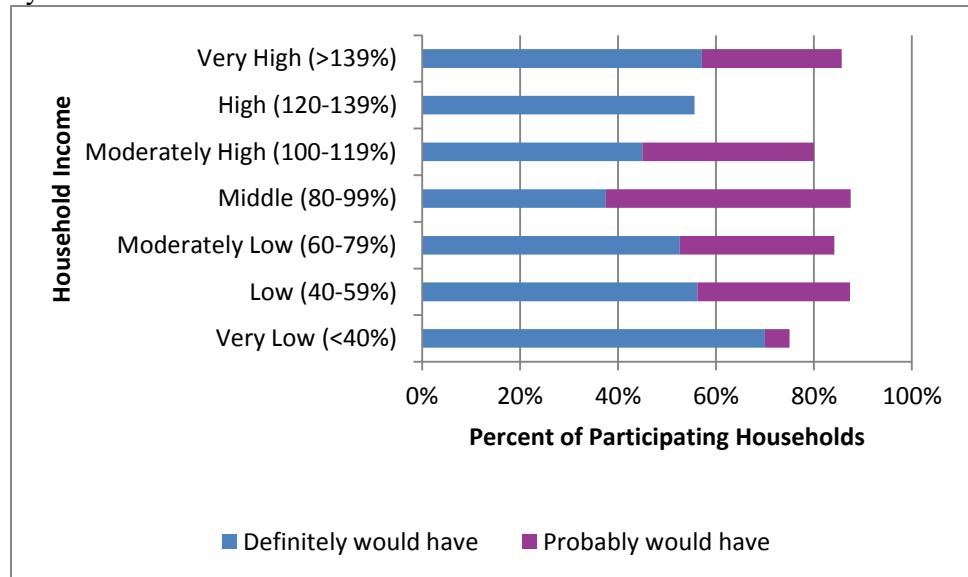
Rebates make implementation an attraction option regardless of income.

Figure 10
Households Not Likely to Move Forward with Recommendations without Existing Rebate by Income Level



N=166

Figure 11
Households Likely to Move Forward with Recommendations with Better Rebates by Income Level



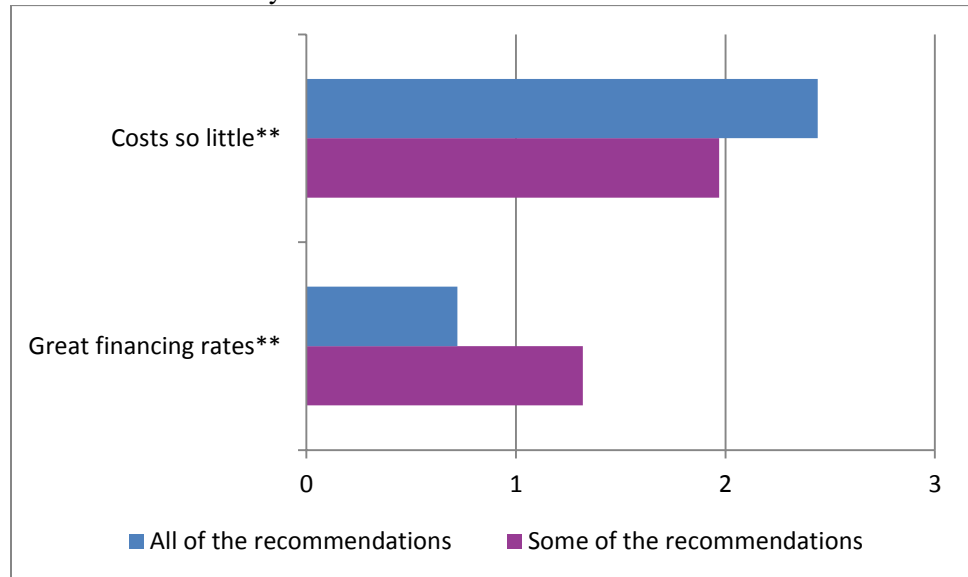
N=122

While rebates affect affordability, the interest-free loans had no impact on implementation rates for most households. Data indicated that while the zero percent

financing rates may be valuable for about one-third of the residents, they provided little to no incentive for two-thirds of Boston residents. For households with a recommendation to replace their heating system, zero percent financing was important to about half of the households and depended very little on the household income level.

Slightly more than six out of ten households with the lowest income (<60% of median state income) or the highest income (>100% median state income) indicated that low financing rates are important. However, for those in the middle income brackets (60-100% of median state income), only about four in ten households indicated that the low financing rates are important. Survey results as well as comments from the interviews, suggested that financing rates were not enough of an incentive to move forward and that rebates would be more likely to encourage adoption of recommendations. As shown in Figure 12, great financing rates trailed low out-of-pocket costs as reasons for implementing recommendations.

Figure 12
Financial Reasons why Residents Move Forward with Recommendations



N=78; 128

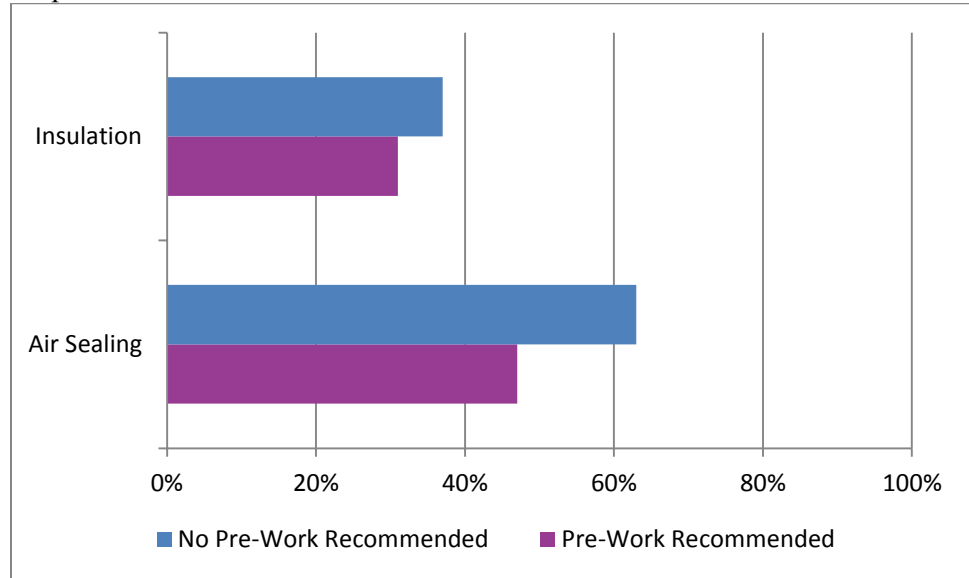
Note: Both differences are statistically significant (independent samples t-test) at the $p < 0.01$ level.

Preparation for Air Sealing and Insulation Adds Costs for Some Homeowners

Pre-weatherization recommendations explain some of the variability in whether or not air sealing and insulation recommendations are fully implemented. As shown in Figure 13, when no pre-work is required, residents are more likely to fully implement these recommendations. However, somewhat more than a third of the residents (37%) implemented all of the insulation recommendations. While the rate for fully implementing all of the air sealing recommendations is higher, it falls shy of the two-

thirds mark, suggesting that pre-work requirements and out-of-pocket costs to the resident are not the only barriers to full implementation.

Figure 13
Full Implementation of Recommendations by Product Type and Pre-Work Requirements



N=1,490-2,996

Some comments listed below from Boston residents on the survey illustrate the reasons behind the different implementation rates shown in the chart above.

“I chose not to go forward because of the cost of removing the knob and tube wiring from the home.”
-Boston Resident

The assessor also discovered that we had knob and tube wiring, which would have required sign off from an electrician and possibly a decent-sized expenditure before we could do any insulation. She also found that there was rot underneath some off our shingles, which would have had to have been repaired before installing insulation. That would have been another big chunk of change. I also live in a three unit building so I would have had to have gotten buy-in/sign-off from the other two units to proceed. By the end of the assessor's visit I was so overwhelmed I wanted to cry. Not that that was her fault - she was great - but all of sudden it just seemed like an awful lot of expensive things needed to be done to my house before I could do anything. So I didn't.

Bottom line, I qualified for free insulation, but only if I replaced the boiler, at a cost of \$6000-\$12000. National Grid and the local mechanical serviceperson disagreed with the tech's results, leading to arguments in my home, and leaving me in the middle.

They said if I moved everything out of the garage, they would insulate. Also they would add more to my attic if I did some other manual labor to prepare for them to do it. It was all too much work for too little.

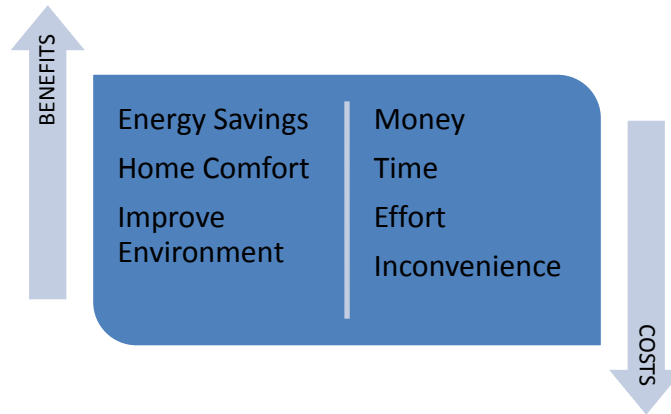
IS IT WORTH IT?

“I would definitely highly recommend this program to anyone willing to spend a day to get so much more in return.”

-Boston Resident

While financial costs are one factor, residents also view other costs as important. Costs in terms of time, effort, and inconvenience are three that have been mentioned on the survey and during the phone interviews. In addition, residents clearly want to see a balance between the costs paid and the benefits received. In other words, is it worth it? The two most frequently identified benefits include energy cost savings and improved comfort in their home. As illustrated by Figure 14, survey and interview results suggest that if the perceived benefits outweigh the costs, residents are likely to move forward.

Figure 14
Logic Underlying Balance of Cost and Benefits



“...my light bill went down...also kept the home much warmer even in the hallway and doors...thank you again.”

- Boston Landlord

While rebates were powerful incentives for many residents, as shown through the online surveys and the phone interviews, saving money on energy bills and improved home comfort was slightly more important to residents than out-of-pocket costs. Comments listed below from Boston residents illustrate the importance of these two factors.

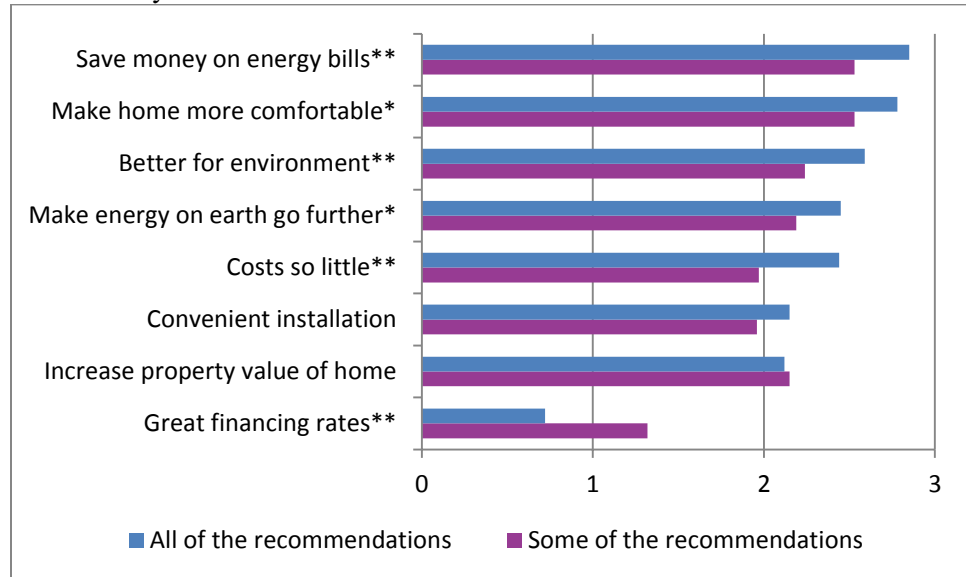
I am so glad we had the energy assessment done in our house. Since then we've noticed a significant savings on our gas and water bill.

Next Step Living was the best thing that happened to my house. It REALLY made a difference this winter. My house was WARM.

My house feels totally different, very comfortable.

As shown in Figure 15, low out-of-pocket costs (i.e., *costs so little*) trailed saving money on energy bills. Of the eight reasons listed in the survey, great financing rates received the lowest rating by far.

Figure 15
Reasons why Residents Move Forward with Recommendations



N=78; 128

Response scale: 1 (this doesn't apply to me at all), 2 (this applies to me a little), 3 (this applies to me somewhat), 4 (this applies to me a lot).

Note: Those differences marked with one asterisk are statistically significant at the $p < 0.05$ level; two asterisks are statistically significant at the $p < 0.01$ level (independent samples t-test).

When the benefits outweigh the costs, full implementation is likely as illustrated by these comments from two Boston residents who moved forward with all of the recommendations from the Home Energy Assessment.

The entire experience was excellent. I would recommend using these services to everyone. Next Step Living and the people who verified the scope of the work and then verified satisfactory completion were professional and efficient. I am very pleased with both the experience and the results. The insulation has helped tremendously.

The initial home energy assessment was very easy and convenient, all NSL staff were exceedingly friendly and helpful, took time to explain everything in our report in very simple terms, answered all our questions. Loved the program and the amazing funding opportunities through Renew Boston and Mass Save ...our home is now insulated, AND we have solar panels on our roof providing clean energy! Thanks, NSL and Renew Boston!

When costs outweigh benefits, implementation of recommendations is unlikely. As shown in these two examples from the online household survey, costs are not always about the out-of-pocket costs to be paid for the installation. Sometimes the costs are not financial, but are real in terms of time, effort, and inconvenience. As shared by one Boston resident who implemented some, but not all, of the recommendations:

I had to call multiple times to have the work completed and, once done several people have come to my house to 'inspect' the work. Apparently no one is keeping track, because I am still getting calls to allow more 'inspectors' in my home. That's the reason why I will not complete all work recommended through Next Step Living, free or not.

“The initial assessment was done in a very professional manner; however, the follow up was very poor.”

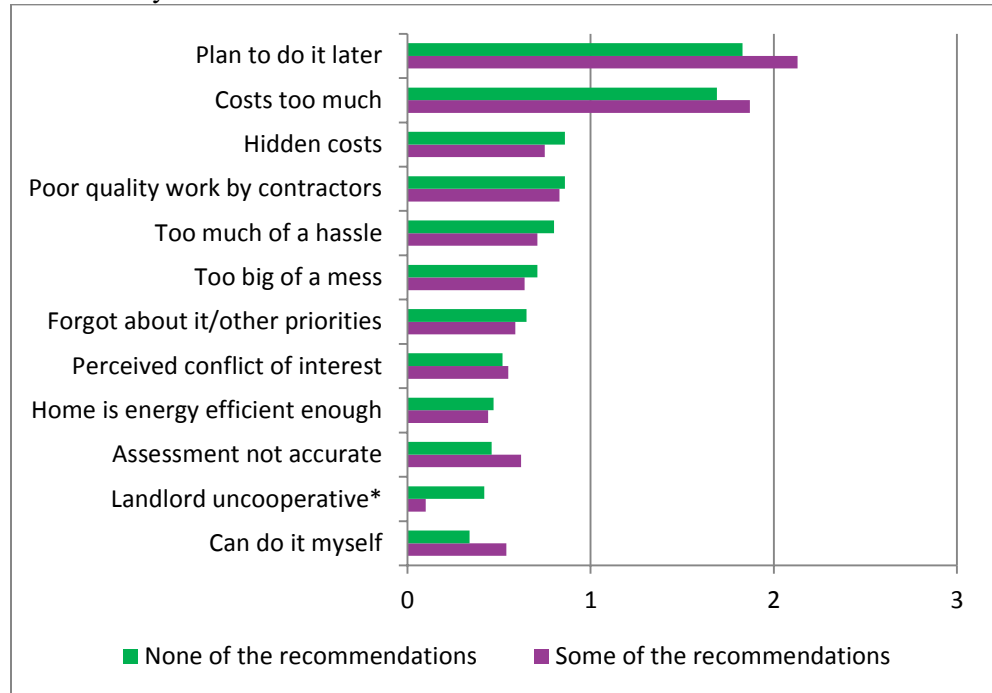
-Boston Resident

Sometimes, costs are about the expenses to be incurred before or after the installation. As shared by this Boston resident who implemented some of the recommendations from the Home Energy Assessment, but did not have insulation added:

Everyone I was in contact with throughout this process was great! However, in order to have insulation put in my house, I would have to have to re-paint the inside of my house & that would be an added cost.

For a large number of residents who have not implemented all of the recommendations, they still plan to do so at a later date. While the surveys and interviews indicated that residents delay implementation for a variety of reasons, out-of-pocket costs (i.e., *costs too much*) were one factor, as shown in Figure 16. Our interview results indicated that in at least a portion of the cases, high-ticket energy efficiency upgrades such as replacing windows, installing solar power systems, and replacing knob and tube wiring were the reason. For some households, the cost was prohibitive. In other cases, the plan is to move forward at a slower pace, such as replacing some windows one year and other windows the following year. In yet other households, some families indicated that they are not ready to live in a construction zone again or have experienced some recent life events (e.g., death in the family, major illness) causing them to put some upgrades on hold.

Figure 16
Reasons why Residents Do Not Move Forward with Recommendations



N=78; 83

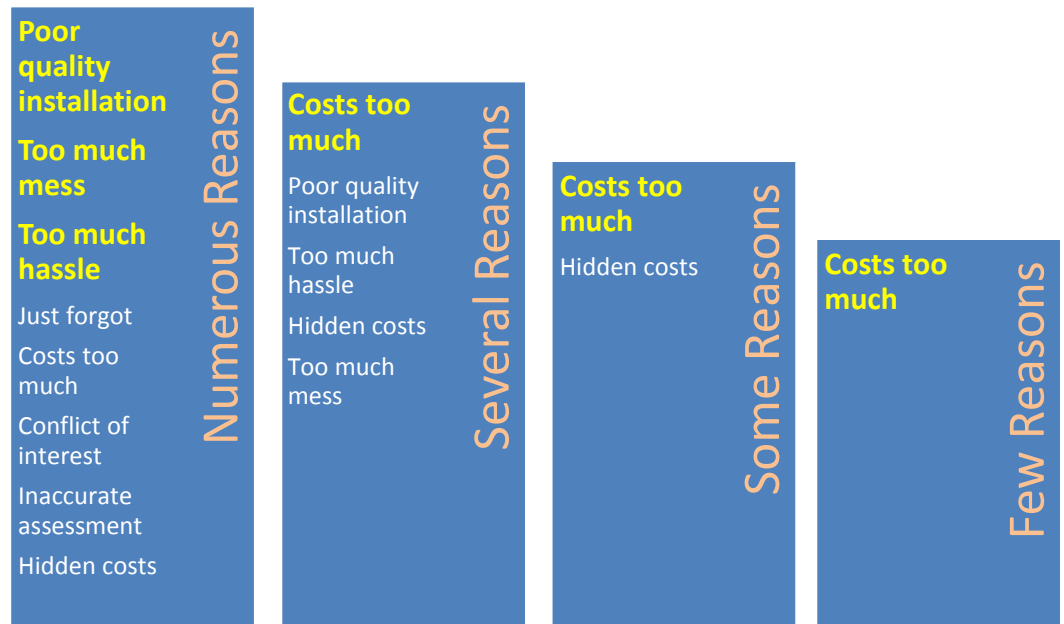
Response scale: 1 (this doesn't apply to me at all), 2 (this applies to me a little), 3 (this applies to me somewhat), 4 (this applies to me a lot).

Note: The difference marked with an asterisk is statistically significant (independent samples t-test) at the $p < 0.05$ level.

Although a fifth of homeowners (22%) indicated a myriad of reasons for not beginning to implement any of the recommendations in the Home Energy Assessment by October 2012, of the ten reasons¹⁸ proposed in the online survey, over half indicated that it was a small handful of reasons. As shown in Figure 17, the primary reason that not all recommendations would be started by October 2012 is cost. Beyond cost, once the number of reasons expanded to six or seven, issues of inconvenience (e.g., too much hassle, too much of a mess) and concern about the quality of the installation started to rise in importance. Overall, homeowners were not likely to indicate that they would do the work themselves.

¹⁸ Two reasons not included: my landlord will not cooperate (only applies to tenants), and will have it done in the future.

Figure 17
Homeowners NOT Moving Forward: Mean Rating of Reason by Number of Reasons



N= 67

Response scale: 0 (this doesn't apply to me at all), 1 (this applies to me a little), 2 (this applies to me somewhat), 3 (this applies to me a lot).

Note: Reasons in bold (mean > 1.8); reasons not in bold (mean > 1.0); reasons not listed (mean < 1.0)

While only a few renters completed the online survey, an uncooperative landlord was the number one barrier identified, followed by “do it later”. Very few other reasons were identified as important.

POST-INSTALLATION TASKS CAN BECOME OBSTACLES

Poor clean-up after installation can create ill will with residents. Nearly one-fifth of the comments (19%) on the online survey related to dissatisfaction with advanced preparation required or post-installation tasks that would need to be completed. In some cases, these tasks came as a surprise to the resident. These three comments illustrate the frustration expressed by residents:

They were supposed to caulk the nail holes in the siding and this was not done. It looks awful.

...the amount of nails (from removing the siding during insulation blow-in, presumably) that we found on the ground. Not ideal for a home where several children and pets live.

“I had to do a great deal of fixing after their departure... This makes me hesitant to perform more energy saving modifications to my home such as additional attic insulation.”
-Boston Resident

...but the way the company put my house back together was horrible. The company who blew in my insulation needs to take some carpentry classes to know that they cannot face nail a shingle and expect water not to get into the house....ruining all the work they just did over time.

Post-installation tasks can be obstacles to implementation. Sometimes the resident was informed in advance of the post-installation tasks to be completed so they could make an informed choice about moving forward. Both of these residents moved forward with some, but not all, of the recommendations.

We would have had the insulation done but because of the exterior of our house, the work would have to be done from the inside. We didn't want holes drilled into the walls to blow in the insulation because that would have created too much work to make the inside look good again. We recently had all the rooms painted and didn't want to do it again.

I was told the job would be messy and that I would have to hire a clean-up crew as well as someone to re-plaster the walls.

However, not everyone had problems with post-installation tasks. Some residents explicitly expressed positive experiences with post installation.

I was afraid the blown in insulation process might damage the outside of our house, but the technicians did a great job and you can't even see any holes.

The team was on time, respectful, polite and cleaned up before they left.

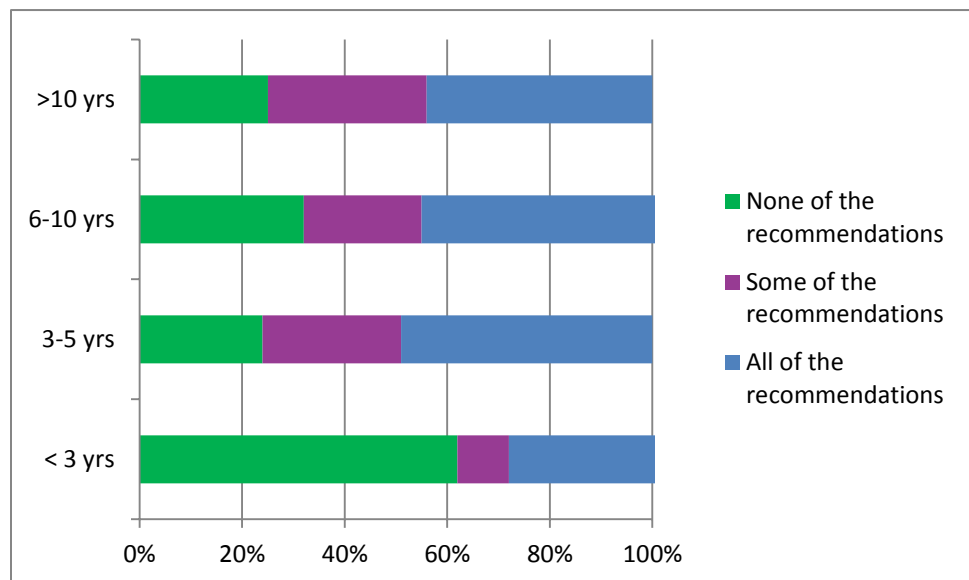
Others regarded the out-of-pocket costs as including not only the total dollar amount required to move forward with the recommendations, but also in terms of perceived value. This suggests that the project must be perceived as not only be affordable but also worth it to the resident. For this resident, the value is based on the how long it would take to recoup the costs.

To accomplish the air-sealing I would need to spend several thousand dollars to remove the existing attic flooring, build it up and then re-install after the work is completed. The simple payback is nearly 15 years, longer than I intend to stay in the home.

BOSTON RESIDENTS PLANNING TO LIVE IN HOME FOR LESS THAN THREE YEARS IMPLEMENT AT LOWER RATES

As shown in Figure 18, residents planning to stay in their home for less than three years were much less likely to implement any of the recommendations. Over 60% of residents expecting to live in their home for less than three years implemented none of the recommendations. However, for families who planned to live in their home for more than three years, only about one-fourth to one-third did not implement any of their recommendations indicating that three more years in a home is a critical threshold for many households.

Figure 18
Implementation Rate by Length of Time Boston Residents Plan to Live in Current Home



N=289

On the other hand, others view the value from a different perspective – increased comfort level now present in the home. These residents shared their opinions.

This was costly and time consuming, but...well worth it. As soon as the insulation was blown I could feel the difference. Thank you so much!

Our home is warmer in the winter and cooler in the summer and we are very pleased.

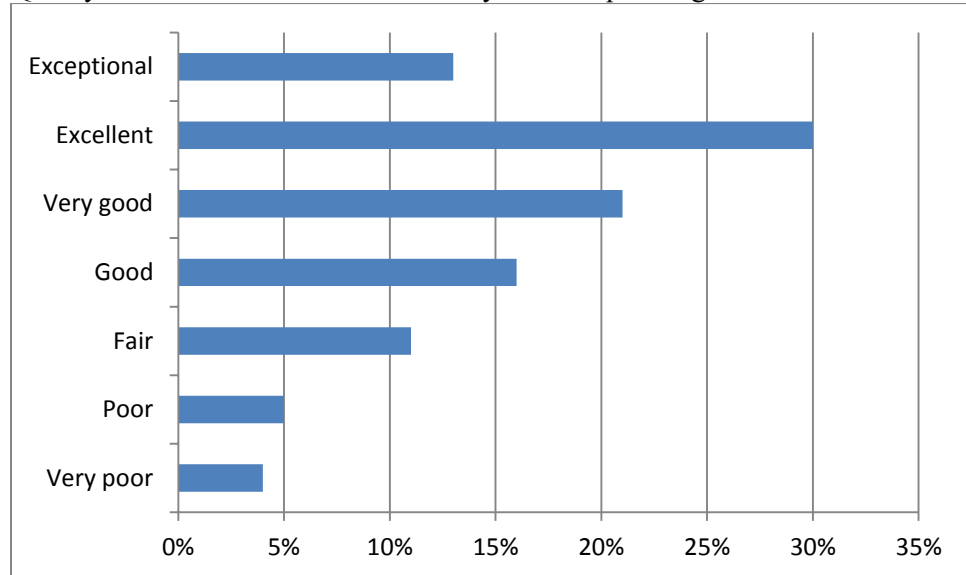
In general, to move forward with implementation, residents must believe the recommendations are affordable and worth the effort and expense for their family.

EXCELLENT EXPERIENCE FOR MANY; UNFAVORABLE FOR SOME

Customer service provided by Next Step Living was rated as *exceptional*, *excellent*, or *very good* by nearly two-thirds of the survey respondents (63%), as shown in Figure 19. Although the experience was extremely positive for many, for one-fifth (20%) customer service provided by Next Step Living was rated as *fair to very poor*.

“The Energy Assessor was very professional, clean, and courteous...This is a tremendous program.”
-Boston Resident

Figure 19
Quality of Customer Service Provided by Next Step Living



N=337

Survey comments as well as phone interviews showed that the residents’ experiences with the Home Energy Assessment varied among households. In addition, the nature of the experience as captured through residents’ comments greatly influenced their perceptions of Next Step Living. Survey comments¹⁹ indicated that over a third of households (36%) had only very positive experiences from assessment through installation. All of these residents rated the quality of customer service as *good*, *very good*, *excellent* or *exceptional*. These results point to the importance of the quality of customer service in shaping perceptions.

Over one-third of residents reported mixed results, meaning that part of their experience was favorable while another part was unfavorable. Of the residents who indicated a mixed experience, over four times as many residents rated the customer service as *excellent* or *exceptional* as did those who rated it as *poor* or *very poor*.

A smaller percentage (21%) of survey comments described only negative experiences. While none of these residents rated the quality of customer service as

¹⁹ A total of 220 survey respondents provided comments.

excellent or *exceptional*, more than half (59%) of these residents rated the level of customer service as *fair*, *good*, or *very good*. This also means that only about 40 people who described negative experiences in their comments rated customer service as *poor* or *very poor*. Thus, when residents experienced alarming or frustrating situations while participating in this program, protective factors may be diminishing residents' negative perceptions of Next Step Living. Some of the survey comments highlighted in this section endorse this theory.

Specifically, residents are more tolerant of negative experiences in two types of circumstances. First, customer service can still be perceived as great if the Next Step Living employee tries diligently to rectify the situation, as shown in this quote from the online survey. This Boston resident rated the quality of customer service provided by Next Step Living as *exceptional*.

Next Step Living started doing the insulation. Everything was fine in the bedroom & dining room. Then they started the living room & blew out the wall on either side of the window so I did not finish the rest of the house. The man that repaired it was very good & even matched the color of the walls.

Second, customer service can still be perceived as very good if the negative experience is relatively minor in comparison to the benefits received. Both of these two Boston residents rated the quality of customer service provided by Next Step Living as *excellent*.

The process took a little longer than expected with regards to getting my home ready for the insulation process, but everything that Next Step Living told me was beneficial to the safety, comfort and well-being of my home. I really appreciate this opportunity that having my home insulated has afforded me.

The holes drilled into the inner walls to blow in insulation were a bit more difficult to finish and paint than I expected. I knew they would only be roughed in, but I didn't think it would be as rough as it was, or that I would have to putty and spackle and sand as much as I did. This is not a complaint, just an observation.

Analyzing the comments from the survey showed interesting patterns in the dynamics that contributed to the quality of the experience. For example, professional, competent, and courteous staff were vital to ensuring a positive experience. On the other hand, poor communication and lack of follow-up were frequently cited as the reasons for the unfavorable experience.

As shown in Table 10, for nearly three-fourths of the residents who shared positive experiences, the dominant factor was, by far, the professional, competent, and courteous staff.

Table 10
Top Five Favorable Experiences Shared through Survey Comments

	Percentage
Professional/courteous/competent staff	72%
Satisfaction with end result	17%
Comprehensive/Good energy audit	19%
Great rebates	12%
Savings on energy bills	8%

N=172

Note: Adds to more than 100% because more responses could be coded into multiple categories.

Comments by residents from the online survey highlighted some of the specific personnel characteristics or behaviors that they found especially gratifying.

The people that came to my home were very professional. They explained what they would be doing, etc. I was very pleased with them.

The insulation crew paid attention to every small detail and were very good with sealing all attic seams, holes around electrical and plumbing ...

...he worked really hard to finish what turned out to be a fairly difficult installation.

Not all residents reported a positive experience. As shown in Table 11, poor communication and lack of follow-up between the resident and Next Step Living or Renew Boston was by far the number one explanation shared by residents (37%) regarding unfavorable experiences, followed by protracted timelines.

Table 11
Top Six Unfavorable Experiences Shared through Survey Comments

	Percentage
Poor communication/lack of follow up	37%
Scheduling issues/long time to finish	20%
Much preparation and/or clean up	19%
Too costly/cannot afford	14%
Poor communication within/across organization(s)	13%
Poor quality installation	11%

N=139

Note: Adds to more than 100% because more responses could be coded into multiple categories

In an effort to keep up with the high demand for Home Energy Assessment services, the number of staff members employed by Next Step Living increased dramatically from a staff of 24 in May 2010 to nearly 430 in October 2012. Maintaining consistent high quality customer service, while dramatically increasing personnel, is a common challenge for start-up companies. Given the high growth rate of Next Step Living, some snags in customer service would not be entirely unexpected. Nonetheless, marketing experts report that negative experiences may have a stronger impact than positive experiences when shared with friends and neighbors²⁰.

The most important factors, according to these data, are competent and courteous staff, good communication with residents, and timely installation services. Even when events go awry, good communication and courteous, helpful staff can counterbalance perceptions in a way that ensures that good will is still maintained.

²⁰ Chevalier, Judith A. and Dina Mayzlin (2006), “The Effect of Word of Mouth on Sales: Online Book Reviews,” *Journal of Marketing Research*, 43, 345-354.

CONCLUSIONS AND RECOMMENDATIONS

This section of the report outlines our conclusions based on the data collected and analyzed. In addition, we have provided one or two recommendations linked to each key finding. We anticipate that Renew Boston, Mass Energy Consumers Alliance, and Next Step Living will be able to identify additional recommendations based on their depth of knowledge and experience with the program.

In order to conduct rigorous, systematic analyses from existing data sources as planned in this study, improved tracking of key metrics that minimizes the amount of incomplete data is a critical first step.

A database designed for long-term strategic planning is critical to documenting the long-term process of implementation of Home Energy Assessment recommendations across Boston. Therefore, *GRG recommends the development of a data system to incorporate a focus on long-term strategic planning, which would include:*

- Clear data entry standards and protocols, including expectations for entering, in a timely manner, data on recommendations on all households that received a Home Energy Assessment, regardless of the intentions expressed by the household member about implementation;
- A data dictionary or codebook that includes the name of every variable, a complete description of the variable, and the possible options or categories. All of the options clearly distinct from one another, with no overlap;
- All staff responsible for data entry are trained in data entry procedures (including timelines for entering data); and
- Daily, computerized, data quality-control checks to flag missing or inconsistent data. Missing data entered in a timely manner.

All of the other GRG recommendations are based on the premise that a data system has been developed such that incomplete data on key metrics are minimal (<3%).

Homeowners living in single family homes implement Home Energy Assessment recommendations at substantially greater rates than those living in multi-unit structures.

Our results indicate that residents living in multi-unit structures, including condominiums, face greater obstacles in implementing recommendations than do those living in single family dwellings. One possible reason is the stacked nature of many of these homes. For example, residents living on the second floor of a two-family home cannot install blown-in wall insulation if the first floor residents are unwilling or unable to insulate their walls. Another likely contributing reason is the sheer number of families that must come to agreement before moving forward. As condominiums have become more popular, many

triple decker homes have been converted into individually owned units, and reaching agreement on a path forward for these buildings could quickly become challenging.

Based on these results, ***GRG recommends that Renew Boston provide additional supports for multi-unit homes, including condominiums.*** One potential support would involve changing the title of the Landlord Coordinator to something like Multi-Unit Coordinator, and revising the job description, where needed, to focus on all multi-unit structures regardless of ownership status. In addition, a critical step is ensuring that these services are routinely offered to residents living in multi-unit structures. By shifting the focus to multi-unit structures, this newly revised position can be a lever to strengthen an existing strategy – empowering one of the residents to serve as a point person to help coordinate the logistics of conducting the Home Energy Assessment as a single structure rather than separate units.

By conducting the assessments in a coordinated fashion, rather than piecemeal, considerable efficiency is achieved (e.g., less time and gasoline spent traveling multiple times to the same building structure). However, more importantly, this strategy increases the likelihood of getting everyone on the same page early in the process and underscores the impact of the decisions of each individual resident and/or owner on all the others living in the same building. Gaining understanding of the perspectives of the other stakeholders of their structure may encourage creative problem-solving that leads to innovative solutions.

For multi-unit homes in which residents have been unable to reach an agreement, ***GRG recommends that the services of a trained mediator should be offered to help homeowners²¹ work out any unresolved differences.*** Mediation is used in labor negotiations as a more cooperative alternative than binding arbitration or litigation in helping labor unions and management reach agreements that are beneficial to all parties. A skilled mediator will listen to homeowners (and tenants) to find out what they want and will use empathy and questions to reach a creative resolution with which all parties are comfortable. Renew Boston could provide a list of skilled, trained mediators from which homeowners may choose. As an alternative, the Landlord Coordinator could receive training in mediation. The cost for one mediation session (e.g., 90 minutes) could be covered, with homeowners paying for additional sessions, if needed. This strategy may help loosen the implementation gridlock that often exists in multi-unit structures.

Landlords implement recommendations in rental units at slightly lower rates than do homeowners living in similar housing structures.

Our results indicate that while most renters live in multi-unit structures and thus experience the challenges previously discussed, they can face a few additional challenges such as an imbalance in bargaining power. Landlords are the ultimate

²¹ Homeowner means the owner of the unit, i.e., the landlord in the case of a rental.

decision-maker regarding upgrades to the home and thus can either pave the path or put up roadblocks. Thus, it is the behavior of the landlord, as well as the relationship between the tenant and the landlord, that the program should aim to influence. Based on these results, ***GRG recommends that Renew Boston focus on providing additional supports for the landlord.***

In many rentals, tenants, not landlords, are responsible for paying the utility bills, so the former can be very motivated to be energy efficient because it directly impacts their wallets. Conversely, lower energy costs are not necessarily a motivating factor for landlords. To have a similar impact, a different strategy is needed that would appeal to them. One strategy is the creation of an incentive system that would reward landlords for providing more energy efficient rentals. Many cities, including Seattle, Baltimore, and Milwaukee, already use incentive programs to influence landlord behavior in domains other than energy efficiency. In order to build a critical mass of responsible landlords in the United Kingdom, some cities have used a comprehensive approach to providing incentives such as reduced fees for permits and licenses, free inspections, discounted insurance rates, and fast track approval for construction permits. Finding the incentives for energy efficiency that would be enticing to Boston landlords would be a crucial first step.

Another option suggested by a tenant we interviewed is the creation of a one-page tip sheet (available in print and/or electronic PDF versions) for tenants to give to landlords and/or tenant management companies, which would provide a summary of the program and highlight the benefits of participation for both landlord and tenant. Inclusion of a website URL, phone number, and/or email address for landlords who seek more information would be critical. Even without an assessment for an entire building or a landlord coordinator, this sheet would help tenants communicate more efficiently and effectively with their landlord about the process and would reduce the possibility of miscommunication. This tip sheet could also be posted on the City of Boston website as a resource for tenants and landlords.

“...where I heard about these opportunities, I am sure I saw information about it in various places afterwards, but I initially made the call at the recommendation of an electrician who told me he had had work done for him and was very satisfied.”
-Boston Resident

GRG also recommends that, where possible, Renew Boston market directly to the decision maker, i.e., landlords and condominium associations.

Personal contact from a trustworthy source leads to higher implementation rates.

Our results indicate that word-of-mouth is, by far, the most popular marketing strategy for inducing residents to get a Home Energy Assessment conducted. However, this strategy has average implementation rates of less than 40%. In contrast, community outreach and door knocking reach only about half as many residents as does word-of-mouth, yet these two marketing strategies have implementation rates (partial or full) near 80%, substantially higher than most other methods used in this program. Residents who have some or a lot of confidence in the community group from which they heard about the Home Energy Assessment are nearly twice as likely to fully implement recommendations compared to those with little to no confidence. Thus, in order

to improve implementation rates, it is crucial to focus marketing efforts on community organizations where at least some trust is already established. Based on these results and a suggestion from a resident we interviewed, ***GRG recommends that Renew Boston focus marketing efforts on one or two Boston neighborhoods at a time to focus on more personalized contact.***

One strategy is to begin with a neighborhood or two in which Renew Boston has already built a strong foundation, i.e., many residents with positive experiences and few residents with negative ones. Our analyses of survey data indicate that neighborhoods such as Dorchester, Mattapan, Roxbury, or West Roxbury are places to consider. However, because the online survey represents only a small portion of participating households from each neighborhood, any other available data would be important to consider as well. Renew Boston may wish to recruit residents who are viewed as trustworthy and had a very positive experience in implementing their recommendations to share their story with neighbors. In addition, consider enlisting the support of organizations in that community that are viewed as knowledgeable and trustworthy.

The quality of customer service matters.

Our survey results indicate – and interview results confirm – that professional, courteous, and competent Energy Specialists to conduct Home Energy Assessments and contractors to perform the installation are key to creating a positive experience for residents. However, poor communication and lack of follow-up are the primary reasons residents experience frustration. While great rebates compensate for some level of inadequate customer service, residents will tolerate only a certain level of poor service, regardless of the size of the rebate. Based on these results, ***GRG recommends that Renew Boston hold vendors accountable to provide a high-quality, consistent customer experience.***

Based on comments provided by residents, we suggest focusing on three aspects of customer service:

1. communication with the resident,
2. competency of the staff, and
3. approach of the staff.

To ensure residents are well-aware of the advance prep work required and post-installation tasks necessary, one option is to provide this information to residents at the same time as the Home Energy Assessment report. Because about nearly two-thirds of the population are visual learners, providing information in a user-friendly *written* form is critical; also reviewing this information orally is important for auditory learners (about 30% of the population). Multiple interactions may be necessary, regardless of the format, because some residents may find the amount of information they are trying to absorb in one day to be overwhelming. This is especially true when the concepts discussed and vocabulary used may be quite unfamiliar.

Residents clearly want competent staff doing the installation itself, but they also want to know that the Home Energy Specialist is competent to conduct the assessment. Ensure that the vendor has put appropriate mechanisms in place to guarantee that each Home Energy Specialist has the background to identify asbestos and other situations (e.g., walls too narrow) which would make the installation of blow-in insulation impossible. Residents taking time off from work to be home for the installation become very frustrated when the installation must be rescheduled, or in some cases, cancelled, due to barriers that were not detected during the Home Energy Assessment.

Finally, ***GRG recommends ensuring staff display an attitude of helpfulness.*** Keeping residents informed about any delays in installation, going above and beyond in rectifying any errors that do occur, and providing concrete options residents could explore if blow-in insulation is not possible all go a long way in building good will with residents.

Rebates are a critical component for success.

Regardless of household income, rebates are a powerful incentive. Between 60% and 80% of households that implemented some or all of the recommendations from their Home Energy Assessment would not have moved forward with recommendations if the rebates had not been available. On average, about 80% of the households that implemented none or some of recommendations would have moved forward if the rebates had been better. Based on these data, ***GRG recommends continuing to offer rebates for insulation and air sealing and possibly consider increasing the amount of the rebate in specific circumstances.*** Specific examples are discussed in the next few recommendations.

Pre-weatherization issues hinder making homes more energy efficient.

Pre-weatherization recommendations explain some of the variability in whether or not air sealing and insulation recommendations are fully implemented. When no pre-work is required, residents are more likely to do these. Based on these data, ***GRG recommends providing additional supports for residents needing to address pre-weatherization issues.***

Based on a suggestion by several residents interviewed, one option is creating four one-page informational sheets, one for each pre-weatherization issue:

1. knob and tube wiring,
2. asbestos removal,
3. heating or cooling system upgrades, and
4. hot water heater replacements²².

²² Air sealing a home is ill-advised if the hot water heater is emitting high levels of carbon monoxide, likely due to improper venting and/or inefficient combustion.

Each sheet would contain:

1. the steps needed to address the issue;
2. a short list of competent contractors, including complete contact information, who are skilled to correct the issue;
3. a brief description of the typical process to resolve the issue (e.g., expected timeline, preparation work to be completed by homeowner);
4. a ballpark estimate of the costs residents could expect to pay; and
5. specific information about any tax credits or rebates available.

The pertinent informational sheets would be given to residents with their completed Home Energy Assessment. Not only is this information comprehensive, it can serve as an incentive for getting pre-weatherization issues resolved quickly. Although descriptive words such as *costly*, *expensive*, or *lengthy process* may be accurate descriptions, they are not specific and are daunting to residents, so they should be avoided in these documents.

Although there may be only a small proportion of homes dealing with knob and tube wiring or asbestos, for some homeowners the correction costs are prohibitive. We have two suggestions for assistance:

1. financial support in the form of rebates from this program when there are few, if any, other sources for rebates or tax credits and
2. partnering with housing rehab agencies and organizations that can help provide families on the lower income side of the targeted population with home renovations.

FINAL CONCLUSIONS

In summary, personal contact was an influential strategy, not only for spreading the message, but also for generating high implementation rates. Specifically, trust is a critical factor in ensuring that this strategy flourishes. Residents with confidence in community groups are nearly twice as likely to fully implement recommendations, compared to those who have little to no confidence in the same organization.

As a program, Renew Boston was very successful -- a win-win situation. New companies such as Next Step Living provided jobs for many people in the area, contributing to the economic health of the city. Boston residents now have more energy efficient homes resulting in lower energy bills and more comfortable living spaces. As homes become more energy efficient, less energy will be wasted and the city of Boston will ultimately consume less of the earth's energy resources.

Renew Boston has the potential to achieve even more. While it was a great experience for many in Boston, there are barriers as illuminated earlier in this report that preclude the program from working optimally. Nonetheless, these barriers are not insurmountable. Concrete, feasible action steps could be formulated – and subsequently adopted – to overcome most, if not all, of these barriers.

In general, Boston residents need to feel that the benefits they receive outweigh any costs, financial and otherwise, before moving forward. So, is it worth it? For some households, the barriers are still too great. Yet, for many, it is undeniably worth it.

LIST OF APPENDICES

**APPENDIX A: BOSTON RESIDENT HOUSEHOLD INTERVIEW
PROTOCOL**

APPENDIX B: ANNOTATED BOSTON RESIDENT SURVEY

APPENDIX C: STATISTICAL ANALYSES OF MISSING DATA

Appendix A

Interview Questions

1. Have you had a chance to implement any of the recommendations from your Home Energy Assessment?
 - a. (if yes) Please tell me about the recommendations you have implemented. [Probe: Which recommendations are they? What specifically led to you getting these recommendations done?]

2. Do you have plans to implement any of the other recommendations?
 - a. (if yes) Please tell me about the recommendations you plan to implement. [Probe: Which recommendations are they? What specifically leads to you getting these recommendations done? Is there anything holding you back in getting these implemented? Can you tell more about this?]
 - b. (if yes) Is there anything that the City of Boston/Renew Boston could do that would encourage you to adopt these recommendations now? What would that be? [Probe, if necessary: Would a larger rebate make a difference? How much do you think is too much for out-of-pocket costs? Would better reduced-rate financing options make a difference? What would make it work for you?]

3. Are there any recommendations you do not plan to implement?
 - a. (if yes) Please tell me about these recommendations. [Probe: Which recommendations are they? Can you tell more about why you do not plan to implement these particular recommendations?]
 - b. Is there anything that the City of Boston/Renew Boston could do that would encourage you to adopt all these recommendations? What would that be? [Probe: Would a larger rebate make a difference? How much do you think is too much for out-of-pocket costs? Would better reduced-rate financing options make a difference? What would make it work for you?]

4. Is there anything else that you would like to share with us regarding home energy efficiency that we have not already discussed?

Thank you very much for sharing your thoughts with me today. As a token of appreciation for your time, you can expect to receive a \$25 amazon.com e-gift card by the end of the month.

Appendix B

How would you rate the overall quality of customer service provided by Next Step Living, the company that conducted your home energy assessment? (The customer service included the initial phone call, the person who did the assessment, and any follow-up phone calls.)

Total Respondents:	338
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Very Poor	4.14 %	14
2	Poor	5.33 %	18
3	Fair	10.95 %	37
4	Good	16.27 %	55
5	Very good	20.12 %	68
6	Excellent	29.88 %	101
7	Exceptional	13.31 %	45

Analytics	
Mean	4.858
Standard Deviation	1.598
Standard Error	0.087
Variance	2.554

How easy or difficult was it to understand your Home Energy Assessment Report?

Total Respondents:	337
Total Skipped:	1

	Choice	Response Percent	Response Total
1	Very easy	50.45 %	170
2	Somewhat easy	40.65 %	137
3	Somewhat difficult	8.01 %	27
4	Very difficult	0.89 %	3

Analytics	
Mean	1.593
Standard Deviation	0.674
Standard Error	0.037
Variance	0.455

At the time of your Home Energy Assessment, you may have received light bulbs, showerheads, or a programmable thermostat. Beyond these, did your report include any recommendations for further home improvements?

Total Respondents:	338
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Yes	85.50 %	289
2	No	14.50 %	49

Analytics	
Mean	1.145
Standard Deviation	0.352
Standard Error	0.019
Variance	0.124

In which of the following categories were recommendations made for your home?
Please select all that apply.

Total Respondents:	289
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Air sealing recommendations	45.33 %	131
2	Insulation/weatherization recommendations	86.85 %	251
3	Heating system recommendations	25.61 %	74
4	Hot water system recommendations	9.00 %	26
5	Central cooling system recommendations	2.42 %	7
6	Other recommendations	7.27 %	21

Analytics	
Mean	2.196
Standard Deviation	1.162
Standard Error	0.051
Variance	1.350

What were the other recommendations?

Total Respondents:	20
Total Skipped:	1

Some people do not move ahead with the recommendations from their Home Energy Assessment and other people have some or all of the work done. Do you expect that any of the work from your assessment will have started by October 2012?

Total Respondents:	289
Total Skipped:	0

	Choice	Response Percent	Response Total
1	No, NONE of the work will have started by October 2012	28.72 %	83
2	Yes, SOME of the work will have started by October 2012.	26.99 %	78
3	Yes, ALL of the work will have started by October 2012.	44.29 %	128

Analytics	
Mean	2.156
Standard Deviation	0.840
Standard Error	0.049
Variance	0.706

How much of the work from each recommendation do you think will be started by October 2012? Please select one response per row.

Total Respondents:	78
Total Skipped:	0

	None of it	Some of it	All of it	Response Total
Air sealing recommendations	19.5% 8	48.8% 20	31.7% 13	41
Insulation/weatherization recommendations	7.4% 5	52.9% 36	39.7% 27	68
Heating system recommendations	48.6% 17	31.4% 11	20.0% 7	35
Hot water system recommendations	45.5% 5	36.4% 4	18.2% 2	11
Central cooling system recommendations	83.3% 5	0.0% 0	16.7% 1	6
Other recommendations	50.0% 2	25.0% 1	25.0% 1	4
Totals:	42	72	51	

Listed below are some of the reasons people say they want to go ahead with the recommendations from their Home Energy Assessment. How much does each of these reasons apply to why you are going ahead? Please select one response per row.

Total Respondents:	206
Total Skipped:	0

	This doesn't apply to me at all.	This applies to me a little.	This applies to me somewhat.	This applies to me a lot.	Response Total
It costs me so little money.	11.7% 24	9.2% 19	20.4% 42	58.7% 121	206
It will save me money on my energy bills.	2.9% 6	4.4% 9	9.7% 20	83.0% 171	206
It will make my home more comfortable.	2.9% 6	3.4% 7	16.0% 33	77.7% 160	206
It will be better for the environment.	5.8% 12	7.3% 15	22.3% 46	64.6% 133	206
It will make the energy we have on Earth go further.	5.3% 11	11.7% 24	25.2% 52	57.8% 119	206
Installation was/will be convenient.	8.7% 18	16.5% 34	33.0% 68	41.7% 86	206
It will increase the property value of my home.	6.3% 13	18.9% 39	30.1% 62	44.7% 92	206
Great rates for financing the work were available to me.	60.7% 125	6.8% 14	9.7% 20	22.8% 47	206
Totals:	215	161	343	929	

If rebates or reduced-rate financing had NOT been available, would you still have had the work done?

Total Respondents:	206
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Definitely not	16.02 %	33
2	Probably not	53.40 %	110
3	Probably would have	24.27 %	50
4	Definitely would have	6.31 %	13

Analytics	
Mean	2.209
Standard Deviation	0.782
Standard Error	0.054
Variance	0.612

If the quality of customer service had been unsatisfactory, would you still have had the work done?

Total Respondents:	170
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Definitely not	21.18 %	36
2	Probably not	49.41 %	84
3	Probably would have	26.47 %	45
4	Definitely would have	2.94 %	5

Analytics	
Mean	2.112
Standard Deviation	0.763
Standard Error	0.058
Variance	0.582

Listed below are some of the reasons people say they do NOT go ahead with some or all of the recommendations from their Home Energy Assessment. How much does each reason apply to why you are not going ahead now with some or all of your recommendations? Please select one response per row.

Total Respondents:	161
Total Skipped:	0

	This doesn't apply to me at all.	This applies to me a little.	This applies to me somewhat.	This applies to me a lot.	Response Total
It will cost too much money.	25.5% 41	13.7% 22	18.6% 30	42.2% 68	161
I can do it myself.	77.6% 125	6.2% 10	11.2% 18	5.0% 8	161
I don't think the Home Energy Assessment was accurate.	72.7% 117	8.7% 14	11.2% 18	7.5% 12	161
I worry that the contractors will NOT do a good job.	58.4% 94	12.4% 20	15.5% 25	13.7% 22	161
It will be too big of a mess in my house.	63.4% 102	13.7% 22	14.9% 24	8.1% 13	161
It is just too much of a hassle.	59.0% 95	16.8% 27	14.3% 23	9.9% 16	161
My landlord will not cooperate.	88.8% 143	1.9% 3	3.1% 5	6.2% 10	161
I think there are hidden costs that I will have to pay.	57.1% 92	16.1% 26	16.1% 26	10.6% 17	161
My home does not need to be more energy efficient.	77.0% 124	8.1% 13	7.5% 12	7.5% 12	161
I am concerned about a conflict of interest when the home energy auditor also provides the	70.2% 113	13.7% 22	8.7% 14	7.5% 12	161

energy installation services.					
I forgot about it/had other priorities.	66.5%	13.7%	11.2%	8.7%	161
	107	22	18	14	
I am interested in having some or all of this work done in the future.	19.3%	13.0%	18.6%	49.1%	161
	31	21	30	79	
Totals:	1,184	222	243	283	

If the rebates had been better, would you have had the work done?

Total Respondents:	161
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Definitely not	3.73 %	6
2	Probably not	13.66 %	22
3	Probably would have	35.40 %	57
4	Definitely would have	47.20 %	76

Analytics	
Mean	3.261
Standard Deviation	0.830
Standard Error	0.065
Variance	0.690

If the quality of customer service you experienced from Next Step Living had been better, would you have had the work done?

Total Respondents:	36
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Definitely not	8.33 %	3
2	Probably not	11.11 %	4
3	Probably would have	36.11 %	13
4	Definitely would have	44.44 %	16

Analytics	
Mean	3.167
Standard Deviation	0.928
Standard Error	0.155
Variance	0.861

Do you own or rent your home?

Total Respondents:	338
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Own	94.67 %	320
2	Rent	5.33 %	18

Analytics	
Mean	1.053
Standard Deviation	0.225
Standard Error	0.012
Variance	0.050

Who initiated getting the Home Energy Assessment done?

Total Respondents:	338
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Me (or someone who lives in my home)	90.53 %	306
2	My landlord	1.48 %	5
3	Other; please specify relationship to you	7.99 %	27

Analytics	
Mean	1.175
Standard Deviation	0.551
Standard Error	0.030
Variance	0.304

Are you currently a landlord also?

Total Respondents:	338
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Yes	35.21 %	119
2	No	64.79 %	219

Analytics	
Mean	1.648
Standard Deviation	0.478
Standard Error	0.026
Variance	0.228

Were you contacted by the Landlord Coordinator, Eunice Yu?

Total Respondents:	338
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Yes	4.44 %	15
2	No	74.56 %	252
3	Don't remember	21.01 %	71

Analytics	
Mean	2.166
Standard Deviation	0.476
Standard Error	0.026
Variance	0.227

How helpful was the Landlord Coordinator in helping you get the information or services you needed?

Total Respondents:	15
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Not at all helpful	6.67 %	1
2	Slightly helpful	13.33 %	2
3	Moderately helpful	6.67 %	1
4	Very helpful	26.67 %	4
5	Extremely helpful	46.67 %	7

Analytics	
Mean	3.933
Standard Deviation	1.289
Standard Error	0.333
Variance	1.662

If the services of the Landlord Coordinator had NOT been available, would you still have followed through on the Home Energy Assessment recommendations?

Total Respondents:	8
Total Skipped:	0

	Choice	Response Percent	Response Total
1	Definitely not	12.50 %	1
2	Probably not	50.00 %	4
3	Probably would have	25.00 %	2
4	Definitely would have	12.50 %	1

Analytics	
Mean	2.375
Standard Deviation	0.857
Standard Error	0.303
Variance	0.734

How much longer do you plan to live in your current home?

Total Respondents:	337
Total Skipped:	1

	Choice	Response Percent	Response Total
1	Less than one year	3.26 %	11
2	1-2 years	3.86 %	13
3	3-5 years	18.40 %	62
4	6-10 years	18.69 %	63
5	More than 10 years	55.79 %	188

Analytics	
Mean	4.199
Standard Deviation	1.073
Standard Error	0.058
Variance	1.150

Please look at the groups below and tell us how much confidence you have in what they tell the public about home energy efficiency.

Total Respondents:	338
Total Skipped:	0

	No confidence	Only a little confidence	Some confidence	A lot of confidence	I am not familiar with this	Response Total
Utility companies	9.3% 31	22.1% 74	47.8% 160	18.2% 61	2.7% 9	335
Next Step Living	3.9% 13	8.9% 30	32.0% 108	53.1% 179	2.1% 7	337
Other insulation companies	4.9% 16	23.2% 76	35.2% 115	5.5% 18	31.2% 102	327
Mass Save	2.1% 7	8.8% 29	30.9% 102	40.0% 132	18.2% 60	330
City of Boston/Renew Boston	2.7% 9	6.6% 22	36.5% 122	50.9% 170	3.3% 11	334
State of Massachusetts	4.8% 16	15.6% 52	42.5% 142	29.9% 100	7.2% 24	334
U.S. Government	7.5% 25	18.9% 63	41.3% 138	25.4% 85	6.9% 23	334
Totals:	117	346	887	745	236	

The following organizations have also been involved in spreading the word about home energy efficiency. From which of the following organizations have you heard about home energy efficiency? Please select all that apply.

Total Respondents:	315
Total Skipped:	23

A graph is unavailable to questions with more than 25 choices.

	Choice	Response Percent	Response Total
1	A Better City	1.59 %	5
2	Action for Boston Community Development	15.56 %	49
3	Allston-Brighton CDC	2.54 %	8
4	American Family Childcare Association	0.63 %	2
5	Ashmont Nursery School	1.27 %	4
6	Asian American Civic Association	1.27 %	4
7	Asian Community Development Corporation	0.32 %	1
8	Blue Hill Boys and Girls Club	1.59 %	5
9	BOLD Teens	0.95 %	3
10	Boston Building Resources	14.29 %	45
11	Boston CAN	4.44 %	14
12	Boston Nature Center	5.40 %	17
13	Boston Workers Alliance	2.86 %	9
14	Castle Island Association	1.27 %	4
15	Century 21	1.27 %	4
16	Chinese Progressive Association	2.22 %	7
17	Clean Water Action	5.40 %	17
18	Codman Square Neighborhood Council	1.59 %	5
19	Codman Square Neighborhood Development Corporation	5.08 %	16
20	Community Advocacy Resource Center	0.63 %	2
21	Cooperative Metropolitan Ministries	0.32 %	1
22	DC Enterprise	0.00 %	0
23	Dorchester Bay EDC	4.44 %	14

Analytics	
Mean	30.838
Standard Deviation	18.936
Standard Error	0.774
Variance	358.560

24	Dudley Street Neighborhood Initiative	3.81 %	12
25	East Boston Neighborhood Health Center	0.95 %	3
26	Egleston Square Main Street	0.95 %	3
27	First Church in JP, Unitarian Universalist	1.27 %	4
28	First Parish Church in Dorchester	0.95 %	3
29	Greater Four Corners Action Coalition	0.63 %	2
30	Greening Rozzie	9.84 %	31
31	Greenlock Energy Solutions	0.00 %	0
32	Green Beginnings Inc.	0.63 %	2
33	Harvest Co-op Market	3.81 %	12
34	Hurley Padres en Accion	0.00 %	0
35	Lenox Hotel	1.27 %	4
36	Mass Affordable Housing Alliance	12.70 %	40
37	Mass COSH	1.27 %	4
38	Mass Energy Consumers Alliance	15.24 %	48
39	Mass Interfaith Power & Light	1.90 %	6
40	Mt. Washington Bank	2.86 %	9
41	New England United for Justice	0.00 %	0
42	NOAH	1.59 %	5
43	Nuestra Comunidad	1.27 %	4
44	Respond, Inc.	0.00 %	0
45	South Boston Youth Lacrosse	0.32 %	1
46	South End Soccer	0.32 %	1
47	St. Brendan Color Guard	1.27 %	4
48	St. Peter Academy	0.32 %	1
49	The Tabitha House	0.32 %	1
50	Third Sector New England's The Non-Profit Center	0.32 %	1
51	Upham's Corner Main Street	0.63 %	2
52	Urban Edge	5.40 %	17
53	Veronica B. Smith Multi-Service Senior Center	1.59 %	5
54	VietAID	0.00 %	0

55	West Roxbury Saves Energy	4.44 %	14
56	None of these	39.37 %	124

How much confidence do you have in each of the following organizations when it comes to what they tell you about home energy efficiency?

Total Respondents:	195
Total Skipped:	19

	No confidence	A little confidence	Some confidence	A lot of confidence	Response Total
A Better City	30.0% 3	10.0% 1	20.0% 2	40.0% 4	10
Action for Boston Community Development	9.1% 5	14.5% 8	45.5% 25	30.9% 17	55
Allston-Brighton CDC	21.4% 3	14.3% 2	42.9% 6	21.4% 3	14
American Family Childcare Association	37.5% 3	25.0% 2	12.5% 1	25.0% 2	8
Ashmont Nursery School	40.0% 4	20.0% 2	20.0% 2	20.0% 2	10
Asian American Civic Association	44.4% 4	11.1% 1	33.3% 3	11.1% 1	9
Asian Community Development Corporation	57.1% 4	14.3% 1	14.3% 1	14.3% 1	7
Blue Hill Boys and Girls Club	27.3% 3	36.4% 4	36.4% 4	0.0% 0	11
BOLD Teens	37.5% 3	12.5% 1	25.0% 2	25.0% 2	8
Boston Building Resources	6.1% 3	8.2% 4	34.7% 17	51.0% 25	49
Boston CAN	21.1% 3	15.8% 2	31.6% 5	31.6% 5	15

	4	3	6	6	19
Boston Nature Center	13.6%	4.5%	22.7%	59.1%	22
	3	1	5	13	
Boston Workers Alliance	21.4%	14.3%	42.9%	21.4%	14
	3	2	6	3	
Castle Island Association	33.3%	33.3%	22.2%	11.1%	9
	3	3	2	1	
Century 21	33.3%	22.2%	44.4%	0.0%	9
	3	2	4	0	
Chinese Progressive Association	25.0%	16.7%	33.3%	25.0%	12
	3	2	4	3	
Clean Water Action	15.0%	5.0%	40.0%	40.0%	20
	3	1	8	8	
Codman Square Neighborhood Council	30.0%	10.0%	20.0%	40.0%	10
	3	1	2	4	
Codman Square Neighborhood Development Corporation	19.0%	9.5%	28.6%	42.9%	21
	4	2	6	9	
Community Advocacy Resource Center	50.0%	16.7%	33.3%	0.0%	6
	3	1	2	0	
Cooperative Metropolitan Ministries	50.0%	16.7%	33.3%	0.0%	6
	3	1	2	0	
DC Enterprise	60.0%	20.0%	20.0%	0.0%	5
	3	1	1	0	
Dorchester Bay EDC	15.8%	5.3%	42.1%	36.8%	19
	3	1	8	7	
Dudley Street Neighborhood Initiative	18.8%	25.0%	31.3%	25.0%	16
	3	4	5	4	
East Boston Neighborhood Health Center	37.5%	12.5%	12.5%	37.5%	8
	3	1	1	3	
Egleston Square Main Street	37.5%	25.0%	12.5%	25.0%	8
	3	2	1	2	

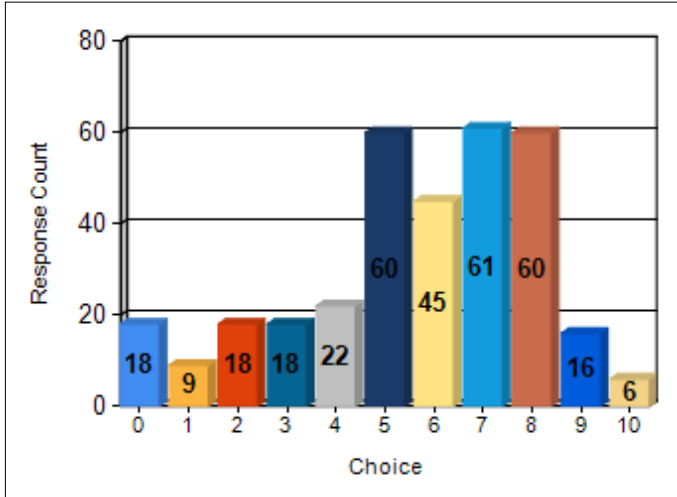
First Church in JP, Unitarian Universalist	33.3% 3	11.1% 1	11.1% 1	44.4% 4	9
First Parish Church in Dorchester	28.6% 2	28.6% 2	14.3% 1	28.6% 2	7
Greater Four Corners Action Coalition	42.9% 3	14.3% 1	28.6% 2	14.3% 1	7
Greening Rozzie	8.3% 3	8.3% 3	38.9% 14	44.4% 16	36
Greenlock Energy Solutions	60.0% 3	20.0% 1	20.0% 1	0.0% 0	5
Green Beginnings Inc.	42.9% 3	14.3% 1	28.6% 2	14.3% 1	7
Harvest Co-op Market	17.6% 3	11.8% 2	47.1% 8	23.5% 4	17
Hurley Padres en Accion	60.0% 3	20.0% 1	20.0% 1	0.0% 0	5
Lenox Hotel	33.3% 3	22.2% 2	11.1% 1	33.3% 3	9
Mass Affordable Housing Alliance	6.7% 3	4.4% 2	51.1% 23	37.8% 17	45
Mass COSH	33.3% 3	11.1% 1	33.3% 3	22.2% 2	9
Mass Energy Consumers Alliance	7.8% 4	7.8% 4	47.1% 24	37.3% 19	51
Mass Interfaith Power & Light	27.3% 3	9.1% 1	36.4% 4	27.3% 3	11
Mt. Washington Bank	21.4% 3	21.4% 3	28.6% 4	28.6% 4	14
New England United for Justice	60.0% 3	20.0% 1	20.0% 1	0.0% 0	5
NOAH	30.0%	30.0%	30.0%	10.0%	

	3	3	3	1	10
Nuestra Comunidad	33.3%	11.1%	33.3%	22.2%	
	3	1	3	2	9
Respond, Inc.	50.0%	25.0%	25.0%	0.0%	
	2	1	1	0	4
South Boston Youth Lacrosse	40.0%	20.0%	20.0%	20.0%	
	2	1	1	1	5
South End Soccer	50.0%	16.7%	16.7%	16.7%	
	3	1	1	1	6
St. Brendan Color Guard	33.3%	11.1%	22.2%	33.3%	
	3	1	2	3	9
St. Peter Academy	40.0%	20.0%	20.0%	20.0%	
	2	1	1	1	5
The Tabitha House	50.0%	33.3%	16.7%	0.0%	
	3	2	1	0	6
Third Sector New England's The Non-Profit Center	50.0%	33.3%	16.7%	0.0%	
	3	2	1	0	6
Upham's Corner Main Street	42.9%	14.3%	28.6%	14.3%	
	3	1	2	1	7
Urban Edge	18.2%	13.6%	31.8%	36.4%	
	4	3	7	8	22
Veronica B. Smith Multi-Service Senior Center	30.0%	10.0%	40.0%	20.0%	
	3	1	4	2	10
VietAID	60.0%	20.0%	20.0%	0.0%	
	3	1	1	0	5
West Roxbury Saves Energy	15.8%	5.3%	52.6%	26.3%	
	3	1	10	5	19

Totals:	170	100	254	221
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Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?
Please select the response that is closest to your opinion.

Total Respondents:	333
Total Skipped:	5



	Choice	Response Percent	Response Total
1	0	5.41 %	18
2	1	2.70 %	9
3	2	5.41 %	18
4	3	5.41 %	18
5	4	6.61 %	22
6	5	18.02 %	60
7	6	13.51 %	45
8	7	18.32 %	61
9	8	18.02 %	60
10	9	4.80 %	16
11	10	1.80 %	6

Analytics	
Mean	6.610
Standard Deviation	2.427
Standard Error	0.133
Variance	5.890

How easy or difficult was it to remember your Home Energy Assessment and answer these survey questions?

Total Respondents:	335
Total Skipped:	3

	Choice	Response Percent	Response Total
1	Very easy – I remembered nearly everything.	47.46 %	159
2	Somewhat easy	44.48 %	149
3	Somewhat difficult	6.87 %	23
4	Very difficult – I couldn't remember much.	1.19 %	4

Analytics	
Mean	1.618
Standard Deviation	0.667
Standard Error	0.036
Variance	0.445

Please provide any final comments you would like to share about your experiences with your Home Energy Assessment.

Total Respondents:	224
Total Skipped:	114

In which Boston neighborhood do you live?

Total Respondents:	337
Total Skipped:	1

	Choice	Response Percent	Response Total
1	Allston	1.19 %	4
2	Back Bay	0.00 %	0
3	Bay Village	0.00 %	0
4	Beacon Hill	0.00 %	0
5	Brighton	4.45 %	15
6	Charlestown	0.30 %	1
7	Chinatown/Leather District	0.00 %	0
8	Dorchester	28.49 %	96
9	Downtown/Financial District	0.00 %	0
10	East Boston	1.48 %	5
11	Fenway/Kenmore	0.00 %	0
12	Hyde Park	11.57 %	39
13	Jamaica Plain	13.06 %	44
14	Mattapan	7.42 %	25
15	Mission Hill	0.30 %	1
16	North End	0.00 %	0
17	Roslindale	14.84 %	50
18	Roxbury	4.45 %	15
19	South Boston	2.67 %	9
20	South End	0.00 %	0
21	West End	0.00 %	0
22	West Roxbury	9.79 %	33

Analytics	
Mean	12.834
Standard Deviation	4.951
Standard Error	0.270
Variance	24.512

How many people (children and adults) live in your home?

Total Respondents:	315
Total Skipped:	23

Rank	Answer	Response Percent	Response Total
1	2	24.76%	78
2	3	20.32%	64
3	4	18.10%	57
4	1	15.56%	49
5	5	12.70%	40
6	6	5.40%	17
7	7	1.90%	6
8	0	0.63%	2
9	10	0.32%	1
10	8	0.32%	1
Other		0.00%	0

Analytics	
Highest	10.00
Average	0.15
Lowest	0.00
Total	46.00

Are you:

Total Respondents:	337
Total Skipped:	1

	Choice	Response Percent	Response Total
1	Female	66.77 %	225
2	Male	27.60 %	93
3	:	0.00 %	0
4	Prefer not to respond	5.64 %	19

Analytics	
Mean	1.445
Standard Deviation	0.765
Standard Error	0.042
Variance	0.585

In what year were you born? Please select from the list below.

Total Respondents:	303
Total Skipped:	35

A graph is unavailable to questions with more than 25 choices.

	Choice	Response Percent	Response Total
1	1920	0.00 %	0
2	1921	0.00 %	0
3	1922	0.00 %	0
4	1923	0.00 %	0
5	1924	0.00 %	0
6	1925	0.00 %	0
7	1926	0.33 %	1
8	1927	0.00 %	0
9	1928	0.00 %	0
10	1929	0.00 %	0
11	1930	0.33 %	1
12	1931	0.33 %	1
13	1932	0.00 %	0
14	1933	0.33 %	1
15	1934	0.33 %	1
16	1935	0.33 %	1
17	1936	0.33 %	1
18	1937	0.33 %	1
19	1938	0.33 %	1
20	1939	0.33 %	1
21	1940	0.99 %	3
22	1941	0.33 %	1
23	1942	0.33 %	1
24	1943	2.31 %	7
25	1944	0.66 %	2
26	1945	2.31 %	7

Analytics	
Mean	43.079
Standard Deviation	12.227
Standard Error	0.702
Variance	149.505

27	1946	1.32 %	4
28	1947	1.32 %	4
29	1948	0.99 %	3
30	1949	1.65 %	5
31	1950	2.31 %	7
32	1951	1.65 %	5
33	1952	2.64 %	8
34	1953	2.64 %	8
35	1954	2.64 %	8
36	1955	0.99 %	3
37	1956	3.96 %	12
38	1957	2.97 %	9
39	1958	2.97 %	9
40	1959	5.28 %	16
41	1960	4.29 %	13
42	1961	2.97 %	9
43	1962	1.32 %	4
44	1963	1.65 %	5
45	1964	1.65 %	5
46	1965	2.64 %	8
47	1966	1.98 %	6
48	1967	3.30 %	10
49	1968	3.63 %	11
50	1969	3.30 %	10
51	1970	1.32 %	4
52	1971	2.64 %	8
53	1972	3.30 %	10
54	1973	1.65 %	5
55	1974	2.97 %	9
56	1975	1.98 %	6
57	1976	2.31 %	7
58	1977	2.64 %	8
59	1978	1.65 %	5
60	1979	2.97 %	9

61	1980	0.33 %	1
62	1981	2.31 %	7
63	1982	1.32 %	4
64	1983	0.33 %	1
65	1984	0.33 %	1
66	1985	0.66 %	2
67	1986	0.66 %	2
68	1987	0.00 %	0
69	1988	0.00 %	0
70	1989	0.00 %	0
71	1990	0.00 %	0
72	1991	0.00 %	0
73	1992	0.33 %	1
74	1993	0.00 %	0
75	1994	0.00 %	0
76	Prefer not to respond	0.00 %	0

Total Respondents:	328
Total Skipped:	10

Which of the following categories best describe your race/ethnicity? (Check all that apply.)

	Choice	Response Percent	Response Total
1	American Indian or Alaska Native	0.30 %	1
2	Asian	3.96 %	13
3	Black or African American	23.48 %	77
4	Native Hawaiian or Other Pacific Islander	0.00 %	0
5	Hispanic or Latino	9.15 %	30
6	White	50.91 %	167
7	Other; please specify	4.88 %	16
8	Prefer not to respond	10.67 %	35

Analytics	
Mean	5.316
Standard Deviation	1.677
Standard Error	0.091
Variance	2.812

Please estimate your total ANNUAL gross household income (before taxes are taken out). We're asking this question to help understand if household income is related to whether people go ahead or not with home energy recommendations.

Total Respondents:	263
Total Skipped:	75

Rank	Answer	Response Percent	Response Total
1	100000	6.84%	18
2	60000	5.32%	14
3	50000	4.94%	13
4	65000	4.56%	12
5	70000	4.18%	11
6	75000	3.80%	10
7	150000	3.42%	9
8	80000	3.42%	9
9	55000	3.04%	8
10	45000	2.66%	7
Other		57.79%	152

Analytics	
Highest	1,000,000,000,000,000.00
Average	3,802,281,414,922.08
Lowest	0.00
Total	1,000,000,012,124,510.00

Appendix C

ANALYSES OF MISSING DATA

If the households with missing data are different in substantial ways from households without missing data (e.g., much more likely not to move forward with recommendations), the findings from any further analyses could be distorted. Missing value analyses helps us understand the impact of missing data on our findings, especially related to key variables, and recommends appropriate next steps for dealing with missing data.

As shown in Table 1, three patterns of missing data are evident. The pattern of *level of implementation (full, partial, or none)* and *out-of-pocket costs (total dollar amount)* are missing together more often than any other combination of variables. This is not surprising. If we do not know the level of implementation, we likely would not have information on out-of-pocket costs. The large number of missing data points is problematic; however, it is critical to understand if these data are missing at random. If these data were missing completely at random, deleting cases list-wise or singly imputing missing values would be viable strategies.

Table 1
Patterns of Missing Data¹

Level of Implementation	Out-of-Pocket Costs	Marketing Methods	Number of Cases
x	x		4,267
	x		1,181
x	x	x	733

N=8,419

Little's MCAR² statistical test indicates that data on two of the variables -- out-of-pocket costs and implementation rate (all, some, or none) -- are not missing at random. Thus, deleting cases with missing values on these variables is not a recommended strategy. Doing so, may produce distorted results. In addition, given the extremely large proportion of missing data on both of these variables (over 50%), multiple data imputation is likely not a viable option.

¹ All other patterns of missing data comprise very small proportion of population (<3%).

² MCAR (Missing Completely at Random), p<.001

Goodman Research Group, Inc.

929 Massachusetts Avenue, Suite 2A
Cambridge, Massachusetts 02139

Tel: (617) 491-7033
Fax: (617) 864-2399

info@grginc.com
www.grginc.com

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