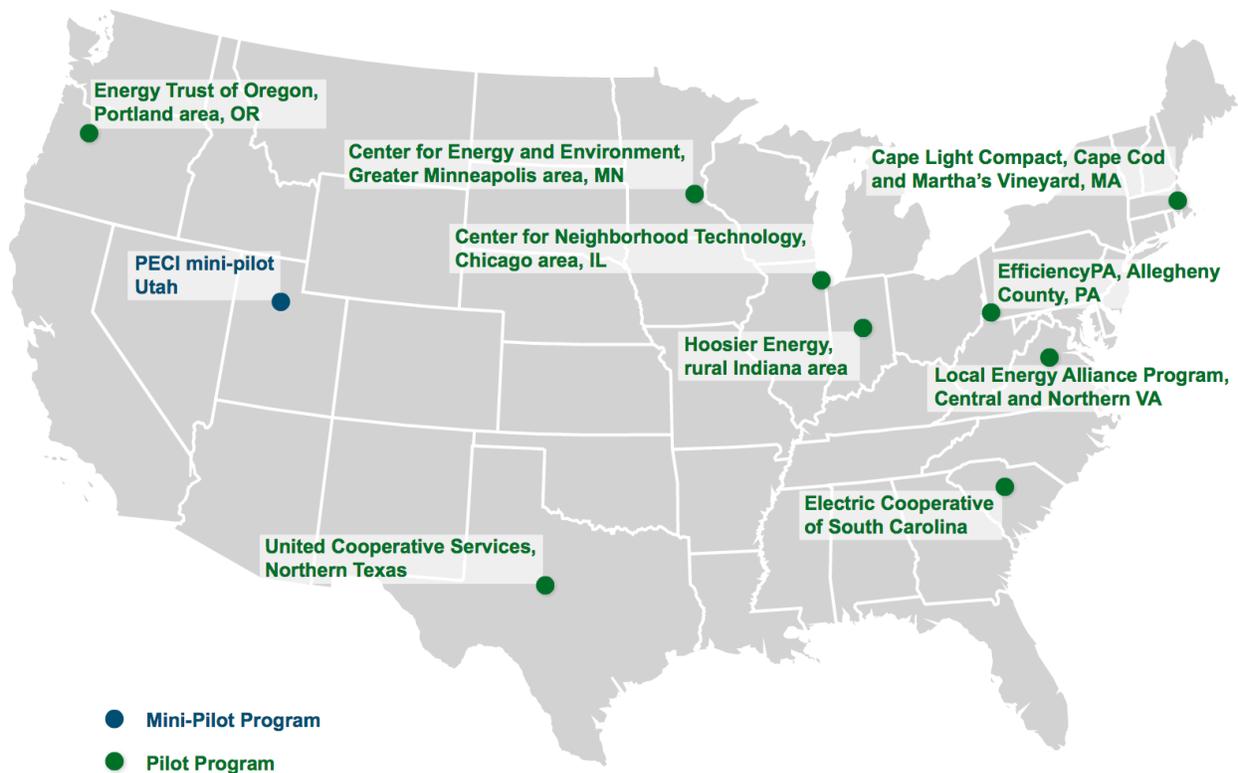


**2011 Home Energy Score Pilot Program:
Homeowner Understanding and Interest**

Executive Summary

The U.S. Department of Energy (DOE) rolled out the Home Energy Score pilot program with 10 partner organizations in 2011. (See map below). Through this pilot effort, the Home Energy Score Program tested a 10-point rating system, intended to characterize the overall energy performance of a home, similar to the miles-per-gallon (MPG) rating for cars. In addition to the current home score, homeowners participating in the pilot program received recommendations for improving the energy efficiency of their home, their home's score if they made those upgrades, an estimate of how much they could save on their energy bills, and a comparative score to top performing homes similar in size to theirs. As part of the pilot testing, the partners collected feedback from homeowners about these materials and the rating process through responses to questionnaires.



Home Energy Score Pilots

Homeowner Feedback

Homeowner responses are summarized in five categories: satisfaction, understanding, plans for improvements, motivations, and usefulness.

Satisfaction

Homeowners in the pilot program were satisfied overall with the Home Energy Score program process and recommendations. However, receiving a low score, or receiving a score lower than one had hoped for, reduced homeowners' satisfaction with the score.

Understanding

The top three things homeowners reported learning from the Home Energy Score program was what to prioritize in improving their home's energy use, information that relieved them of worry about their home, and encouraging information.

Self-reported responses also suggested that, overall, homeowners understood the 1 to 10 scale, how their homes compared to top performing homes, what their utility bill savings could be and how to achieve them.

Plans for making improvements

Some homeowners had plans to improve their homes before receiving the Home Energy Score, but the number of planned improvements increased after getting a Home Energy Score. The top three post-Home Energy Score plans were to upgrade appliances, insulate attics, and air seal cracks and gaps. Plans to seal ducts and vents also increased significantly.

Motivations

The most often cited reason to make an improvement was 'to help me save on my utilities', followed by 'increase comfort in my home', and 'improve my Home Energy Score'. The most often cited reason for not making an improvement was 'I have to hire someone to do it', followed by 'it's not affordable,' and 'it's not a priority for me right now.'

Usefulness

Recommendations for improvements were cited most often as the most useful aspect of the program. Homeowners are identified direct incentives, the assessor, and information on savings as useful components of the service provided to them. When asked how the program could be changed to be more useful, the most frequent comment was 'no changes'. This was followed by suggestions for changing aspects related to the partners' other programs; increasing the personalization and accuracy of the Home Energy Score; and changes regarding the professionals who did the home energy evaluation, referred to by the program as "assessors."

Conclusions

The scope of this study was limited and did not include longer term follow-up with homeowners to monitor their investment in energy improvements. However, homeowner response suggests that the Home Energy Score is easy to understand, may educate homeowners about the relative benefits of different improvements, and may enhance their interest in undertaking such improvements.

Feedback also indicated a number of areas where the Home Energy Score program could improve and benefit from additional consumer research. The lessons learned during the Pilots, including from information derived from assessors, pilot administrators, and homeowners, informed the latest version of the program, launched with about 20 partners in June 2012. DOE plans to undertake additional evaluations in this next phase of program implementation to guide future program development and help ensure that consumer information is useful, reliable, and motivational.

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Introduction

The U.S. Department of Energy (DOE) tested the Home Energy Score program at ten pilot sites across the country in 2011. The pilot effort was geared at evaluating the Home Energy Score, a 10 point rating system intended to characterize the overall energy performance of a home. In addition to the current home score, homeowners participating in the pilot program received recommendations for improving the energy efficiency of their home, their home's score if they made those upgrades, an estimate of how much they could save on their energy bills, and a comparative score to top performing homes similar in size to theirs (see Appendix A for sample materials).

As part of the program evaluation, the pilot partners collected feedback from homeowners about these materials and the rating process through responses to two questionnaires. The questionnaires were intended to assess homeowners' experience during the pilots, including their understanding of program materials, and help identify ways to improve the Home Energy Score program's effect in motivating homeowners to make energy improvements.

This report describes how the study was conducted, the characteristics of the homeowners involved, and feedback collected in the following five topic areas:

- 1) Satisfaction
 - Are homeowners satisfied with the program?
 - Are there aspects of the program that affect satisfaction?
- 2) Understanding
 - Do they understand the score and materials?
 - What did homeowners learn from the program?
- 3) Plans
 - Do homeowners have plans to improve their home's energy use?
 - Do these plans change after receiving a score?
- 4) Motivation
 - What do homeowners report as motivating or discouraging to them?
- 5) Usefulness
 - What do they find most useful?
 - What do they find least useful?
 - What would they like to change?

Method

Six of the pilot partners ("Pilots"), Chicago (IL), Cape Cod (MA), Indiana, Minnesota, South Carolina, and Texas, gave two questionnaires to homeowners—a pre-Home Energy Score questionnaire and a post-Home Energy Score questionnaire. It was important to get information

from participating homeowners before and after they received a Home Energy Score in order to assess whether homeowners' views about their home's energy efficiency and/or plans for improvements changed after receiving the Score. The Pilots distributed their questionnaires in different ways, but generally followed the protocol outlined below.

Pre-Home Energy Score Questionnaire

When an assessor entered a home, he or she gave the homeowner a Home Energy Score information sheet, a form informing participants of the use of and confidentiality protections for their data, and a pre-Home Energy Score questionnaire. If a homeowner agreed to the process, he or she responded in writing to four questions, while the assessor collected data to generate their Home Energy Score. Assessors collected completed pre-Home Energy Score questionnaires at the end of the home visit. Completed pre-Home Energy Score questionnaires were sent to the Survey Research Center (SRC) at Portland State University. The SRC entered the questionnaires into a database and, as a confidentiality protection measure, assigned each questionnaire a unique identity number so homeowner responses could not be linked to their addresses.

Post-Home Energy Score Questionnaire

The SRC sent the Pilots a unique URL to forward to each homeowner. The URL provided the homeowner with access to the post-Home Energy Score questionnaire and to a copy of their Home Energy Score. If a homeowner had email, the Pilot emailed these URL links to the homeowner. With these links, homeowners could answer a questionnaire on their own computers and refer to their Home Energy Score, as needed. When completed online, SRC received the questionnaire responses instantly. Pilots followed up by email, phone or mail with participants who did not complete the questionnaire.

If the homeowner did not have email or did not want to be contacted by email, the Pilot mailed homeowners a print out of their Home Energy Score report and post-Home Energy Score questionnaire. It included a stamped addressed envelope for homeowners to mail their completed questionnaires directly to SRC.

Response Rate

Approximately 1,000 homes were assessed and given a Home Energy Score.

- 527 of the homeowners completed the pre-Home Energy Score questionnaire and 187 completed the post-Home Energy Score questionnaire.
- 151 homeowners completed both pre- and post-Home Energy Score questionnaires resulting in a response rate for both questionnaires of roughly 15 percent.
- **The results discussed in this report are an analysis of the responses from the 151 homeowners who responded to both pre- and post-Home Energy Score questionnaires.**

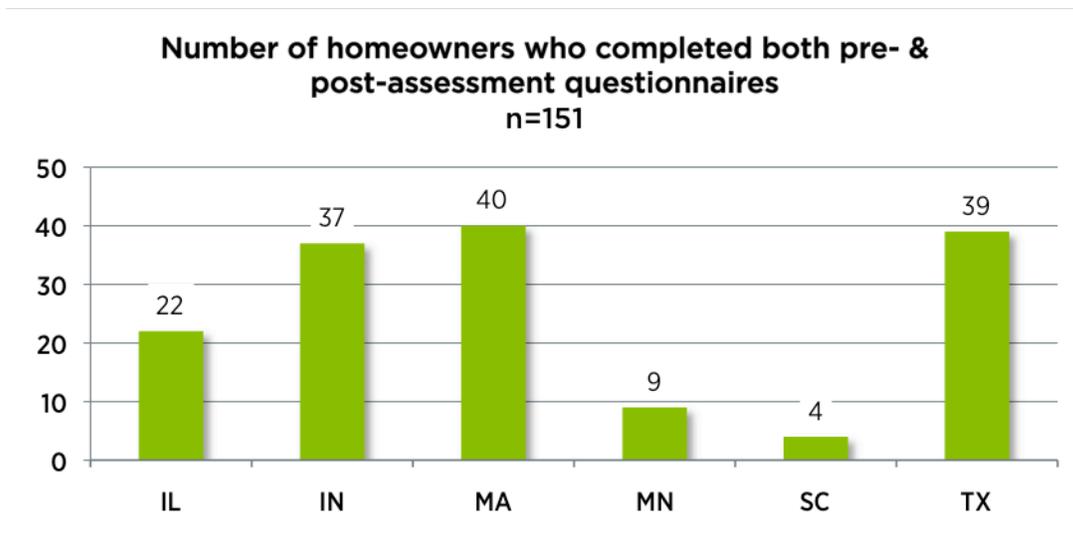


Figure 1. Number of respondents for both questionnaires

Attributes of Homeowners

Gender

The gender of the 151 respondents was split roughly evenly (men = 72 , women = 69). This half and half split was true within each Pilot as well (see Appendix B, Figure B1).

Race and ethnicity

The majority (90%) of respondents identified themselves as White, including mid-eastern backgrounds. Only two participants identified themselves as belonging to two ethnic categories (see Appendix B, Figure B2).

Income levels

Homeowners fell almost evenly into three income brackets, below \$50, 000, \$50,000 -\$100,000, and over \$100,000 per year. 10% didn't report their income. One site, Indiana, had a disproportionate number of lower income participants, due to that Pilot testing the Home Energy Score within the context of a low-income targeted program.

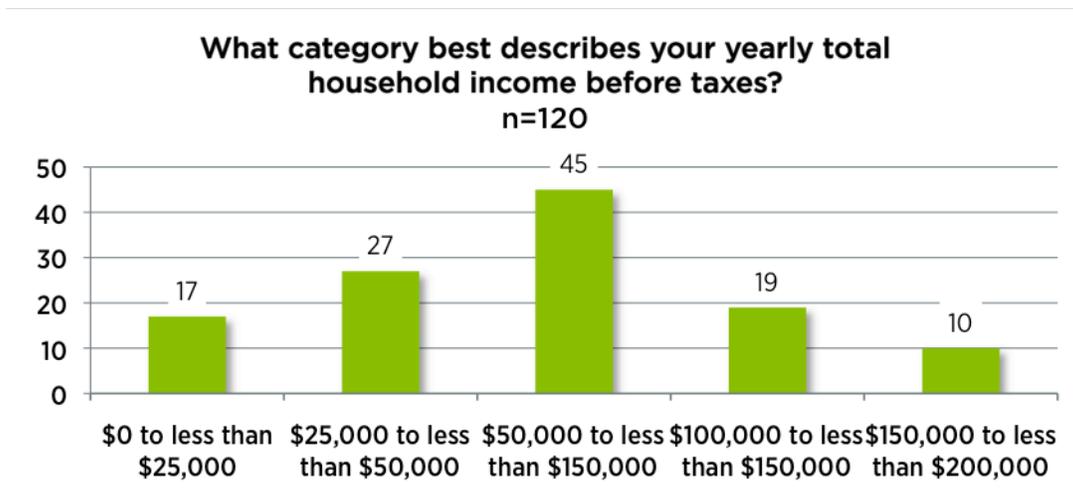


Figure 2. Reported Household Income

Education levels

The majority of respondents (52.2%) had a bachelor’s degree or higher. Indiana and Texas had higher than the expected number of homeowners reporting lower levels of education (high school diploma or less). Conversely, Illinois and Massachusetts had a disproportionate number of homeowners with master’s, doctoral, or other professional degrees.

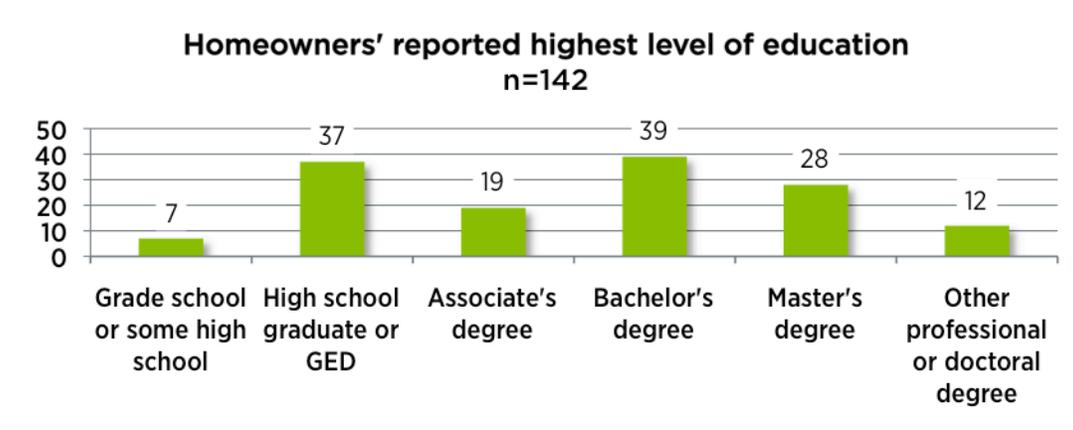


Figure 3. Reported Education Level

Years in home

Homeowners were divided almost evenly into 4 categories according to years they had spent in their current home (5 or less, 5-10, 10-18, more than 18). Texas had a higher than expected number of participants with 5 years or less in their homes. Massachusetts had a higher than expected amount of homeowners in the 10- 18 years category; and, Indiana had a disproportionately high number of respondents who had been in their homes the longest, in the 18+ years category.



Figure 4. Time in Home

Adults in the home

Most (70%) of the respondents lived in households with two adults.

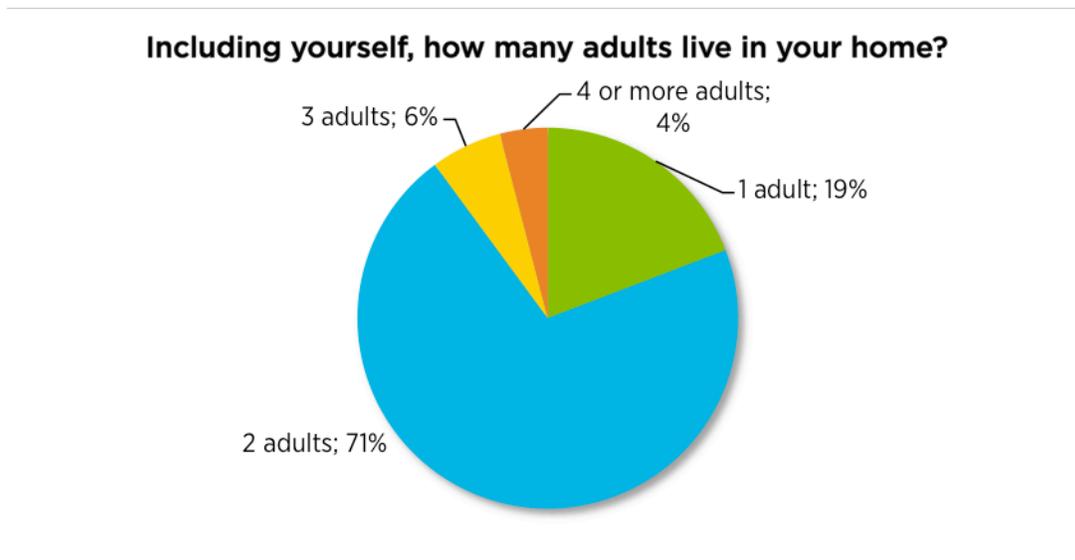


Figure 5. Number of Adults

Children in the home

A large majority of the homes in this study did not have any children living in the home (69%). 16% had two children, 12% had one child, and 4% had three or more children living in the home.

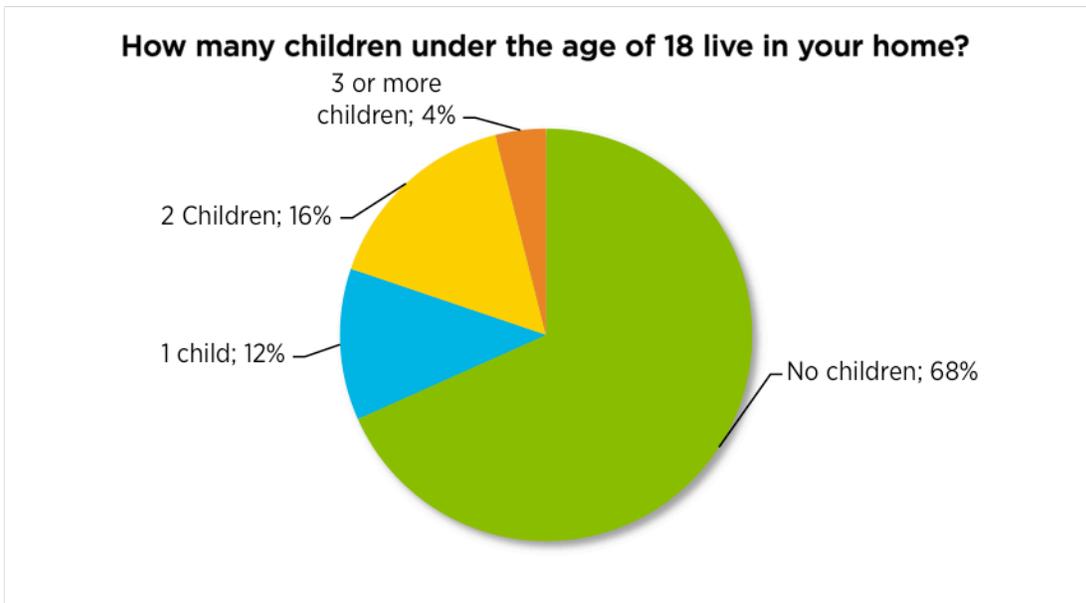


Figure 6. Number of Children

Expectation of Score

Most respondents (55%) expected higher scores than they received. The most frequently cited score expected was 7 and the median expected score was 6.

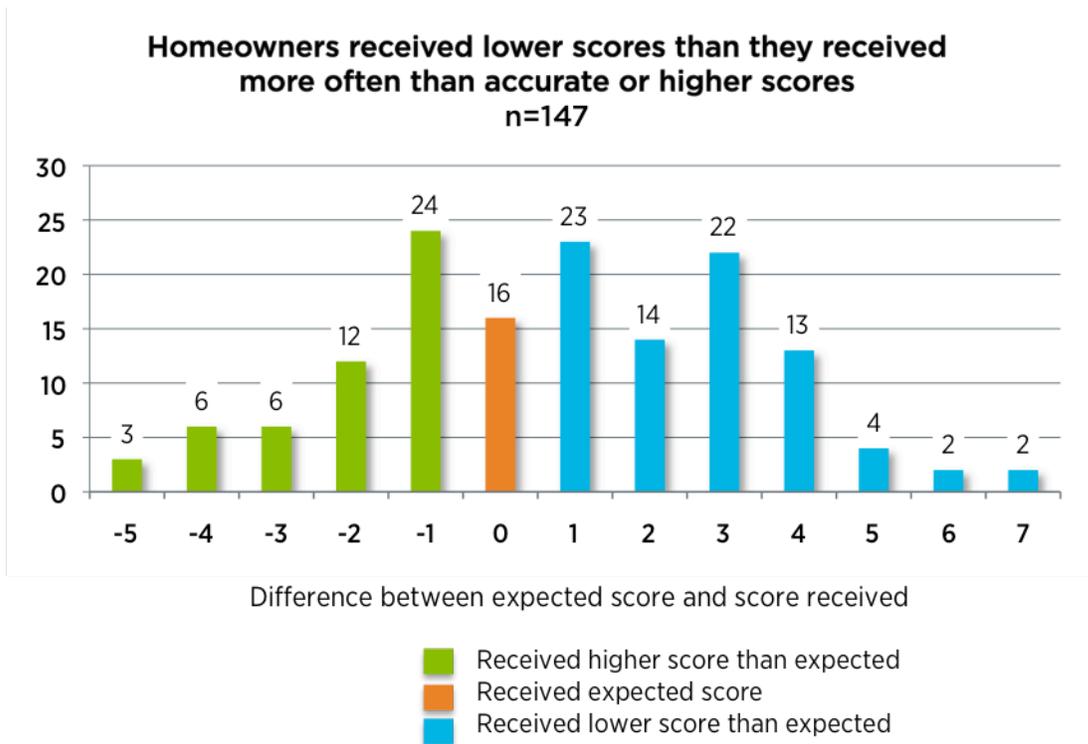


Figure 7. Homeowners with Lower than Expected Scores

Analysis of Homeowner Responses

This section reports responses as they relate to five areas: homeowner satisfaction, understanding, plans for energy improvements, motivation, and usefulness of information.

1. Homeowner Satisfaction

Homeowners were satisfied with the overall experience of the Home Energy Score program. Respondents' mean level of satisfaction was significantly higher than the neutral rating. The greatest satisfaction was with the Recommendations, where 73% of respondents reported they were satisfied or very satisfied. 64% were similarly satisfied with the program overall. Lastly, 53% of respondents were satisfied or very satisfied with how their home scored (see Appendix B, Figures B3-B5).

As one might predict, people who expected a higher score than they received were less satisfied with their Score than those who expected a lower Score than they received. Also, a significant correlation exists between the Score received and satisfaction, indicating that people who received a low Score were less satisfied than those who received high Scores ($r^2 = .327$, $p < .001$).

One other measure of satisfaction was whether people would want to tell others about the program. 68% of the respondents agreed or strongly agreed with the statement "I will tell people about the Home Energy Score program." (See Appendix B, Figure B6).

2. Understanding

The questionnaires had several measures of how well homeowners felt they understood the Home Energy Score and what they learned from the process.

These questions used a five part scale, ranging from 1 = strongly disagree to 5 = strongly agree. The median response indicates that most homeowners agreed with the statements, except for the last question which was reverse-worded, so a 'disagree' response is expected. (See Appendix B, Figures B7 - B10).

Homeowners were asked whether they agreed with the following four statements:

1. The Home Energy Score 1 to 10 scale was easy to understand. (Median response was 4, agree)
2. It is clear to me how much I can save on my utility bills and how I can achieve those savings. (Median response was 4, agree)
3. I understand how my home compares to top performing homes in my area. (Median response was 4, agree)

4. I didn't learn anything new from the Recommendations. (Median response was 2, disagree)

Homeowners were also given an open-ended question so they could describe what they learned from the program in their own words. 124 homeowners answered the question “What did you learn from the Home Energy Score program?” and their answers fell into seven categories, listed in Table 1 below.

Table 1.

What I learned	Number of times mentioned
What I need, what to prioritize	42
Something encouraging (e.g., I can save energy or money)	31
Confirmed my house is ok	26
Something discouraging (e.g., disbelief, disagreement, anxiety or anger provoking)	24
General energy efficiency info	18
My score is not good	11
Other	5

The most often cited answer (42 times) centered on **learning about a specific way to improve one's home**, such as learning that an attic needs insulation, or that air sealing will provide the best savings. For example, a homeowner listed specific recommendations they received: “Need more insulation in roof, need to replace old central heat and air unit, install water heater blanket.”

What did I learn? “That I could save much more energy, which means saving money.”

Some wrote more generally, stating they learned “where I can improve my energy savings” or “what exactly needed to be done to be more efficient.” Others focus on the behavioral

“We have a new house and... we were happy with the result. We have large windows that face north and that is why our rating is not any higher.”

recommendations such as, “thermostat temps for winter and summer, CFL bulbs, install digital thermostat, info on rebate programs, how to use electricity more efficiently.”

The second most-often cited category of answers (31 times) focused on **learning something encouraging**. This took the form of people expressing confidence in their ability to make improvements or how they learned something that motivates them. Examples of these statements include, “That I have a good opportunity to

save a fair amount of energy and money if improvements are made to the house.” Some encouraging statements were tied to specific recommendations but many were general, such as, “little things can make a big difference.”

Twenty-six respondents wrote that they **learned something that brought them relief** or confirmed for them that their house is ok. For example, “I was worried that my house would score poorly in everything but found out that it is pretty average and not too terrible.” Some were more specific such as a homeowner who was relieved that their boiler was still efficient.

In contrast to homeowners who felt relieved and affirmed by the Score and Recommendations, 24 people were **discouraged**, projecting anxiety and sometimes anger. Some of their answers focused on loss (e.g., “That I'm losing money every day”) and conveyed a sense of hopelessness, that they couldn't do much to improve their home or Score (e.g., “According to the report, my house is a worst case condition, scoring a one.”)

Eighteen people more generally commented that they **learned something about energy efficiency**. Examples of these comments are, “The effect of, and what is, air sealing on energy savings” and “How insulation improves the function and mechanics of my house.” A non-energy fact made some efficiency improvements stand out, such as “Air movement through house is very important. Reducing this even helps with the wife's dusting.” Another homeowner seemed unimpressed with the behavioral recommendations that were included as part of the pilots - “The recommendations were the typical... turn lights off, unplug appliances, don't radically change the heat.”

Eleven homeowners noted that what they learned was their **Score is low**. Some noted this neutrally or with some humor, such as this homeowner “I learned that my home scored lower than I thought it would, but there have been many improvements in home construction since 1896 when my home was built.” Others seemed more discouraged by their low Score, like the segment discussed earlier. “The energy score was very low. The recommendations were good, but they didn't have much effect on raising my score.”

3. Plans for improvements and expected savings

This section reports the kinds of savings respondents expected from home improvements, the plans they made before and after the Home Energy Score assessment, and how expected savings and plans relate to each other.

All of the recommended improvements provided by the Home Energy Score program would save homeowners energy. However the highest energy savings often result from three improvements: sealing cracks and gaps, sealing ducts, and insulating attics. Findings from this pilot test show that homeowner perceptions of potential energy savings are on target in some areas and not on target in others. Sealing cracks and gaps and insulating attics both rank in the top five of improvements from which homeowners expect a lot of energy savings. These improvements also rank highly in plans homeowners have for improving their homes, both before and after a home assessment.

Upgrading appliances is perceived as resulting most often in energy savings, in both the ‘some’ and ‘a lot’ categories. The number of homeowners planning on upgrading appliances also soared after the home assessment, perhaps because that recommendation and the information about it during the Home Energy Score visit fit with their expectation of savings.

Replacing windows and replacing HVAC systems also ranked in the top five of potential energy saving improvements and they were also in the top five of planned improvements before the home assessment. Post-Home Energy Score, these improvements dropped in the ranking of planned improvements, maybe due to information in the Home Energy Score process that changed their perceptions of potential savings.

Before and after the home assessment, homeowners were asked whether they had intentions to make home improvements (see Table 2, below).

Table 2.

Planned home improvement	PRE-HOME ENERGY SCORE Number of times cited	POST-HOME ENERGY SCORE Number of times cited
Seal cracks and gaps	23	54
Insulate attic	20	78
Upgrade appliances	19	88
Upgrade HVAC system	18	37
Upgrade windows	15	17
General insulation	14	n/a
Other	11	11
Seal ducts or vents	6	47
Insulate basement	6	45
Insulate walls	2	16

Before the home assessment, sealing cracks and gaps was cited most often, followed by insulating attics, and upgrading appliances. Interestingly, upgrading windows ranked 5th out of ten, even though this improvement is often cited anecdotally as an improvement homeowners are eager to make, more so than other improvements.

The way homeowners reported plans for improvements was different, pre- and post-Home Energy Score. In the pre-Home Energy Score questionnaire, homeowners answered an open-ended question, so their answers didn’t necessarily fit the categories of improvements they were asked about in the post-Home Energy Score questionnaire, which reflected the categories of

Home Energy Score recommendations. There were many improvements that were classified as ‘general insulation’ or ‘other’. In the ‘general insulation’ category, homeowners didn’t refer to a specific area they wanted to insulate or their plans didn’t fit the usual categories (e.g., insulating the floor). In the ‘other’ category, people stated they had plans to do miscellaneous improvements, such as fixing their roofs or installing storm doors.

After receiving a Home Energy Score, the most popular improvement homeowners stated they had plans to make was to upgrade their appliances to Energy Star models, followed by insulating the attic, and sealing cracks and gaps. In the ‘other’ category, 10 people said they had plans for miscellaneous projects such as getting new doors, new thermostats, and sealing around recessed lights. Six people said that they didn’t have plans since the recommendations weren’t relevant to them, either because they had already done recommended improvements or they didn’t consider them reasonable.

Plans to do energy efficiency improvements increased in all categories, except ‘other’ when comparing respondents’ pre- and post-Score responses. Upgrading appliances saw the largest increase of 59 more homeowners stating they had plans to do this after their Home Energy Score assessment. Replacing windows increased the least and dropped two places in the ranking of planned improvements.

Homeowners were also asked what effect they thought the Recommendations had on their plans. The median response was ‘agree’ to the statement “The recommendations will help me prioritize what types of energy improvements to make to my home.” Homeowner response was more mixed when asked whether they’d want to have their Home Energy Score updated after remodeling, with a median answer between ‘neutral’ and ‘agree’ (see Appendix B, Figures B11 and B12).

Before their home assessment, homeowners were asked what improvements they thought might make their home more energy efficient and whether they thought these improvements would bring little savings, some savings, or a lot of savings. Their answers demonstrate that in some areas, homeowners have a good sense of what will save them energy but in others, they are mistaken.

Findings also show that perceptions are not uniform amongst homeowners. For example, upgrading windows ranked #3 in a list of improvements homeowners thought would have greatest potential savings in their homes; it also ranked #2 in improvements they thought would have little to no savings. (See Appendix B, Figures B13-B21, for graphs of perceived savings for each type of improvement.).

The top five improvements homeowners thought would bring them a lot of savings were 1) replace major appliances with Energy Star models 2) add insulation to the attic 3) upgrade windows with energy efficient models 4) seal cracks and gaps in walls and foundation and 5) replace HVAC systems.

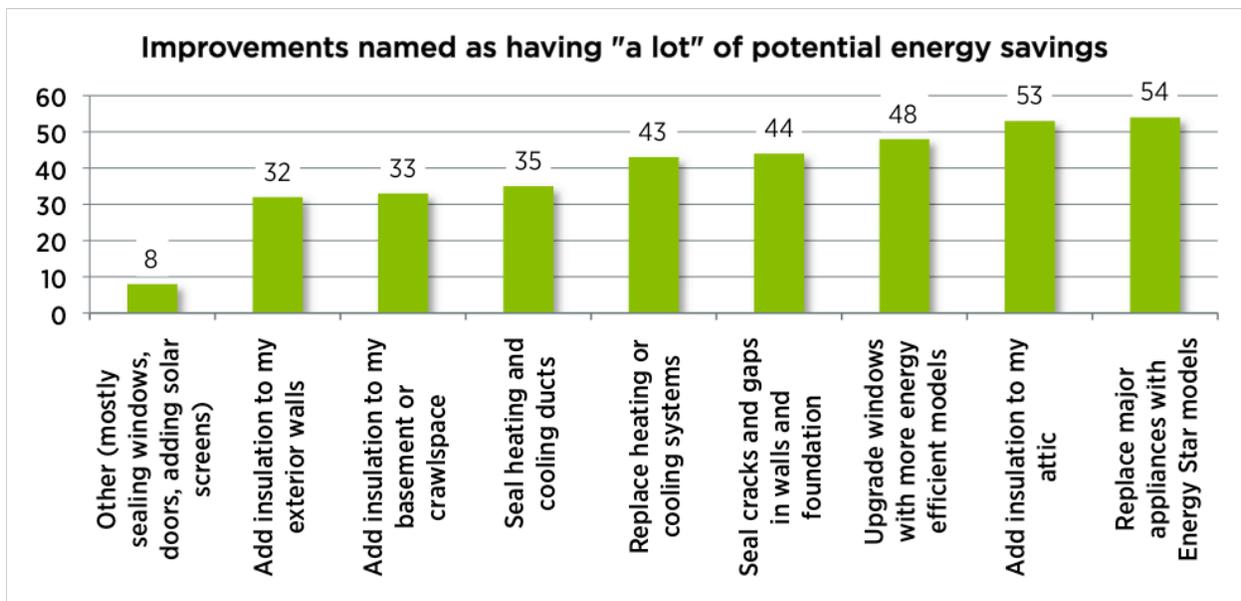


Figure 8. Homeowner Perspective on Energy Saving Improvements

Homeowners named insulating walls, replacing windows, and upgrading HVAC systems as the top three improvements that would bring ‘little to no savings’.

4. Motivation

Pilots asked homeowners whether they agreed with a series of statements about what would encourage them to make recommended improvements. They could agree with as many as applied to them.

The most often cited reason to make an improvement is “to help me save on my utilities,” followed by “increase comfort in my home,” and “improve my Home Energy Score.” Least often cited is the ability to do something by oneself and not needing to hire someone.

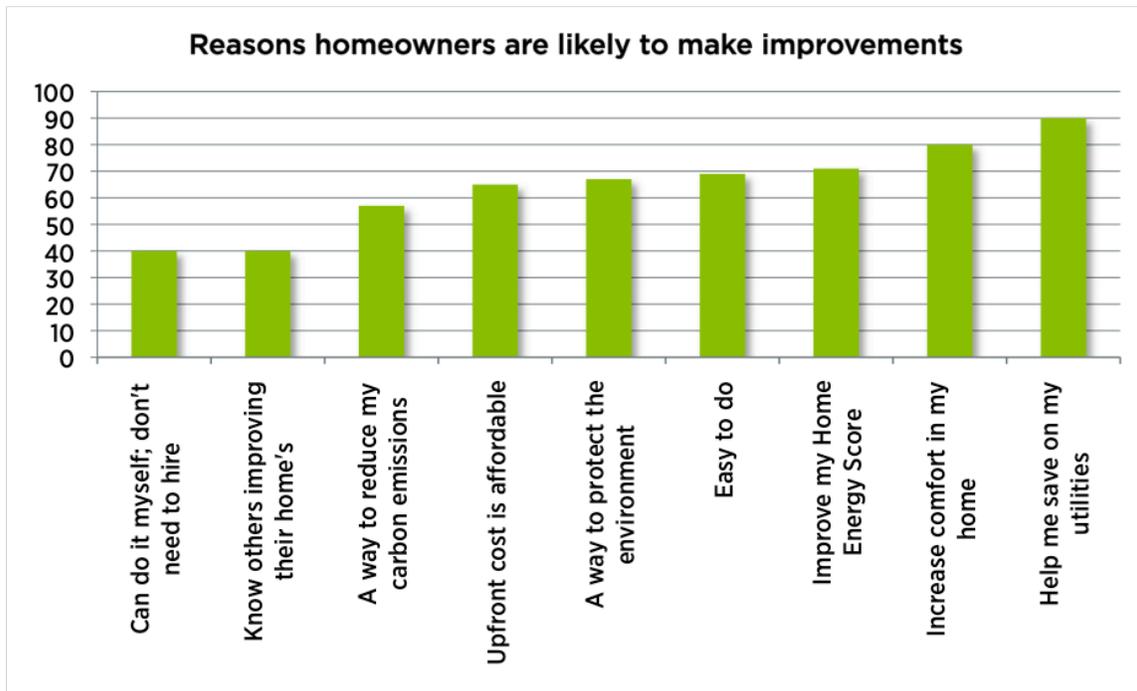


Figure 9. Reasons cited for making improvements

Pilots then asked homeowners why they decided to NOT make recommended improvements, assessing this by asking them how much they agreed with statements that people often give for not making energy efficiency improvements in the home.

The most often cited reason for not making an improvement was "I have to hire someone to do it", followed by "it's not affordable," and "it's not a priority for me right now." Least cited reason by homeowners as to what deters them from making improvements is "I don't know how to get started."

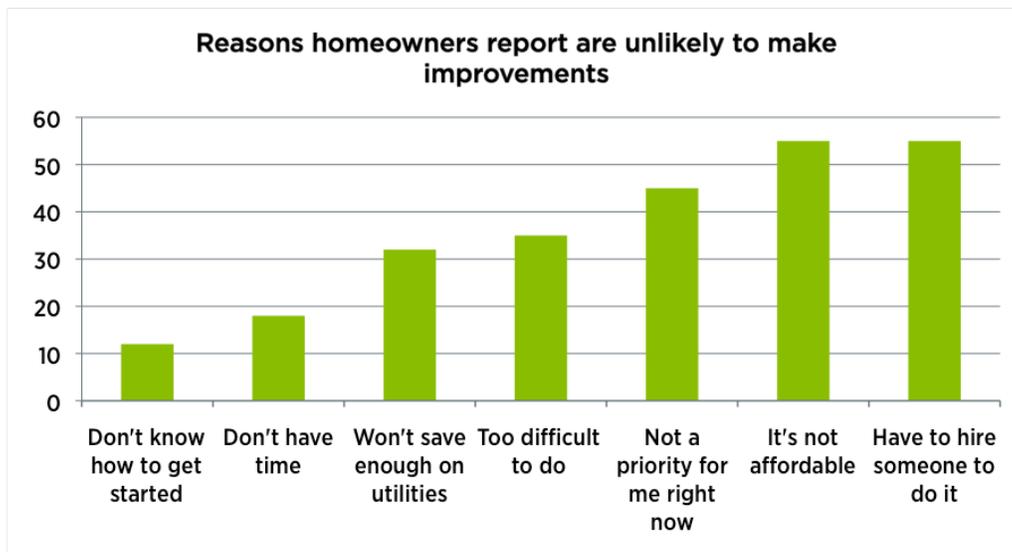


Figure 10. Reasons cited as discouraging improvements

In a different part of the questionnaire, homeowners were asked whether they would only make recommended improvements if there are rebates or tax credits available. The median response was “neutral,” i.e., neither agree nor disagree (see Appendix B, Figure B22).

Finally, homeowners were asked directly whether the Home Energy Score encouraged them to make improvements. This question was presented in two forms, one phrased positively and the other reverse-worded to avoid agreement bias (i.e., the Home Energy Score convinced me to NOT make home energy improvements.) The median response was “agree” for the positively framed question and “disagree” for the reverse-worded one (see Appendix B, Figure B23 and B24).

Some respondents expressed dismay with the scale given that they could not reach a 10, or could only move up a couple of points (e.g., from a 4 to a 6). One homeowner noted “There were

“We can’t improve greatly even with the recommendations.”

nothing listed that I needed to do. I already had 2 new energy efficient heat pumps and programmable thermostats. A new washer that was energy efficient. 80 gallon hot water heater approved by the electric cooperative. My score was 7 but didn't get any recommendations. What good is the report?”

5. Usefulness of Information

One hundred-six respondents answered the question “What about the Home Energy Score process and materials were most useful to you?” Four of these responses were not relevant to the question and were not coded. The 102 remaining answers were coded into ten categories, detailed in Table 3, and listed in order of frequency cited. Some individual responses are included in more than one category where relevant.

Recommendations were most frequently noted as the most helpful aspect of the Home Energy Score program, mentioned 34 times whereas the second most often cited aspect received just 19 mentions. However, none of the Pilots gave homeowners ONLY the Home Energy Score Recommendations. Therefore, some of the comments concerning recommendations (both positive and negative) may not be specifically related to the recommendations generated by the Home Energy Scoring Tool.

Many homeowners stated they generally found the recommendations the most useful part of the program, without going into details. But some homeowners broke down the more useful aspects, such as this homeowner who wrote, “the concise summary of the work needed, how much each item cost, savings associated with each, and payback if the work was performed.”

***What is most useful?
Knowing “what exactly
needed improvement
and how to do it.”***

For some already motivated homeowners, recommendations in combination with financial incentives and rebates helped them prioritize and figure out which step to take first, like this respondent:

“We had a feeling that there were areas that needed updating and we wanted to make our home more energy efficient and the Home Energy Score report helped us to pinpoint what we could do first using the rebates and incentives.”

Table 3.

What is most useful?	Number of times mentioned
Recommendations, instructions on how to improve	34
Direct incentives, give-aways, e.g., light-bulbs, rebates	19
Assessor related, e.g., quality of auditor	14
Information on savings	14
Technical aspect, e.g., learning about a specific part of the home or environmental health info	13
Everything or general “it was useful”	12
Confirmation of beliefs about home or relief	9
The Score itself	7
Learning for the sake of understanding	3
Nothing	3

Several homeowners mentioned that they liked the tips for using energy more efficiently, such as temperature settings, using ceiling fans, changing air filters, and closing shades. For both use-oriented suggestions and retrofit-oriented recommendations, a theme in many responses was an appreciation for specificity - being shown exactly what could be improved and how to do it.

Direct incentives and give-aways from the Pilots were mentioned 19 times as the most useful aspect of the program. The appeal of getting something for free, even if it is a small item, holds great appeal. Homeowners were given items such as compact fluorescent light bulbs, insulation installation, shower-head aerators, and water heater blankets. Rebates were also an appreciated incentive.

“I loved the fact that you had an express/rush service combining energy audit with a bid and approved contractors waiting. It made it very easy to make upgrade for attic insulation and the rebate incentives made it a no brainer.”

Fourteen homeowners commented on the usefulness of the **assessor or energy professional**. Homeowners who found assessors helpful noted their high level of knowledge, thoroughness, and patience as qualities that made the assessor useful. They also seemed to appreciate the greater detail, specific to their situation that a trained professional provided, compared to a print-out of recommendations. For instance, this homeowner’s response is typical of this category:

“(Assessor’s name redacted) was extremely knowledgeable and very patient in answering all of our questions. He was more than fair with his call time. What is most useful are all of his recommendations of changes to make our home more energy efficient, i.e., changing settings, caulking, maintaining equipment and his time explaining the whys and wherefores of his recommendations. Very informative.”

Most useful?
“Annual savings and how the changes can make a marked difference.”

For some homeowners who are already engaged in making energy efficient improvements, interacting with a helpful professional can motivate them to pursue even more energy savings: “I have completed many energy efficiency projects on my home during the past 4 years. Having a professional evaluate my home after the improvements and make additional recommendations was very beneficial.” Additionally, when energy professionals are trusted, having an audit plus

connections to a contractor who can do the recommended work can motivate a homeowner to act quickly.

Savings information was mentioned as often as energy professionals as the most useful aspect of the program. Savings information seemed to work in both directions though; they encouraged some homeowners and discouraged others. Some homeowners cited the savings figures as helpful, especially within the context of the recommendations. For example, one homeowner wrote, “Recommendations for how to improve, the estimates for how much we will save, and how long it will take for that investment to pay for itself” was the most useful part of the Home Energy Score. Others, like this homeowner, felt the savings estimate confirmed their resistance to investing in energy efficiency. “The fact that there is nothing I can do that will have a reasonable payback.”

“The most useful thing for me was finding out that my heating system is in good shape and doesn’t need to be replaced.”

Thirteen homeowners noted that they learned something very specific about their home and that was most useful to them. In contrast, 12 homeowners responded that everything was useful. For 9 respondents, the Score confirmed that their house was as energy efficient as they thought it could be or that they didn’t have any major work to do. One homeowner summed up this category well, writing that the most useful part of the Home Energy Score was “confirmation that I don’t have any major issues with my home.”

Seven homeowners stated that **the score itself was most useful**. A helpful aspect of the Score is that it was a marker for how much improvement was needed and/or how much a home could improve (e.g., the potential Score). A few appreciated **learning about energy efficiency** for its own sake. Finally, there were three respondents who found nothing useful in the program.

Eighty-five respondents answered the question “What about the Home Energy Score process and materials were LEAST useful to you?” Seven of these responses were not relevant and were not coded. The 78 remaining answers were coded into seven categories, detailed in Table 4 below, and listed in order of frequency cited. Some responses appear in more than one category.

Table 4.

What is least useful?	Number of times mentioned
Nothing, everything was useful.	34
Score	10
Recommendations	9
Hassles, e.g., took too much time, time off work, dirt	6
Technical problem	6
Things that are not applicable to me	5
Miscellaneous	15

A positive finding was that 34 homeowners said “nothing” was least useful or that “everything was useful,” meaning that they couldn’t identify an aspect of the program they considered “least useful.”

Ten homeowners said that the least useful aspect of the program was the Score itself. Several responses indicated that there was a frustration with the narrow range of improvement in the score, e.g., “It lists the changes/actions I can do to bring my score up from a 5 to a 7, but not what I can do to bring it up above a 7.” Others in this category were dissatisfied with the inaccuracy (real or perceived) of the score.

“Seems like a lot of wash because (it would be) such a minor jump in score. Plus, no one told us what to do to have a more significant improvement in our score.”

Recommendations were perceived as unhelpful for a few reasons—they were seen as irrelevant or wrong, not do-able, or lacking step-by-step instructions. At the same time, as stated above,

“It was absolutely worth it, but it was a hassle to be home.”

recommendations were also cited as the most useful aspect of the program. So, respondents were clearly not uniform in their opinion of recommendations, but recommendations can make a strong impression in both

positive and negative directions.

Six homeowners reported that the **hassles** of having their home assessed or retrofitted were least useful. Timing, either having to take time off of work or how long it took to get results, was the main complaint. One homeowner who had their attic insulated as part of the pilot partner's program disliked the dust it created. To place these comments in context however, it should be noted that earlier in the questionnaire most homeowners agreed that "The amount of time I had to be at home while my house was assessed was reasonable" (see Appendix B, Figure B25 where the median response is "agree").

Technical problems were noted by 6 homeowners. This included many house-specific issues such as contesting assumptions made about fan use, size of additions, etc. Five homeowners cited recommendations or other information they felt was **not applicable to them** as being the least useful aspect of the program.

There were 15 answers that were combined into the **miscellaneous category** since these responses did not overall much if at all. This feedback included complaints related to Pilots' other programs done in combination with Home Energy Score (e.g., extras not helpful, didn't like radon testing, and Pilot assessor didn't explain Home Energy Score). There were also comments about problems with the materials handed out (e.g., they were hard to understand or hard to read). Other "least-useful" aspects of the program included the assessor, savings information, and not getting credit for previous home improvement work.

Ninety-five respondents answered the question "What changes would you suggest we make to the Home Energy Score process and materials?" Four of these responses were not relevant and were not coded. The 91 remaining answers were coded into ten categories, detailed in Table 5, and listed in order of frequency cited. Some responses appear in more than one category.

"I don't understand (that) if replacing (my) heat system was not advised, why my score was so low. It is very confusing."

"I suffered a bit of info overload since they tried to move the process rapidly. I imagine some folks might be somewhat overwhelmed."

Homeowners most often stated that they had **no suggestions** for changing the Home Energy Score program. This was far and away the most popular response, stated by 47 respondents, while the second ranked suggestion, **changing the Pilot's program**, was only mentioned 9 times. Changing the Pilot's program often included suggestions to include more or different giveaways, such as LED lights, better CFLs, and more efficient windows and insulation.

Eight homeowners would like to see the **Score changed to be more reflective of their home's current state**. This group thought that the assessment and resulting score was not accurate.

There were several suggestions made about the role of the **assessor**. A few homeowners felt confused by the assessors and would have liked more time with them or more explanation from them. In local programs where improvements are made alongside of assessment, there can be several staff in a home at one time and this can be confusing to homeowners, such as a homeowner in this sample who said, “I had a hard time keeping everyone straight.” Having well-trained and careful energy professionals was also suggested.

Table 5.

What changes would you suggest we make to the program?	Number of times mentioned
Nothing, it’s all fine.	47
Related to Pilots’ other programs done in combination with Home Energy Score (e.g., get rid of radon testing, or would like other give-away options)	9
Make it more reflective of my home	8
Assessor or contractor related	7
Recommendations	7
Materials, e.g., make easier to understand, more specificity, compare savings to actual utility bills	7
Technical changes	5
Reduce hassles (mainly, time at home)	4
Evaluation, e.g., change questionnaire, increase opportunity for evaluation	4
Other	5

Homeowners had some specific thoughts for how to change the **Recommendations** section of the program. Several wanted more specific information for how much each recommendation could save them. For example, one suggestion was “I would have liked a single sheet of paper listing the suggested improvements in the order of c/b (their cost/benefit ratios). What is the most urgent to do and what is the easiest to do and what are c/b ratios?” In this case, the Pilot most likely provided their own recommendations given that the Home Energy Score recommendations were ranked in priority order. Another possibility is that the prioritization needs to be clearer for the consumer to understand.

Seven respondents suggested improvements to the **materials**, e.g., making it easier to understand, have more specificity, make the text larger, and compare savings to actual utility bills.

Technical changes that were suggested included changing the score to use kWh instead of MBtus and changing the form assessors used. Given the specificity of these responses and the fact that the latter applies to forms not used by the homeowner, it is unclear whether these responses were directly provided by the homeowners. The two homeowners who were displeased with the use of MBtus had all-electric homes and appeared to be particularly well-informed about the difference between kWh and MBtus. They were also from the same Pilot -- a rural electric co-op service area.

Four homeowners suggested **reducing hassles**, mainly, time needed to be at home and doing everything in one visit. 4 homeowners suggested changing the **evaluation of the program**, both those not wanting to complete the questionnaires or change its scope and those who wanted more opportunity to evaluate the program in more detail. Of the 5 answers in the “**other**” category, 3 stated that they didn’t receive a Score and would have liked more information on it and the program.

“I think there needs to be a list of each item recommended and the potential savings in energy and dollars for those recommendations.”

Conclusion

Homeowners shared a great deal of feedback with the Pilots. This analysis, along with other information learned during the 2011 Pilots, led to a number of program improvements. The current Home Energy Score, which rolled out in June 2012 with approximately 20 Partners, provides streamlined information as well as more specific guidance to homeowners, and uses a new approach to generating recommendations.

While some improvements have been made, this analysis suggests that further evaluation may be helpful in informing future program development. In particular, DOE plans to conduct additional evaluations to ensure the Home Energy Score is successful in motivating homeowners to undertake cost-effective energy improvements. The following are some of the areas that DOE will consider and evaluate as the program evolves in this next phase of implementation.

Greater specificity of information and next steps

Homeowners repeatedly noted that they appreciate specificity in instruction, more than technical specificity in presentation of information. Homeowners also appreciated assessors who clearly explained the steps for making an improvement, whether it meant hiring someone to do it or the homeowner could do it on their own. When assessors aren't able to give such specific instruction, homeowners might benefit from having step by step instructions in combination with how each improvement can improve their Score and savings.

Some consumers may also respond more positively and act upon the recommendations if there were "how to" guides explicitly outlining how to do each improvement recommended. Would listing an estimate of how much each improvement would increase a home's Score affect homeowners' plans to make improvements?

Layers of information

Related to giving specific instructions, layers of information could be available to homeowners. Those homeowners who want more information and instruction could "drill down" and access it. Homeowners who are overwhelmed by detail could stop at the more general level. A web-based report may be effective in laying information so that those who want minimal information can see it upfront, while those consumers interested in more detail could access additional information easily.

Refinements to the scale

Homeowner feedback showed that a limit in Score improvement can affect satisfaction and possibly motivation. Some homeowners were frustrated that their maximum possible Score after improvements was still low or that their Score could only increase by a couple of points. Providing clarifying or contextual information may assuage some consumers' concerns. For example, if a homeowner learns that even the most efficient 1930s home in their area can score only a 6 or 7, then that homeowner may see their improved score as more acceptable and still worthy of attaining. Additional presentation methods need to be evaluated to ensure that the

Score motivates consumers regardless of where they are on the scale, and particularly those whose homes score poorly.

Greater personalization

Some social scientists suggest that personalizing the information can be effective in engaging consumers. The Home Energy Score may benefit from incorporating a storyline and pictures of people into the materials to create a sense of personal connection with the Score. Examples of success stories from other homeowners may also help make the Score less abstract and humanize the consequences of energy use.

Ties to social values

Homeowner expectations of savings from specific home improvements showed that expectations were highest for upgrading major appliances. And while appliance upgrades don't necessarily result in the most savings, it is an area homeowners are familiar with and it is also more visible than some other upgrades. This kind of improvement may also have more social value as it something you can show and even "show off" to others. Home Energy Score providers may consider ways to bundle appliance upgrades with improvements that are less visible, harder to do, and not as socially exciting, like insulating and air sealing, and evaluate whether this approach promotes greater investment in these less visible improvements.

DOE may also consider whether providing the Home Energy Score through a community approach vs. individual homeowner approach makes a difference in homeowner investment in improvements. Engaging an entire block, neighborhood, or other defined communities may be effective in capitalizing on the comparative and perhaps even competitive aspect of the Score.

Homeowner segments

It may be useful to consider how a consumer's specific life situation affects their reaction to and use of the Score. For example, how do homeowners, homebuyers, home sellers, renters, and landlords respond to the Score and supplemental information? Future analysis may consider how to best tailor information and address the specific interests of different consumer groups.

Anchoring effects

Anchoring effects refer to a phenomenon where people set a certain value for a service or good and use that value as a frame of reference for future decisions about those goods or services. For example, energy efficiency giveaways are always appreciated and may be effective in introducing consumers to new technologies. At the same time, giveaways may backfire by setting a low-price anchor in homeowners' minds, creating the expectation that energy efficiency should be cheap, and making these homeowners more resistant to costly improvements.

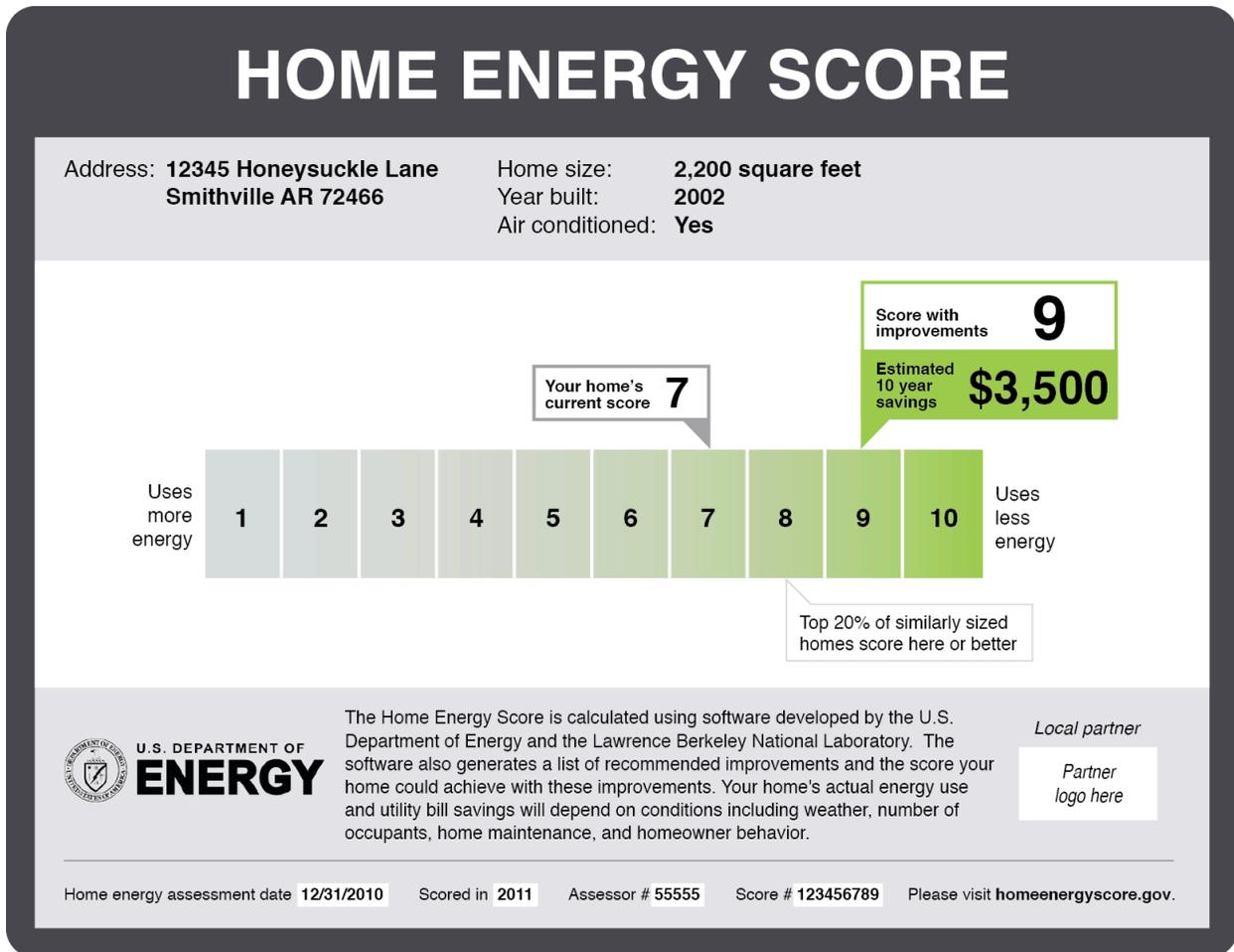
Future evaluation may consider whether the Score unintentionally serves as another type of mental anchor – perhaps by creating efficiency ceilings with the improved score and/or expected savings projection.

Justification effects

Some of the respondents noted relief given the fact that their homes scored relatively well. For example, “I learned that my house is much more efficient than I thought. I could add insulation to an attic room upstairs, but warned that some ventilation is necessary. My furnace is fine, which was one of my concerns.” Future analysis may consider whether receiving a “relatively” good score actually discourages homeowners from making cost-effective improvements since they can justify inaction with a relatively good score.

Appendix A.

Home Energy Score (2011 Pilot Version)



Appendix B

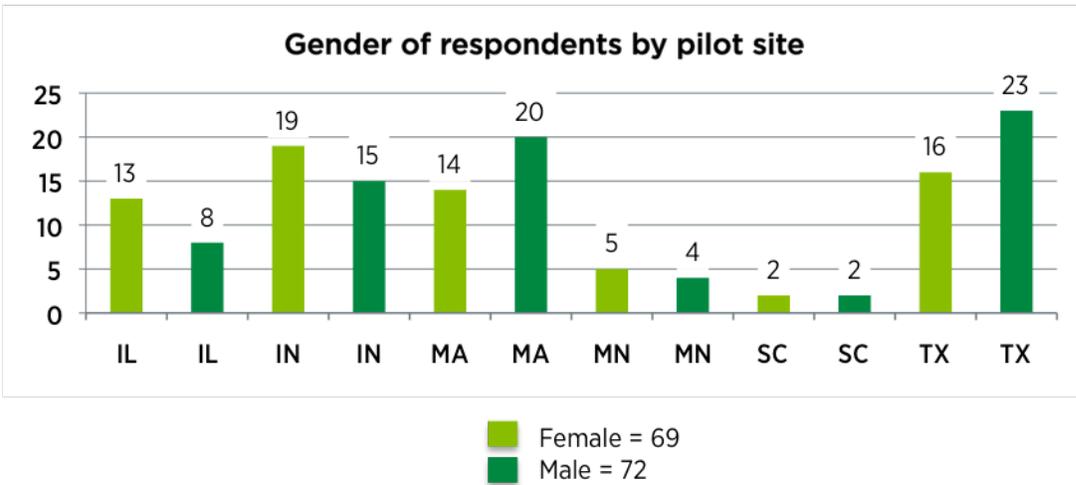


Figure B1. Gender of Respondents

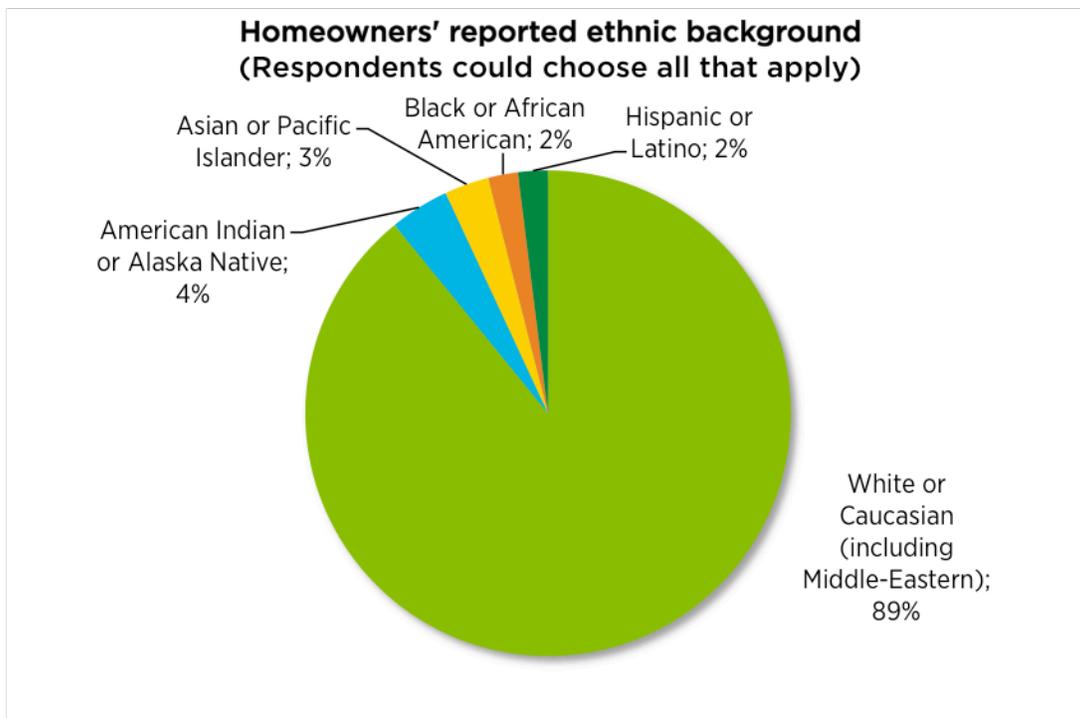


Figure B2. Reported Ethnic Background

Response to "How satisfied are you with the overall experience with the Home Energy Score program?"
n=151

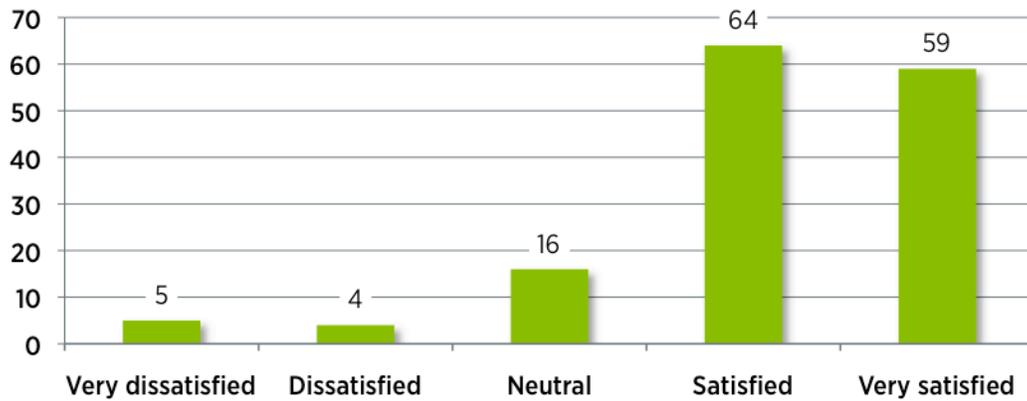


Figure B3. Overall Satisfaction with Program

Response to "How satisfied are you with the information given with your list of recommended improvements?"
n=145

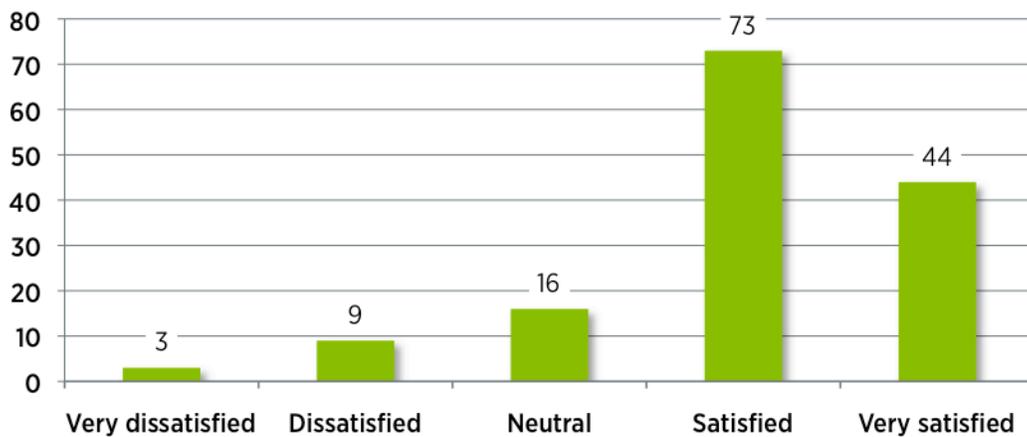


Figure B4. Satisfaction with Recommendations

Response to "How satisfied are you with how your home scored?"
n=147

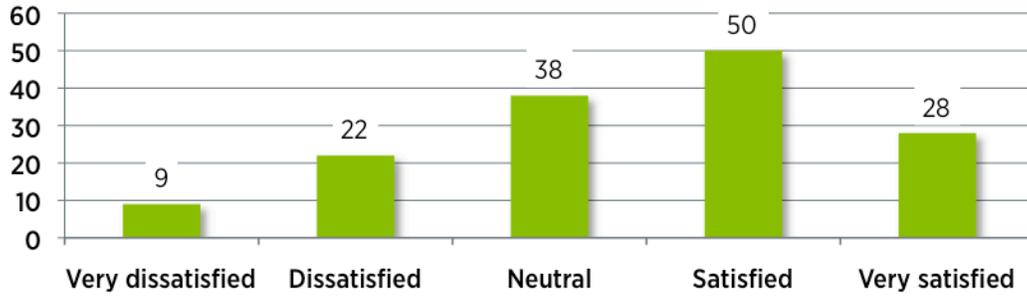


Figure B5. Satisfaction with Their Home's Score

Response to "I will tell people about the Home Energy Score program"
n=148

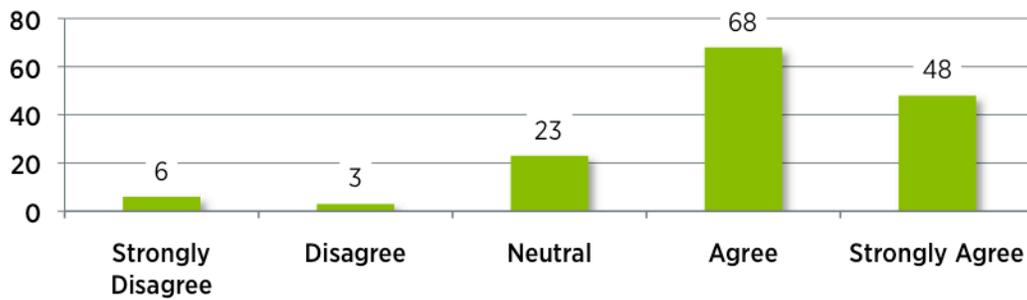


Figure B6. Likelihood to Tell Others

Response to "The Home Energy Score 1 to 10 scale was easy to understand"
n=149

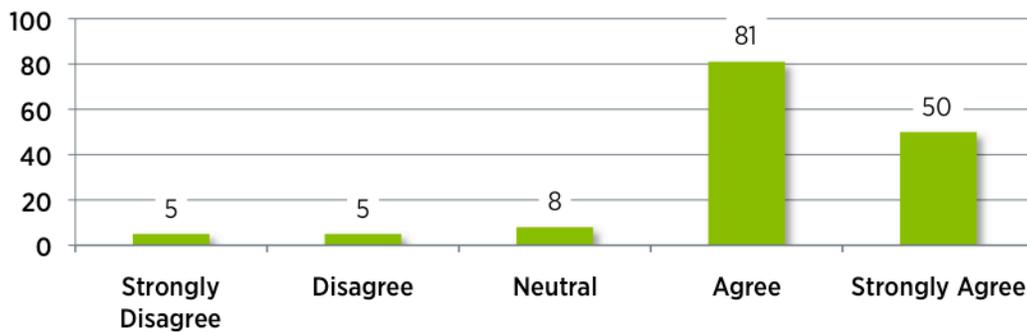


Figure B7. Understandability

Response to "It is clear to me how much I can save on my utility bills and how I can achieve those savings"
n=147

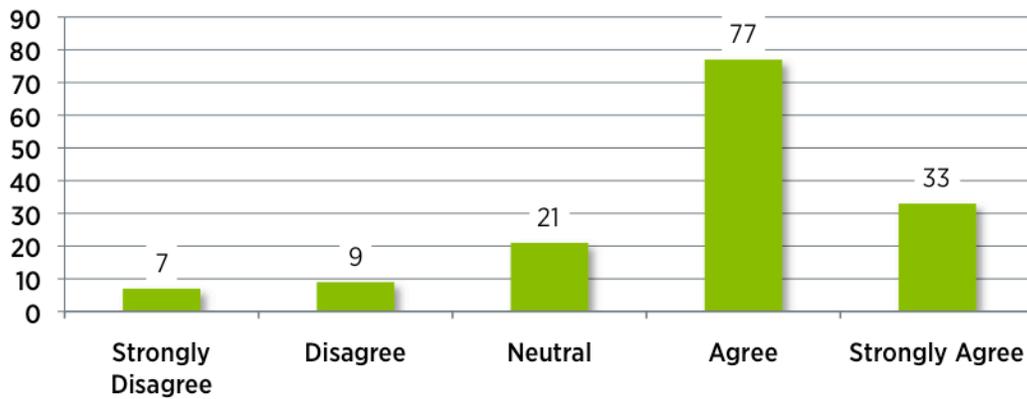


Figure B8. Clarity of Savings Information

Response to "I understand how my home compares to top performing homes in my area"
n=147

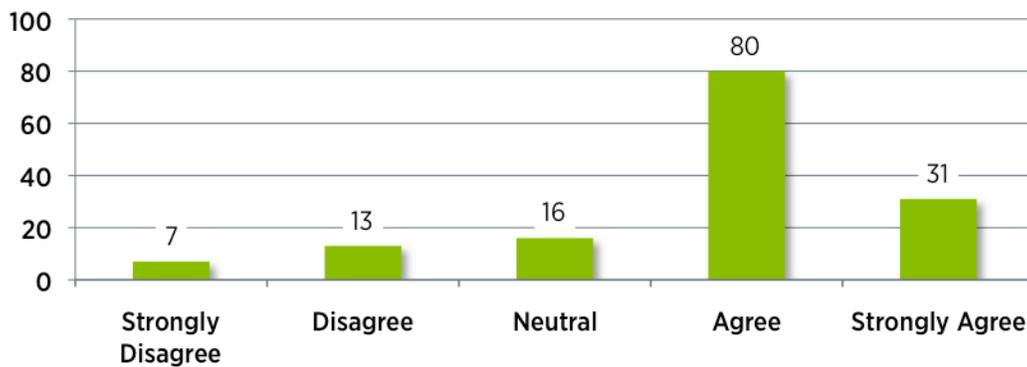


Figure B9. Clarity of Comparative Information

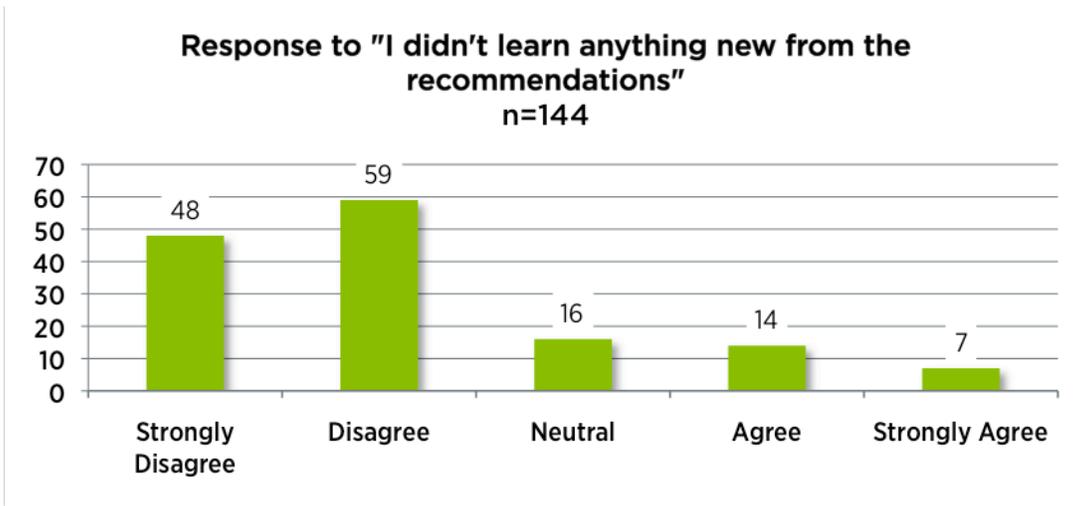


Figure B10. Recommendation's Lack of Usability

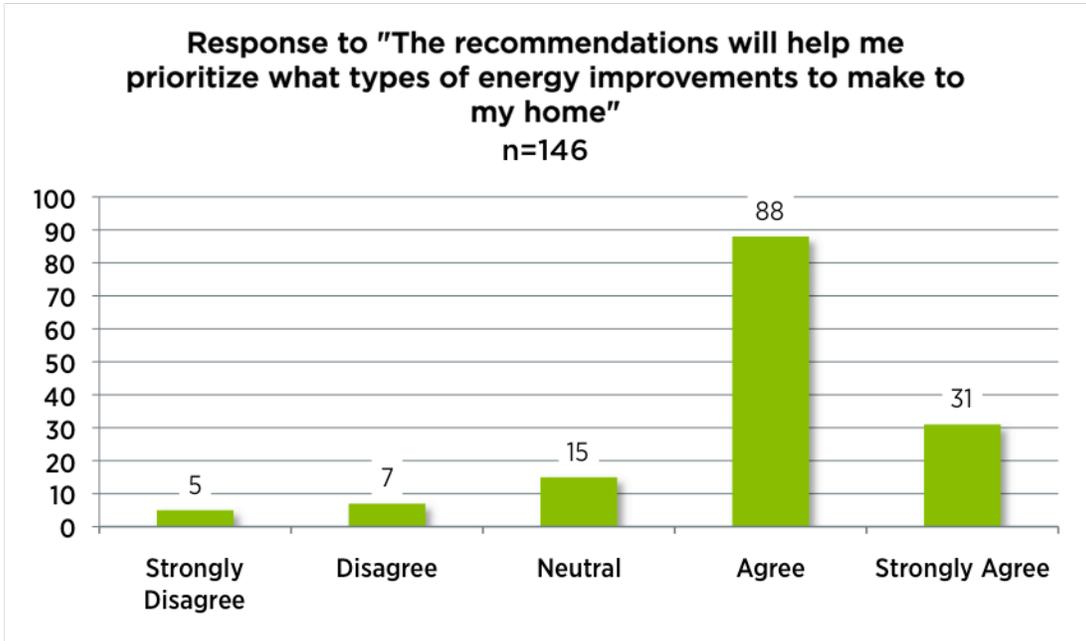


Figure B11. Usefulness in Assisting Prioritization

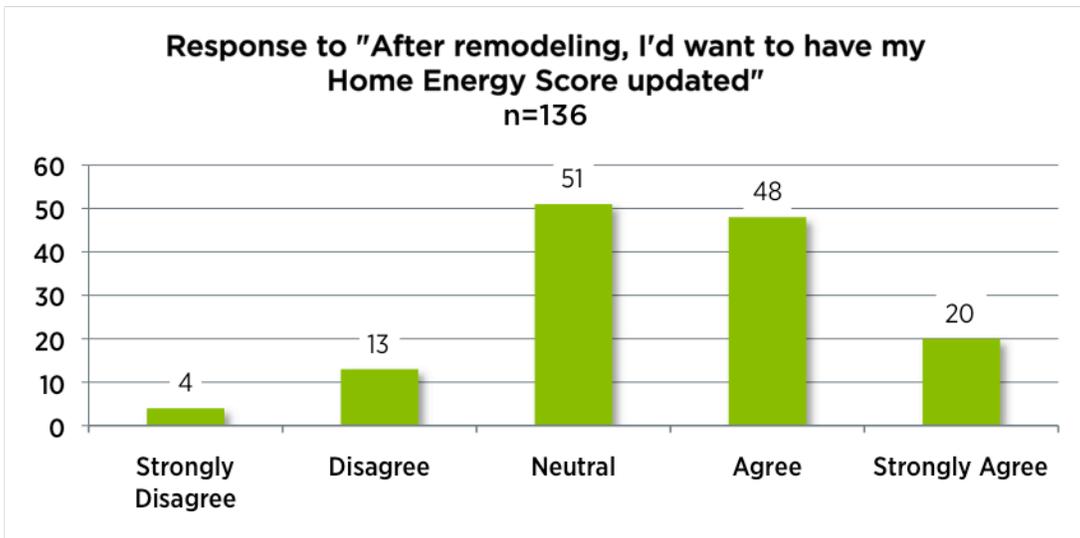


Figure B12. Interest in Updating Score after Remodeling

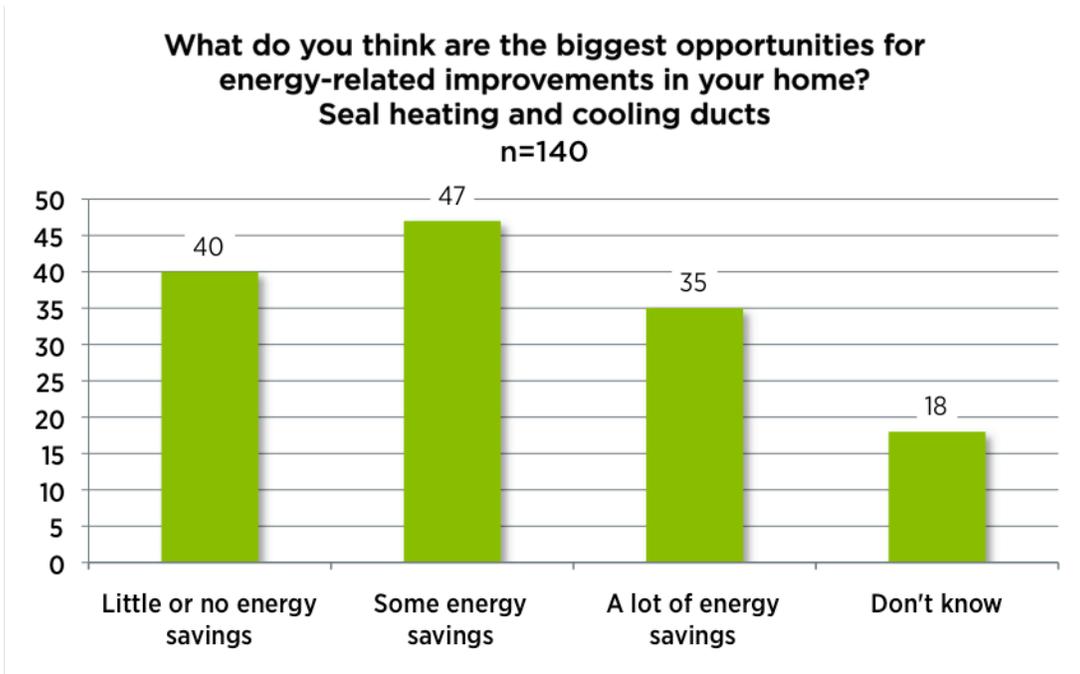


Figure B13. Perceived Importance of Sealing Heating and Cooling Ducts

**What do you think are the biggest opportunities for energy-related improvements in your home?
Seal cracks and gaps in walls and foundation**
n=151

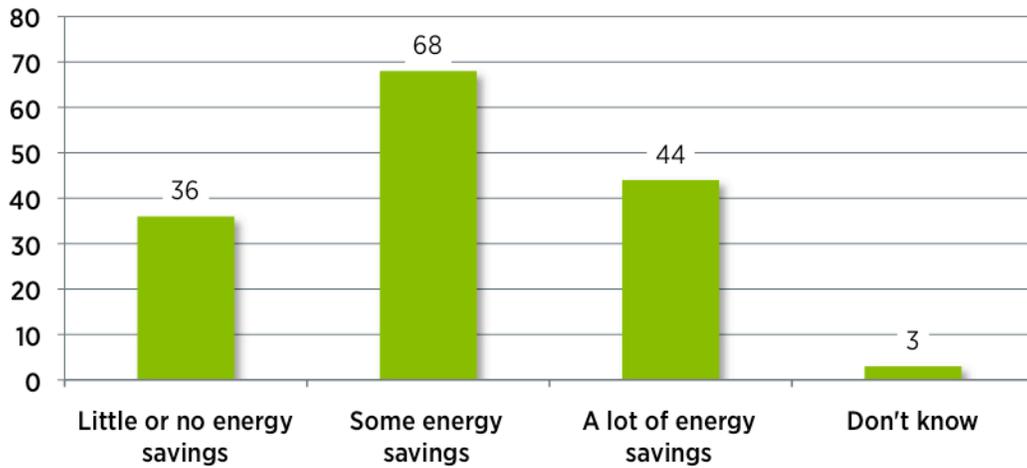


Figure B14. Perceived Importance of Sealing Cracks and Gaps in Walls and Foundations

**What do you think are the biggest opportunities for energy-related improvements in your home?
Add insulation to attic**
n=144

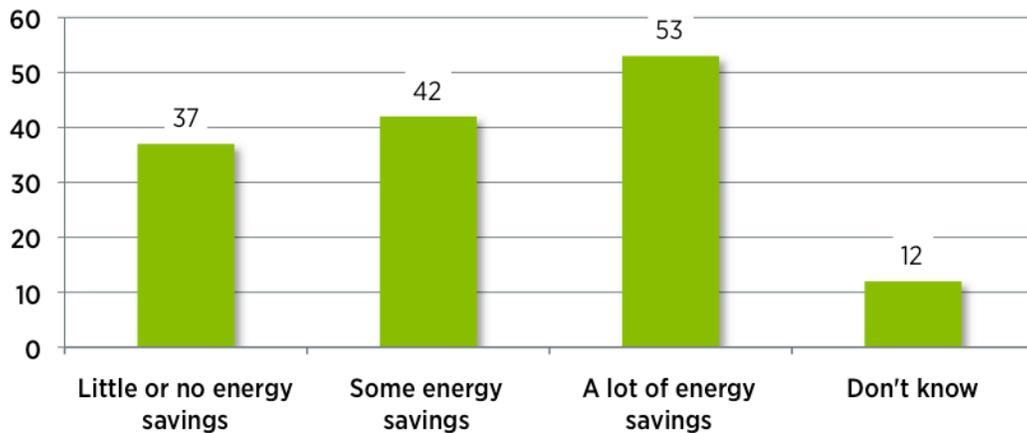


Figure B15. Perceived Importance of Attic Insulation

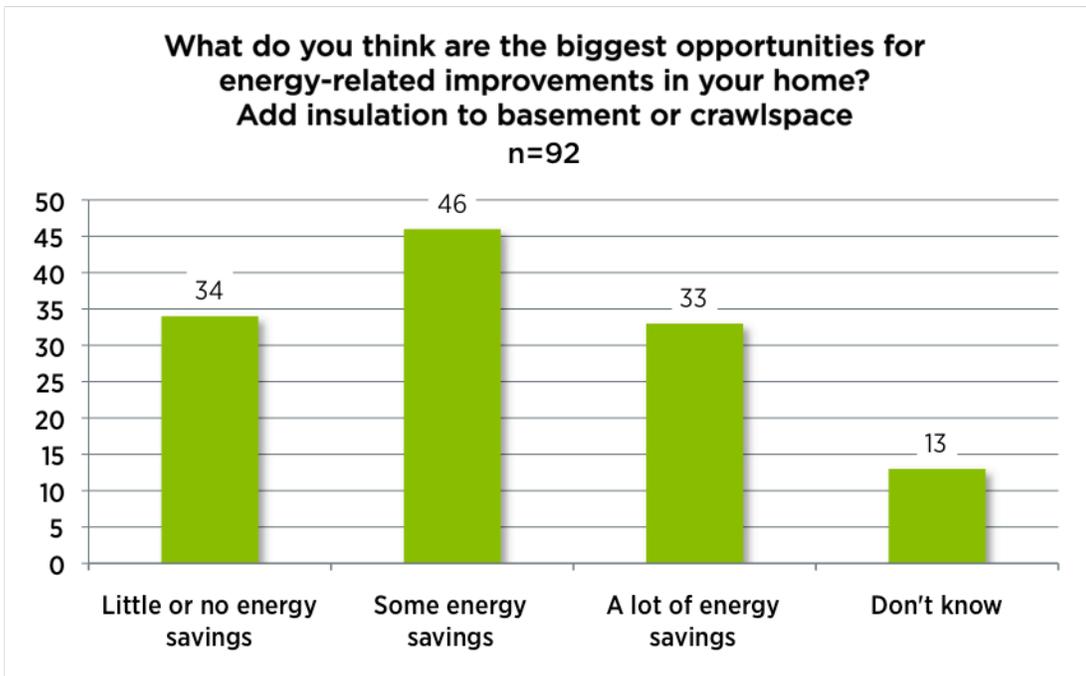


Figure B16. Perceived Importance of Basement/Crawlspace Insulation

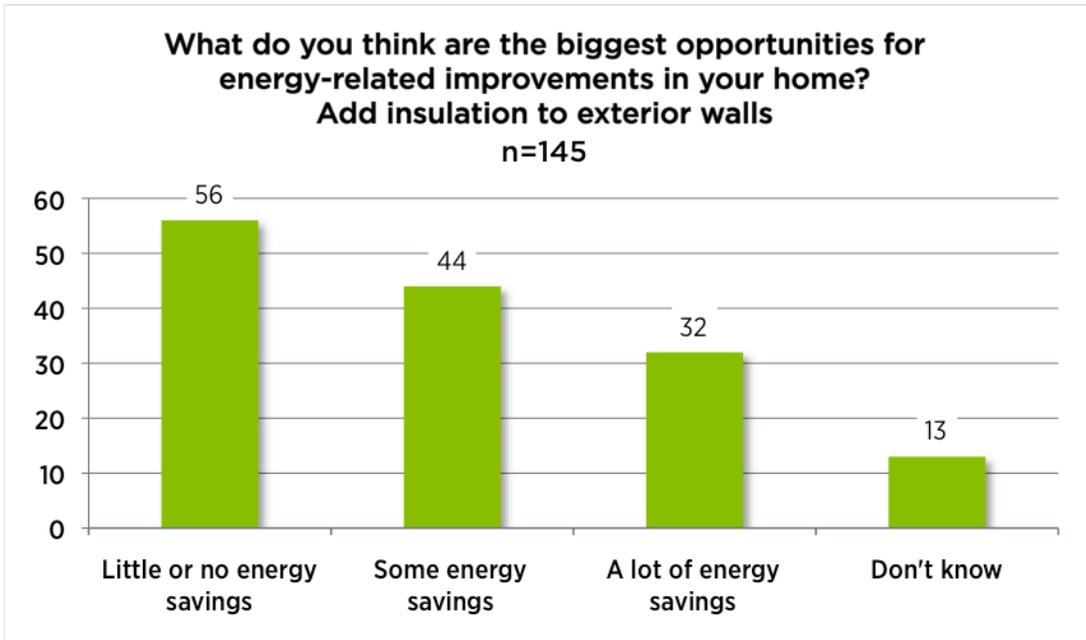


Figure B17. Perceived Importance of Exterior Wall Insulation

**What do you think are the biggest opportunities for energy-related improvements in your home?
Replace heating or cooling systems
n=147**

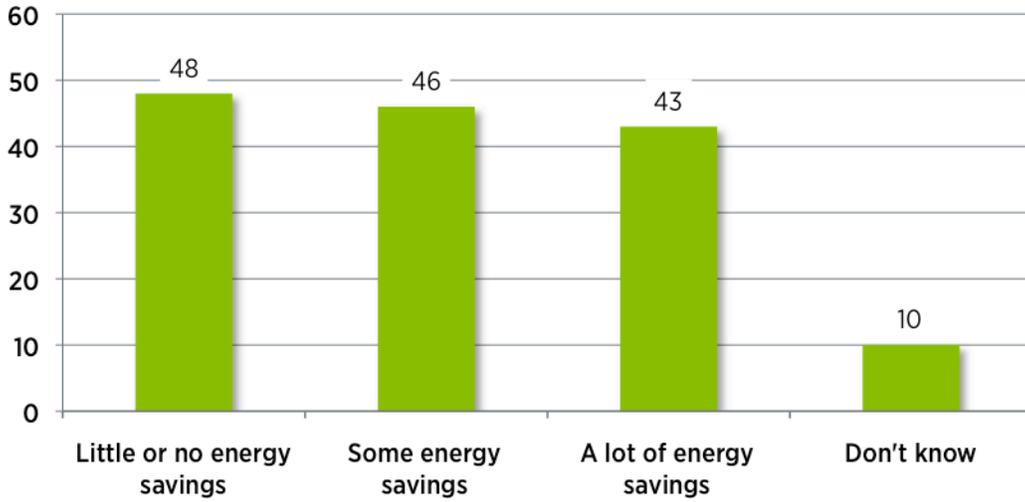


Figure B18. Perceived Importance of Better Heating or Cooling Systems

**What do you think are the biggest opportunities for energy-related improvements in your home?
Upgrade windows with more energy efficient models
n=150**

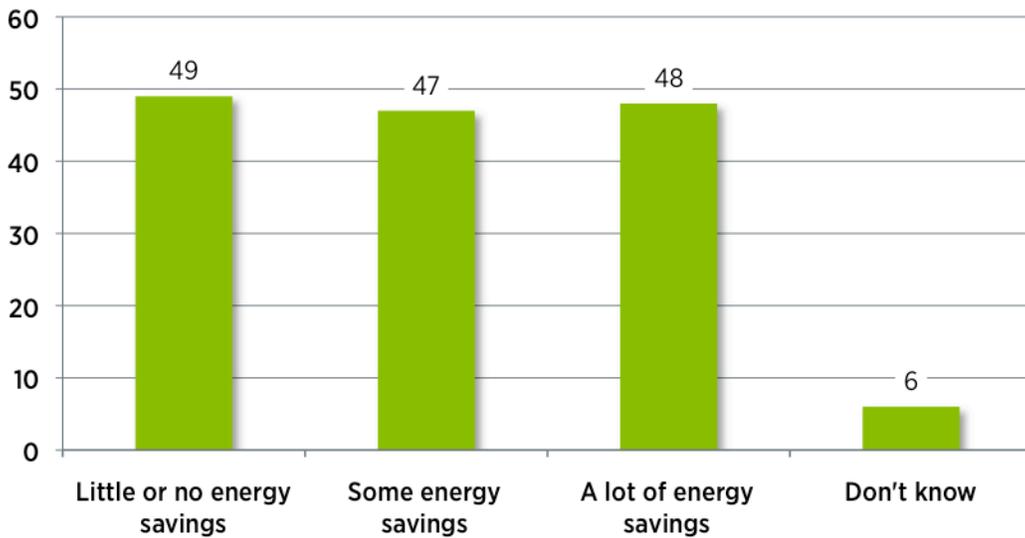


Figure B19. Perceived Importance of Window Upgrades

**What do you think are the biggest opportunities for energy-related improvements in your home?
Replace major appliances with ENERGY STAR models**
n=150

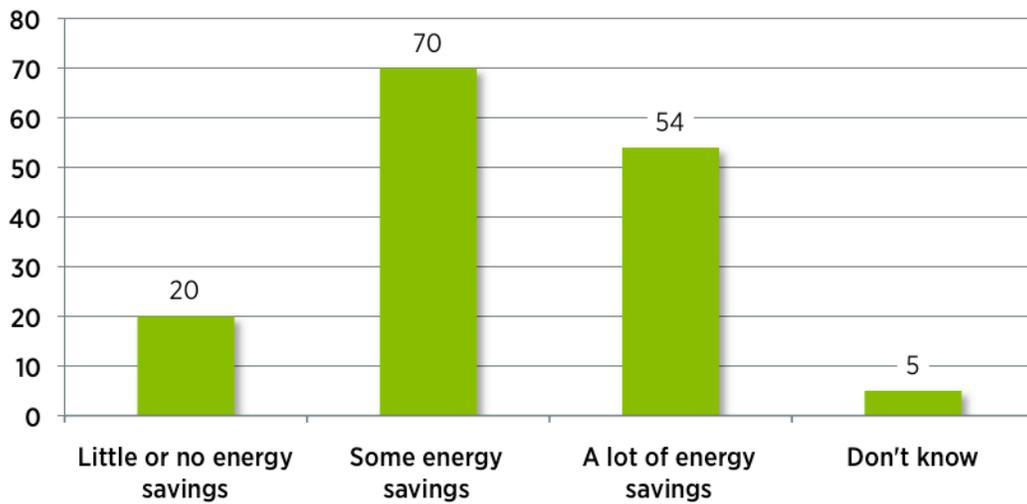


Figure B20. Perceived Importance of Replacing Major Appliances with Energy Star models

**What do you think are the biggest opportunities for energy related improvements in your home?
Other (e.g., sealing windows, doors, solar screens)**
n=17

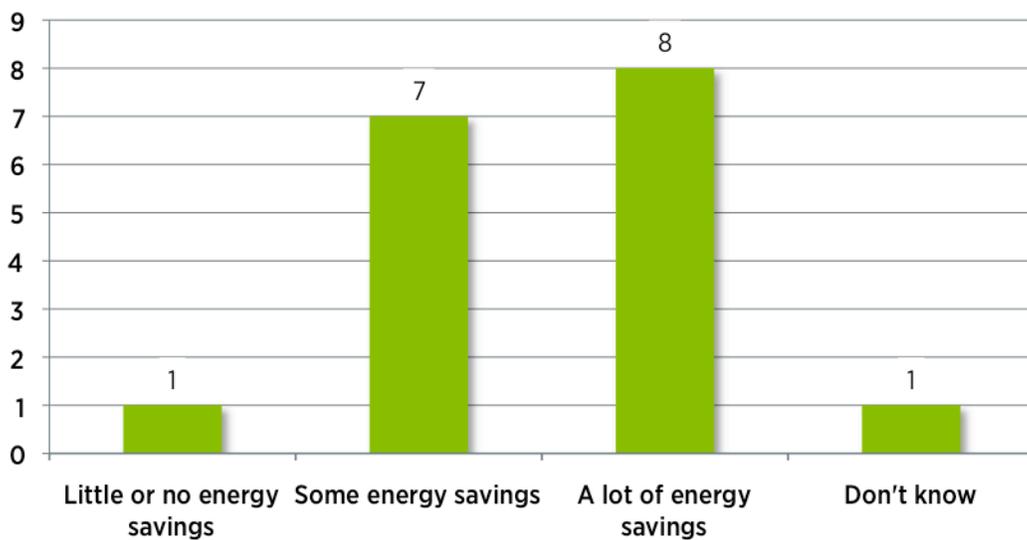


Figure B21. Perceived Importance of Other Efficiency Improvements (e.g., sealing windows, doors, solar screens)

Response to "I will only make recommended improvements if there are rebates or tax credits available"
 n=145

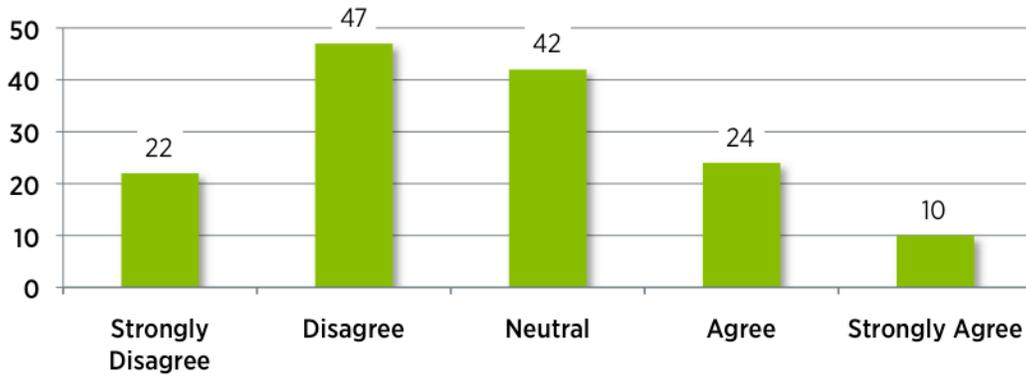


Figure B22. Effect of Rebates or Tax Credits

Response to "The Home Energy Score encouraged me to go ahead and make home energy improvements"
 n=144

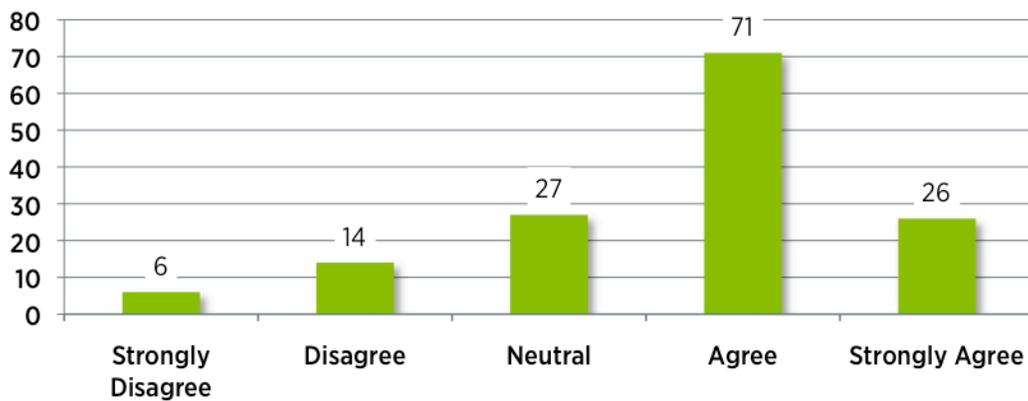


Figure B23. Motivator

Response to "The Home Energy Score convinced me to not make home energy improvements"

n=144

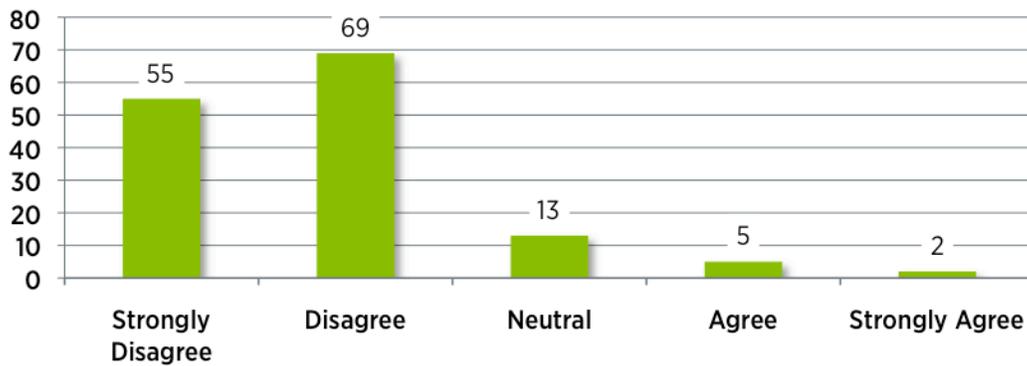


Figure B24. Demotivator

Response to "The amount of time I had to be at home while my house was assessed was reasonable"

n=149

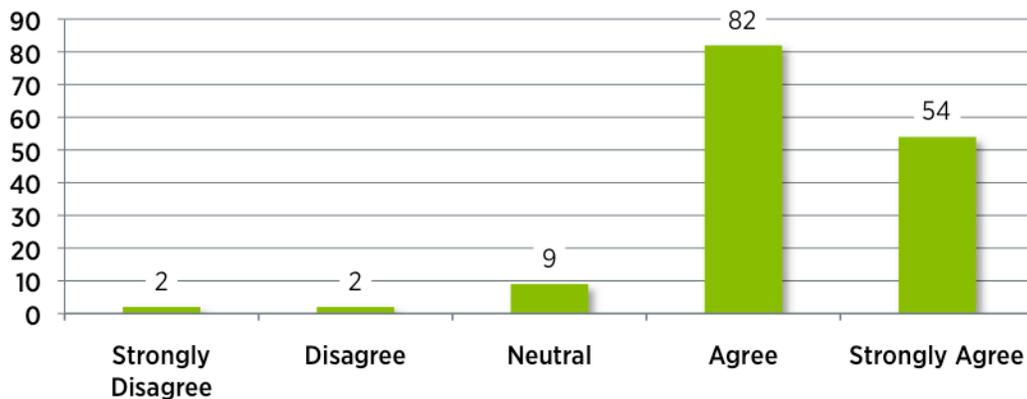


Figure B25. Reasonableness of Time Requirements for Assessing Home