Making Energy Efficiency Desirable:
Lessons from a Cutting-Edge Program in Minneapolis

by

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ABSTRACT

For the last 30 years, experts have claimed that energy efficiency upgrades in existing buildings can lead to significant reductions in energy use, yet efficiency programs, particularly those geared towards households, have failed to meet expectations. Through interviews with participants of the Community Energy Services program in Minneapolis, Minnesota, I identify the barriers to investing in energy efficiency facing homeowners, even with a cutting-edge program that combines technical and financial assistance and seeks to create neighborhood norms around addressing energy efficiency. I argue that it is important to distinguish between financial and logistical barriers and emotional or psychological barriers. Both are important to convince a homeowner to take action, yet Community Energy Services, like many other programs, focuses too much on the former, while failing to make a compelling emotional argument for the majority of their participants. The Community Energy Services program improves on previous energy efficiency programs by simplifying the process and supporting the homeowner. It provides a promising model that, once strengthened with a more convincing emotional argument for upgrades, could be a breakthrough to significant reductions in energy use.

Thesis Supervisor: Judith Layzer, Associate Professor of Environmental Policy

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INTRODUCTION

Katie Snow and her husband bought their house in Minneapolis almost two years ago. When Katie heard about an energy efficiency program through her neighborhood association, she was excited to have a free audit to see how she could save money on her utility bills and invest in her new home. Her house was built in the 1940s, and she had noticed cold winter drafts. The program recommended that Katie insulate and seal her attic, and she was glad to have them pick the highest priority actions for her. Though Katie knows what she needs to do to improve the efficiency of her home and has a list of vetted contractors, she has not done it yet. "I don't know why we didn't make this a priority last year," she explained, "I guess it's just more expensive owning a house than we had thought."

Katie and her husband represent millions of American homeowners. U.S. households account for 38 percent of national carbon emissions through their direct actions, including both home energy use and transportation (BBC News, cited by Gardner & Stern 2008). Yet household energy use could be reduced by 20 percent within 10 years using proven technologies (Dietz et al. 2009). This potential adds up to huge savings; McKinsey & Company (2009) estimate that by adopting all cost-effective energy efficiency measures, an upfront investment of $520 billion, U.S. households and businesses could earn $1.2 trillion in present dollars. This potential for savings has existed for at least three decades, but most homeowners are not knowledgeable about what actions are effective and how much energy can actually be saved (Gardner & Stern 2008). Energy-efficiency retrofits also require many complex steps, making them unappealing to undertake (Fuller et al. 2010). Hunt Allcott and Sendhil Mullainathan summarize the contrast between potential and actual achievement: "The great potential for energy efficiency has been detailed in consistently optimistic language in 30 years of discussion papers… compared to these possibilities however, the actual penetration of energy efficiency technologies and behaviors is strikingly low" (Allcott & Mullainathan 2010, 1204). This disparity is dubbed the "energy efficiency gap" (Jaffe & Stavins 1994).

Though residential use accounts for more than one third of total U.S. energy consumption, it is one of the hardest sectors to influence. The efficiency gap for

homeowners can be explained by a number of barriers, including up-front costs, lack of information and competing priorities. Homeowners like Katie Snow frequently pass up opportunities to cut energy use, even though efficiency upgrades have a better rate of return than many other investments (Gates 1983). Traditionally, energy efficiency programs have tried to convince homeowners with information and financial assistance (Action Research 2010), aiming to overcome logistical and cost barriers. This approach overlooks the difficulty of actually completing a home retrofit as well as the complexity of human decision-making, and many programs have failed to achieve significant rates of adoption. One study found that several home energy retrofit programs reach less than 0.1 percent of eligible participants (Fuller 2008, cited in Fuller et al. 2010).

Emerging literature in the behavioral sciences helps explain these low adoption rates by illuminating the complexity of consumer behavior. Psychologist Jonathan Haidt (2006) explains consumers' decision-making process using the metaphor of an elephant and its rider. The elephant is our emotional side, lazy and difficult to motivate, especially for future payoffs. The rider, our rational side, holds the elephant's reins but is dwarfed by the animal's size and has difficulty controlling it.[1] The goal for programs that aim to change peoples' behavior (e.g. by encouraging energy efficiency) is to direct the rider and motivate the elephant in the same direction (Heath & Heath 2010, 7). In order to convince homeowners to complete upgrades, energy efficiency needs to be more desirable than not taking action, which is why motivating homeowners is so challenging and why the energy efficiency gap has persisted.

This essay examines a cutting-edge residential energy efficiency program: the Community Energy Services pilot program run by the Center for Energy and Environment (CEE), a Minneapolis non-profit organization. Community Energy Services is an ambitious program in a liberal city with a cold climate. In other words, the program is designed for people who could save a lot of money by taking steps to conserve energy, yet, like most Americans, have not taken action. I investigated this program because it is designed to

[1] Haidt's metaphor is borrowed from Buddha, who compared his mind to a wild elephant and enlightenment to "a wild elephant controlled by the trainer." Haidt also extends his analogy, modifying it to a horse and buggy, to fit Freud's theory—where the buggy driver is the Ego (our rational side), the horse is the Id (our emotional side), and the Superego is the driver's father who shouts instructions from the backseat (representing the rules of society) (Haidt 2006, 2-3).

address many common barriers to energy efficiency by using targeted messages, social and community marketing strategies, and extensive one-on-one assistance. The program is a "one-stop shop" that delivers a comprehensive, easy-to-use package of energy services to homeowners in the hope of convincing them to invest in energy efficiency.

Despite CEE's best efforts, the momentum that brings participants into the program stalls when it comes to major retrofits. Although over 95 percent of workshop participants commit to a home visit, only about 17 percent actually implement recommendations for efficiency upgrades. Through interviews with nine program staff and 30 program participants (see Appendix A for details on research methods), I explore how the program works to convince homeowners, and where it falls short. For many, the program provides the direction and motivation needed to spur investment in home upgrades. Yet for some interviewees and most program participants, the program fails either to fully address either the financial and logistical barriers or the emotional barriers to completing upgrades, or both. A program must be designed to overcome both types of barriers, ushering both the rider and elephant in the same direction, in order to spur a homeowner to action. The Community Energy Services program presents a substantial improvement over traditional residential programs. However, like many other programs, it fails to make a compelling enough emotional argument to inspire the majority of its participants to prioritize energy efficiency above other concerns. Without this, even a carefully designed program struggles to close the efficiency gap.

CLOSING THE EFFICIENCY GAP: COMMUNITY ENERGY SERVICES

If environmentalists and efficiency advocates hope to significantly reduce residential energy use, we need a new model for efficiency programs that captures a large portion of potential savings. Cities and states that aim to significantly reduce greenhouse gas emissions (including Minnesota, which plans to reduce emissions by 80 percent by 2050) will need to substantially reduce home energy consumption.[2] Minnesota must

[2] Though commercial and industrial energy uses are easier to target than residential, in order to make significant reductions in total energy use and meet greenhouse-gas reduction goals, all sectors will need to reduce energy use. In addition, in the past, rates of investment in efficiency for the residential sector have been lower than other sectors (Stern et. al. 1986), so there may be more potential for immediate efficiency

retrofit 50,000 homes every year in order to meet state energy savings goals in the residential sector (Nelson 2011). With over 2 million homes in Minnesota, this equates to about 2.4 percent of the housing stock that must be retrofitted each year. The emerging model for energy efficiency programs builds on traditional methods, adding lessons from social marketing and the behavioral sciences to address both logistical *and* psychological barriers to energy efficiency, recognizing that it is not enough to provide information and access to capital (Fuller et al. 2010). The Community Energy Services program in Minneapolis has adopted this new model, and the program is carefully designed to motivate homeowners to action. They focus on three areas: 1) low-cost retrofits completed during the home visit, 2) behavior changes inspired by participation in the program, and 3) major home upgrades (Nelson et al. 2010). This essay focuses on their efforts to persuade homeowners to complete major home upgrades.

Minneapolis and Minnesota Context

Existing state and local policies allow CEE to bring together several funders: electric and gas utilities (Xcel and CenterPoint Energy), the city, and the Environment and Natural Resources Trust Fund, which is funded by state lottery proceeds. CEE was initially a Minneapolis government agency that became a not-for-profit spin-off in 1979. In addition to Community Energy Services, the city currently promotes the Minnesota Energy Challenge (a state-wide residential efficiency competition), and sponsors a Business Energy Efficiency Loan program, both run by CEE (City of Minneapolis 2011). The city adopted a Sustainability Plan in 2005, which sets goals for carbon dioxide (CO_2) emissions reduction, but does not explicitly include efficiency for either businesses or residents. Minnesota's energy policy also calls for CO_2 emissions reduction. In 2007, Governor Tim Pawlenty (2003-2011) signed the Next Generation Energy Act, setting sequential goals for statewide greenhouse gas emissions reductions: 15 percent by 2015, 30 percent by 2025, and 80 percent by 2050. To achieve these targets, the act requires electric and natural gas utilities

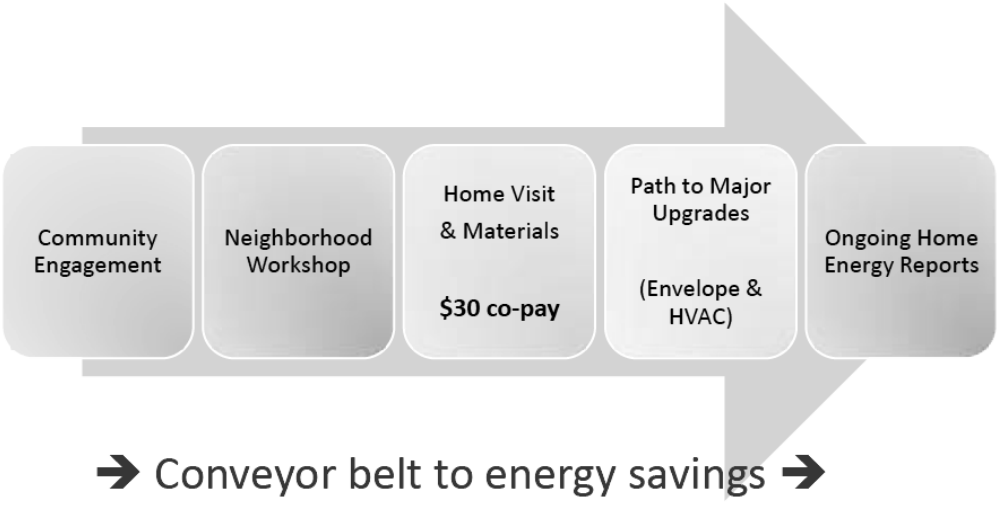
with available technology in the residential sector than in others. In addition, though efficiency programs will need to address the rental housing market, the Community Energy Services program and this essay focus on homeowners.

to conduct energy efficiency programs with the goal of conserving 1.5 percent of annual retail electric and gas sales (Minnesota House of Representatives n.d.).

The Community Energy Services Program

CEE starts participants with simple steps and builds towards more substantial commitment. First, participants are recruited by their neighborhood associations to attend a free workshop. At the workshop, new participants receive information and a few items they can install immediately, like compact fluorescent light bulbs (CFLs). CEE uses a "foot-in-the-door" approach, which builds on initial interest in small, manageable steps from the workshop to the home visit. At the home visit, a two-person team conducts an audit, installs some low-cost items, such as CFLs, pipe insulation, and low-flow showerheads, and recommends appropriate upgrades. The program provides rebates and loans for homeowners that complete upgrades and sends quarterly home energy use reports to all participants (Nelson et al. 2010) (see Figure 1). At each step, CEE draws on past experience as well as on theory from the behavioral sciences to try to convince homeowners to continue the process (see Table 1).

Figure 1. The Community Energy Services Program Process



Source: Center for Energy and the Environment

CEE creates formal partnerships with neighborhood associations, which bid to participate in the program and often contribute funding to reduce the cost of the home visit for participants. Neighborhood associations market the program to their members through emails, neighborhood newsletters, and volunteers that go door-to-door (Nelson et al. 2010). CEE relies on neighbors to be "trusted messengers." This is a common social marketing technique that involves exploiting demographic similarities to make communication more effective. At the workshop, the program distributes signs that residents can place in their front yards advertising their participation in the program (Fuller et al. 2010). These yard signs are free advertising for the program from a trusted source, and, in theory, create a neighborhood norm of participation. Partnering with the community also facilitates targeted outreach messages. For example, in the Longfellow neighborhood, which has a history of environmental action, messages focus on environmental and neighborhood pride, whereas in Logan Park, a lower income area, messages focus on lowing utility bills (Nelson et al. 2010).

CEE is careful about the language they use. While energy efficiency programs typically use terms like audit and retrofit, CEE staff talks about "home visits" and "upgrades." Language must make sense to people and "it must work emotionally" (Lakoff 2010, 72). By using positive language that is less intimidating to homeowners, CEE is trying to change perceptions of energy efficiency from a technical problem to an opportunity to invest in one's home and make it more comfortable. Paul Stern and his colleagues explain that "energy users often act as consumers, showing more concern for intangibles such as appearance and comfort than for the financial benefits of energy efficiency" (Stern et al. 1986, 149).

At their workshops, CEE makes energy as interesting and engaging as possible; to that end, presenters train with a local improvisational comedy group. Information is a significant determinant of individual decisions about energy conservation (Stern 1992) and many homeowners do not know the most effective steps to improve energy efficiency, or where to find credible information (Action Research Inc. 2010). In a recent survey of 505 U.S. households, when asked how to save energy most respondents mentioned behavior changes (like turning off the lights) rather than efficiency improvements, whereas experts argue the latter is more effective (Attari 2010). The Community Energy Services workshop

aims to correct these misconceptions and provide accurate information about where energy is used in the home.

More importantly, CEE believes that bringing neighbors together at the workshop and having them commit to the next step, the home visit, in front of one another creates a social norm of taking action to improve efficiency. Research shows that comparison to one's neighbor is effective motivation. A study in California used five varieties of doorknob hangers: one version contained only information about how to save energy, and four included an additional motivational message and accompanying graphic. The four messages were a descriptive norm (e.g., 99% of people in your community reported turning off unnecessary lights to save energy), self-interest, environment, or social responsibility. The researchers found that the descriptive norm, which compared the resident to their neighbors, resulted in greater energy conservation than the other messages (Nolan et al. 2008). Evidence suggests that CEE's tactic of getting neighbors together is effective: though the home visit requires a $30 co-pay by the homeowner, over 95 percent of workshop participants sign up for a home visit (Nelson et al. 2010).

Home visits are a chance for CEE to complete an audit and further educate the homeowner. Two staff members visit each house: one focuses on the technical aspects of the audit; the other walks through the house with the homeowner and points out potential areas for improvement, including behavior changes, such as washing clothes on cold or putting electronics on power strips. The home visit team completes basic efficiency work, including replacing light bulbs, installing low-flow showerheads and faucets, and wrapping water heaters (Fuller et al. 2010).

At the end of the home visit, the team leaves the homeowner with no more than three recommendations and a list of program-approved contractors to make next steps clear and easy. For about 80 percent of households, the program recommends one or more major upgrade, including attic and wall insulation, attic bypass sealing[3] and furnace or hot water heater replacement (Nelson et al. 2010). People get overwhelmed with options, so to avoid decision paralysis CEE identifies the three most effective actions the homeowner can

[3] Bypasses are hidden air passages connecting heated rooms to the attic. As warm air rises, it moves through the bypasses and escapes into the attic. Sealing these passages keeps the warm air inside the home, reducing the energy required to condition livable space.

take. The team also explains any available rebates, loans, and tax credits, and estimates the cost and payback for upgrades.

After the home visit, program staff follows up by email and telephone to encourage the participant to complete the recommendations, clarify outstanding questions, and assist with rebate or loan applications (Nelson et al. 2010). Participants also receive a quarterly "Energy Snapshot" that compares the household's energy use to similarly sized homes and to a target (a percentage reduction from the participant's projected energy use) (Kracum 2010). Studies show that competition and comparison to one's neighbors inspire energy conservation. In a program run by a company called OPOWER, some residents received energy-use feedback reports comparing their energy consumption to that of their neighbors. Compared to residents that did not receive the report, target residents reduced their energy use by about 2.3 percent (Allcott 2010), a notable amount from a low-cost method and without technological improvements. CEE's Energy Snapshot reports put the household's energy use in context, inspire a bit of competition, and remind the homeowner to consider energy-related behaviors (Nelson et al. 2010).

CEE does not distinguish between their tactics to address each side of the brain, though they do try to both direct their participants' rational side (the rider) by simplifying the process and inspire the emotional side (the elephant) through social norms and messages about comfort and good choices. The program successfully motivates some people to participate; Community Energy Services completed 2,410 home visits in 2010 (the first full year of the program) in 34 Minneapolis neighborhoods (Thommes 2011). On average, 7 percent of eligible homes in participating neighborhoods completed a home visit; that figure reached 16 percent in some areas. CEE calculates that the low-cost materials installed during the home visit save over 600 kWh per household, worth about $90 over their lifetime (Nelson et al. 2010). Program Manager Carl Nelson (2011) estimates that households participating in the program typically reduce their energy use by 10-15 percent, though it can be up to 40 percent for those that complete major upgrades and have little insulation to start. Despite CEE's accomplishments, they have not met their goal of persuading 25 percent of participating homeowners to complete major upgrades, a goal that many program staff believe is very ambitious. The current rate is 17.5 percent after more than a year a half of running the program (Crane-Smith 2011).

Table 1. The Community Energy Services Program Theory

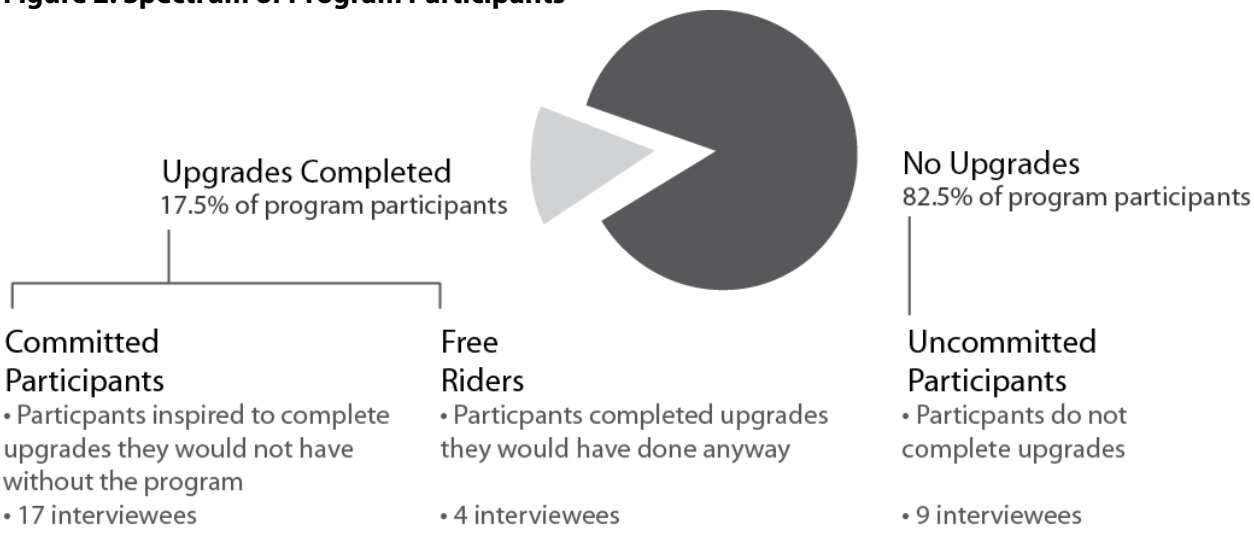
Step	Actions	Program Theory
Marketing & Outreach	• Use of Neighborhood Associations • Door-to-door canvassing • Yard signs • Positive language	• Uses targeted messages • Neighbors are trusted messengers, face-to-face outreach • Creates a social norm of energy efficiency • Language is less intimidating
Workshop	• Reminder call 48 hours before the workshop • Information • Neighbors gather	• Creates cues to commit • Provides information/education with humor • Creates social norms/peer pressure because action to sign up for home visit is visible
	• Provided with materials to take immediate action	• Puts a "foot in the door" and primes homeowners for further action
Home Visit	• Direct install measures	• Immediate energy savings and foot in door
	• Tangible evidence of inefficiency • Recommendations	• Teams makes a targeted sales pitch • Limited choices overcome decision paralysis
Follow Up	• Calls and emails • Assistance with rebates, loans	• Provides personalized follow-up • Simplifies process
"Energy Snapshot" reports	• Report on energy use • Comparison to neighbors and to a target	• Creates cues/reminder to consider energy use • Instills social norms and competition with neighbors
Financing	• Rebates (CEE and utility) • Loans (CEE) • Federal tax credits	• Lowers upfront cost • Makes investment possible for households without ready cash

Sources: CEE staff interviews and Nelson et al. 2010

Three categories of people emerged among the 30 interviewees (see Figure 2): *committed homeowners* (17 interviewees) took action because of the program they would not have otherwise; a small number were *free riders*, who knew exactly what they wanted and used the program for its financing; and the majority (though only nine interviewees), were *uncommitted participants,* whom the program failed to motivate. Of the 30 participants I interviewed, 21 had completed at least one recommended upgrade and 9 had not. Since only 17 percent of program participants have completed recommended retrofits, this confirms a bias in who chose to participate in an interview (demographic information

for the interviewees is included in Appendix B). Since the homeowners I spoke to self-selected to be interviewed, they likely represent the most motivated participants.

Figure 2. Spectrum of Program Participants



Most of the "committed participants" are concerned about the environment and energy efficiency, but would not have figured out the necessary steps to upgrade their home without the Community Energy Services program. Most of these homeowners had multiple motivations; they wanted to invest in their home, make it more comfortable, lower their heating bills, and do something for the environment. On the other hand, the nine "uncommitted participants" cited mainly financial reasons for not completing upgrades, including that they could not afford it, they did not know what the payback would be, or they did not understand the loan program. Only four of the people I spoke with were "free riders," who knew exactly what their home needed and participated in the program specifically for financial assistance.[4] One knew a CEE staff person, who recommended the program for its rebates; another needed to replace his boiler and was interested in the program's low-interest loans. The two other homeowners in this category were inspired by the program to make additional, unplanned upgrades. Nic Baker knew that his water heater needed to be replaced, and also insulated his attic, while Amy Arcand needed to replace her

[4] It is typically difficult to distinguish between free riders and participants influenced by a program. I asked people why they were interested in participating and what motivated them to attend the workshop and to complete retrofits; I count free riders as those homeowners that knew exactly what was wrong with their home beforehand, and joined the program to address this specific concern.

boiler and was motivated by the program to get a highly efficient, tankless model and to complete attic air sealing. Though many efficiency programs are concerned about free riders taking program resources away from other participants, the experience of these two participants suggest that the program can convince some free riders to take additional actions.

WHAT WORKS FOR PROGRAM PARTICIPANTS?

Even for the most committed participants, Community Energy Services makes the process easy and clear, reducing the amount of time and money needed to invest in energy efficiency. Many were like Gerry Tyrell who described how the program encouraged him: "They recommended the biggest bang for the buck, which was helpful, and pointed out the rebates. All of those helped push me to get this done." By providing expertise and direction, as well as rebates and tax credits, the program makes a rational argument, which directs the mind's rider. The program also aims to coax participants' emotional elephants with messages about home comfort and making a smart investment, which gets participants to identify as someone who saves energy.

Direction for the Rider

The Community Energy Services program gives specific recommendations so that participants know what to do and what steps are involved, and information about costs and finances, so a homeowner can make an informed decision. Information is most useful for the committed participants, those that are already motivated to prioritze energy efficiency, but need help figuring out what steps to take. Though the strongly motivated participants would likely have figured out how to move forward with at least some upgrades eventually (Kris Leveille, for example, had previously scheduled an audit from her electric utility but hadn't completed it), Community Energy Services made it easy for them to take immediate action.

A few participants said they would not have known what to do, or that a particular

measure was an option, without the assistance of the program.[5] Jill Catherwood, for example, explained, "They recommended getting the attic insulated, which I would not have known. I wouldn't have come to that conclusion by myself." Similarly, Karen Kenny said, "I knew that we needed to do something, but I'm not really savvy with home repair. So I knew that we needed insulation up there, but I didn't know that there was a whole procedure to seal the attic and once I heard about it I definitely wanted to do it." For homeowners like Jill and Karen, the program provided important, new information that made investment in energy efficiency possible. For Mary Ludington, the fact that this information came from an outside expert made it easier to convince her partner. She said, "My partner is a very frugal man…. So I think if it had just been me going, 'Honey I think we need to insulate the attic,' I don't think we would have won the battle. But with other experts and authorities to say it, I was able to convince him."

For those with more knowledge, the program prioritizes which actions to take. Tracey Deutsch, a strongly committed participant, and her husband moved into their house a year ago, prepared to invest in a more comfortable and efficient home because the environment is important to them. Tracey explained, "We knew the realm of possibility, but we needed them to prioritize for us and they did. So it was really helpful." Like Tracey, many homeowners needed help establishing priorities. Despite common wisdom that more is better, research indicates that more choices actually lead to paralysis from "choice overload" (Iyengar & Lepper 2000).[6] CEE deliberately gives homeowners only a few recommendations in order to overcome this paralysis.

The value of the information and prioritization that the program provides is in its specificity to the participant's own house. When I asked participants about what they

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[5] This is particularly true for windows. Many participants commented on the recommendation to refurbish windows rather than replace them. As Joe Brown put it, "They talked to us about having [our windows] refurbished instead of replaced, and how that can save energy and is more cost-effective. So that was something we hadn't heard about, but will probably end up doing eventually. We had looked into [replacing our windows], but it's pretty expensive. With the refurbishing being much cheaper, it will probably happen sooner."

[6] Sheena Iyengar and Mark Lepper's study (2000) compared limited versus extensive choices. In one experiment, supermarket customers got to taste either six or 24 flavors of jam; nearly 30 percent of the customers who encountered six options bought jam, whereas only 3 percent of customers who saw 24 choices made a purchase. They found similar results when students were provided with either six or thirty options for an extra credit essay; more students completed the essay (and at a slightly higher quality) when given fewer options. Iyengar and Lepper dub this "choice overload."

learned from the workshop, which included general information about how energy is used, most said that they had not learned much new information. The response from one homeowner (Interview #14) was typical: "Mostly it was stuff I already knew, like to turn off the lights and which appliances you should think about updating." By contrast, participants were often surprised by the recommendations given about their own homes, and happy to have "an honest opinion and a well-informed opinion," as Clare Sorman mentioned.

The home visit team also estimates the cost of upgrades, which is essential for the homeowner to make an informed choice about whether to proceed. As one Corcoran homeowner (Interview #4) said, "They put a price in there, a quote in general, and [the attic insulation] wasn't quite as high as I thought it would be, so that was helpful. But the wall insulation was more, so I just knew we weren't going to do that." Knowing how much the upgrade will cost allows the homeowner to make a rational decision about whether the up-front cost is affordable and the payback makes sense.

The program also provides a list of vetted contractors, removing one more barrier for homeowners. Research suggests that people are concerned about working with contractors, and perceive them to be costly and provide inferior work (Action Research 2010). By vetting the contractors, CEE overcomes this negative association. Heather McPherson said, "We already knew the insulation was bad, but we didn't know who to call. Particularly in Minnesota, you don't just have anyone insulate your attic because of ice dams, it's kind of a major thing and you can actually do more harm than good." Tracey Deutsch also called CEE staff to compare bids she received from several contractors. She described her conversation with a staff person: "He was very helpful, because even once we called [the contractors] out for bids, the estimates were quite different…. he knew the companies really well. He said that they use different types of insulation and here are the advantages and disadvantages…he was very helpful in his knowledge about these contractors." The list of recommended contractors makes finding a contractor easier, while also giving homeowners faith in the contractors' bids. Several homeowners got only one or two bids. Corri Sandwick explained, "We could call a contractor and get a price and know if it was in the ballpark or not. Whereas before when I did the first energy audit [through a utility company], I felt like I had no idea when I talked to a contractor whether the price was high or low."

Finally, for some participants, the program helped then plan for future improvements. Kris Leveille, for example, noted that they home visit team "went through the different options… how long a water heater is expected to last, how old ours was…. I had no idea about the lifespan or what we should be looking for." Having this knowledge will set realistic expectations about when future repairs are required.

Motivation for the Elephant

In addition to clearing the path to energy-efficiency upgrades, Community Energy Services tries to emotionally inspire participants by making energy efficiency real, providing support through a difficult process, and creating new social norms. For participants that are not strongly motivated before the workshop, the program must convince them to prioritize energy efficiency. These homeowners need both logistical and emotional support; without reasons that resonate, these participants can slip into the uncommitted category.

One way the program motivates homeowners is to make efficiency tangible during the home visit. One homeowner (Interview #3) explained, "We were surprised how little insulation was up there [in the attic] when they actually went in and looked at it. It became pretty clear that we need to do this sooner rather than later." Corri Sandwick repeated this idea, "They also told us that we had a two and a half foot square equivalent hole in the house from the blower door test. It's always kind of unnerving when you see that." The home visit teams I spoke to also noticed that people respond to visual aids, such as showing them the back draft from the water heater or drilling a hole to show that there is no insulation in the wall (Boots et al. 2011).

The program also provides intangible, emotional support. Leah Huyser explained, "It can feel overwhelming, but it suddenly felt manageable instead of this overwhelming I need to fix my house feeling." Because the program makes only a few recommendations and guides the process, homeowners have confidence in the right course of action. The recommendations provide direction, as noted above, but the program also gives the owner an emotional sense of ease. Most homeowners do not know much about building technology or home repair, and rely on the expertise of the program to make them

comfortable going ahead. As Mary Ludington said, "I just kind of go deer-in-the-headlights when they start talking builder speak." For Mary, the program is a translator, allowing her to be comfortable working with a contractor. The Community Energy Services program can play these roles, as an educator, financial planner and a translator, in part because it is a non-profit with no direct gain from any one homeowner's action.[7] Leah Huyser summed it up, "It's a low-pressure help situation, that's not a sales situation."

A few participants commented on how nice it was to see their neighbors involved in the program. Elizabeth said, "I think the chance for neighbors to encourage other neighbors to do it is really helpful…. seeing the van pull up to someone's house and seeing the test done is really an encouraging way to go about it." Similarly, Kris Leveille explained, "It was nice to see all the neighbors and that they did it as a neighborhood; that was great." Indeed, CEE staff have found that the neighborhoods that have the highest rates of volunteers going door-to-door also have the highest turn out at the neighborhood workshops (Nelson et al. 2010). This type of social influence is consistent with studies on normative influence, where comparison to neighbors spurs people to conserve more energy than the standard appeals, such as protecting the environment or saving money. Previous research also indicates that people are unable to identify the true cause of their behavior (Nolan et al. 2008, 922). Although several interviewees commented on how nice it was to see their neighbors at the workshop, none directly attributed their actions to this social norm. When asked to rank the reasons that saving energy is important to them, everyone I spoke with ranked the fact that other people are saving energy lower than benefiting the environment and saving money.

Do Financial Incentives Matter?

For many homeowners, the program's financial assistance (rebates, tax credits and loans) was a powerful incentive to participate, and motivated both the participant's elephant and rider. Rebates and tax credits support a rational, financial argument for upgrades, while also making participants feel good about getting a discount. Some

[7] The home visit teams believe that most people do respond better to CEE because it's a non-profit, though some are confused because the home visit staff are required to wear shirts with a utility logo per CEE's funding agreement (Boots et al. 2011).

participants described how the program and finances made it the right time to act, especially with the 2010 federal tax credit.[8] "The cost to do it was very minimal when you really look at the energy savings plus the rebate plus the tax credit. So this is a perfect time to do it," said one homeowner (Interview #24).

Homeowners that were already interested in efficiency were motivated by the rebates to act immediately, while for others that had not previously considered upgrades, the rebates made the upgrades a deal. Particularly for attic insulation, where homeowners could receive $800 in rebates from CEE and CenterPoint (as well as the federal tax credit in 2010), the cost was dramatically reduced. Tracey Deutsch, who had just moved into her house and had planned on completing some upgrades, described, "We were thrilled that the [attic] insulation was as reasonable as it was. We had budgeted much more for it. It's a good deal between the two rebates."

For others, the financial incentives made upgrades possible. As one homeowner (Interview #4) explained, "The financial incentives made it realistic to do it. We have a cold house and we have two little kids, but honestly, the rebates were the biggest motivator." This homeowner described her appreciation that the program helps middle class families afford these upgrades.

Not all rebates have equal weight, however. The program offers significant rebates for insulation ($400 from CEE and $400 from the utility), which motivate many homeowners, particularly to complete attic insulation. By contrast, the $50 water heater rebate does not compel participants to replace a functioning water heater (Dewitt 2011). This finding confirms previous research that shows that larger incentives are more likely to trigger investments (Stern et al. 1986), and that financial incentives only matter if they are large enough to attract attention (Stern et al. 1985).

WHAT GOES WRONG?

Even though a majority of the participants interviewed (21 of 30) did complete upgrades, their critiques of the program and the experiences of the nine homeowners that

[8] In 2010, the U.S. government offered a $1,500 tax credit for home improvements for energy efficiency; this program was not extended in 2011.

have not completed upgrades highlight some of the reasons that the Community Energy Services program still fails to meet its goal of getting 25 percent of participants to complete major upgrades.

Bad Timing

The timing of the program conflicted with other major plans for a few participants. Three of the interviewees are planning future renovations or additions to their home and did not want to pay for efficiency upgrades that will need to be redone during the renovations. Elizabeth, for example, was not willing to add attic insulation that would become unnecessary when she replaces her roof with structural insulated panels. Heather McPherson plans to move within the year and did not want to invest money that she would be unable to recoup. She explained her decision: "We went back and forth and back and forth about whether we should invest in the house. So ultimately, we didn't because the likelihood of our making the money back is slim to none." Though Heather had initially participated in the program in order to lower her heating bills in the short-term and to do her part for the environment, in the end, these considerations were trumped by long-term financial ones.

Single-Action Bias

People tend to respond to the need for action by making just one change, even if that single action is only the first step needed (Weber 1997 cited in Ashby et al. 2010). Although the people I spoke to did not mention this, some participants that do not complete upgrades may feel like they have done enough by completing the home visit, where some low-cost measures are installed. An ethnographic study in California showed that many people feel like they are doing everything they can to reduce their energy use (Dougherty et al. 2010). This feeling deters further action, especially because home upgrades require a substantial investment.

Because of financial constraint, some people were only able to invest in one upgrade, even when several actions were recommended. A homeowner (Interview #3) described her situation: "We do not have the money to buy a new furnace right now…. That

one was sort of like, ok thanks for the recommendation, but that's isn't happening now. But the insulation one, we felt like, ok, we could do this now and there were some rebates available, so that made it financially affordable."

Most participants that completed one upgrade did not tackle additional ones, particularly when both attic and wall insulation were recommended. A few homeowners who chose to only complete attic insulation described wanting to see the energy savings and improved home comfort before pursuing any additional upgrades. Because attic insulation is significantly cheaper than wall insulation and the rebates take care of a large portion of the cost, many homeowners choose to invest in just this one upgrade, sometimes misunderstanding that attic insulation yields greater energy savings than wall insulation. One homeowner (Interview #24) explained that the wall insulation "would probably take 12 years to get the payback. They said that most of your savings will come from additional insulation in the attic." Actually, more savings would come from wall insulation; about 25 percent of heat can be lost through an un-insulated attic, compared to 35 percent for un-insulated walls (Mitchell-Jackson 2010). Because it is cheaper to insulate the attic than walls, attic insulation has a shorter payback. One homeowner (Interview #4) exemplifies this misunderstanding, "We decided not to do the wall insulation because it was too expensive, or didn't seem as necessary. It sounded like from the workshop that you lose most of the heat through the attic." The program carefully present accurate information, and must overcome this "single-action bias," that when people do one thing, they think have addressed the issue (Fuller et al. 2010).

Finances are Confusing

Several participants made comments about how confusing the financial calculations were or how they were unsure about the payback. Heather McPherson exemplified this confusion:

> I guess if I had a more clear idea about how much would this cost, and what could we get back in tax credits, and what would this loan mean for us and, at the end of the day, how much is this going to cost us, and how fast could we make this back. So a little more handholding in the financial realm of things [would be good], because after they left, it then became "Are we going to do this or not? Does it make financial sense?" We kept sitting down and looking over it and going through the numbers and getting confused and putting it aside.

Like Heather, several of the uncommitted participants would have benefited from more help figuring out how the costs and potential energy savings would align. As Katie Anthony put it, "The big upfront dollar number is hard to justify, unless you can say in, well, five years, we'll more than see the savings on this. I think that people who are really on the fence about spending money on improvements could really use this." Though the program is designed to give homeowners a sense of the cost and payback for upgrades, the home visit team may not always do this, or it was not emphasized (or not remembered) for many of the interviewees. Yet the homeowners who did complete upgrades did not seem to have a better understanding of their payback. To them, the upgrades either seemed to be a better deal or they were motivated by other, non-financial reasons, such as caring for the environment or improving comfort in their home.

Similarly, many homeowners did not know whether they had saved any money or energy through the program. Of the participants I interviewed, at least half *felt* they had saved money or energy by participating in the program, however, most were like Jill Catherwood and did not actually track their utility bills. Jill explained, "I haven't looked at the numbers, but it has to be less than it was last year, and it feels less drafty. Maybe it's psychological; it just feels more snug." Participants did not pay attention to their actual energy use or costs, but either had a visceral reaction to changes in their home, or assumed that they were saving energy to justify the time and money spent participating in the program.

When asked how they planned to spend any savings, participants all said that they did not have a plan to spend it, and most mentioned that it would go into household expenses. As one homeowner described, "It's great to save any money you can, but it doesn't feel like extra money, because it's just going somewhere else" (Interview #4). Though efficiency saves money, the amount spent by the average household on energy is small in absolute terms—on average $151 per month in 2005 (U.S. Energy Information Agency 2009)—and relative to total household expenditures. This signifies that homeowners do not see money saved through energy efficiency as noticeable savings, which limits how effective a financial argument for efficiency can be.

Regardless of potential cost savings, for participants that do not have cash on hand to pay for upgrades, CEE provides low-interest loans, but they are not always easy to

access. Todd Bennington had taken a loan for small home improvements when he bought his house, and he was interested in doing that again. He said, "They may have had some homeowner loan options, but I wasn't really clear on that." Other homeowners had no interest in taking out a loan; Katie Snow said, "I think it's just that all the mortgage stuff was so fresh in my mind and I don't like loans, so I just opted to not go that route." She plans to use her federal homeowners tax credit to pay for the recommended attic insulation. Similarly, Anandram Seriram said, "We hate owing money," and plans to save money and complete upgrades "piece by piece each year." This result is in line with previous research that indicates that consumers prefer upfront savings to loan subsidies (Stern 1992). Indeed, if participants do not understand the finances, are not tracking their cost savings even after investing in upgrades, and at least some are adverse to loans, CEE must make the upgrade *feel* like the right thing to do.

Complicated Process

Even with all of the handholding that Community Energy Services provides, some still found the process complicated or time consuming. Gerry Tyrell, who did complete an upgrade, noted:

> What struck me about it was that it was a lot of work to get it done and they gave me the names of the places to call... I mean I was highly motivated, I was getting all of this money back to do it, it made total sense, and yet, in my busy schedule and just the day-to-day world, I felt like, wow, it took me much longer to get it done than I thought. It was just a lot of work.

Though Gary was motivated enough to put in the time and effort to complete the upgrades, less motivated people are likely to drop out.

Even though CEE takes care to limit the number of recommendations to three, for some participants, they are complex to complete. Leah Huyser found wall insulation daunting. "We found out our walls are actually completely un-insulated, not even with newspaper. But that's a very involved process, so we haven't done anything," she said, though she completed attic insulation herself and had her windows refurbished. Another homeowner (Interview #4) described her concern about releasing lead and asbestos from the shingles on the outside of her house if she were to complete wall insulation. Similarly, Angela Corbett explained that she was not going to replace her furnace because to do so

would involve asbestos abatement. Like Angela, other participants have to take remedial action before they can act on recommendations (for example replacing a water heater before adding insulation because of back draft and combustion concerns), which make implementing recommended upgrades significantly more difficult and expensive (Dewitt 2011). Particularly without additional support from the program for lead or asbestos remediation, this solidifies decision paralysis for most homeowners, who instead stick to the status quo.

Even without remedial actions and despite the assistance from the program, some participants were still not sure what to do. Megan Bergseth needed to install a bathroom-ceiling fan to remove moisture from her house, but didn't know where to buy the fan or who could install it. "It just took me a while to find out which one I needed and then once I found out, I haven't purchased it because its also going to require… an electrician to get it installed and then re-plaster the ceiling." This highlights the importance of the list of vetted contractors that the program provides for other types of upgrades, and of making the steps clear to the homeowner. Though CEE aims to make the process as simple as possible, it still requires significant dedication from homeowners, especially when remedial actions or extra steps are required.

Inadequate Feedback and Follow Up

CEE's actual implementation does not live up to their planned approach on the two forms of follow-up after the home visit: contact from a staff person and customized energy reports. Having a quick and thorough follow-up procedure is essential. As homeowner Clare Sorman put it, "People tend to get excited about something, but if they aren't constantly reminded about it then they tend to lag off and not do it." Michael Wachner, CEE's resource coordinator who follows up with each homeowner by phone after the home visit, also believes that participants need the encouragement and are appreciative when they hear from him. Many participants mentioned how the program staff assisted them with rebate forms, contractors, and other follow up, even though the majority of interviewees did not remember being contacted after the program or thought that they had initiated the contact.

When I spoke with Michael in January, however, he had 500 participants to follow up with, and 80 new files coming in every week (Wachner 2011). This is a significant bottleneck in the program. Like many organizations implementing energy efficiency programs, CEE is a non-profit with a limited budget, and they ramped up this program quickly, so it is not surprising that they have fallen behind. However, this is a critical area if they aim to convince more homeowners to follow through on upgrades.

Similarly, very few people received a customized Energy Snapshot at the home visit or quarterly follow up reports, and several mentioned that they were disappointed or would be interested in this information. Particularly people who had invested in upgrades were interested to see if they reduced their energy use. As of January 2011, CEE was having difficulties getting the necessary data from the electric utility; nevertheless, this is a missed opportunity. As Amy Arcand put it, "If someone is going to be making that kind of investment…you want to show them that it was worthwhile so that they will make a similar choice next time when there's not a program." Also, many of the participants who have not completed upgrades still plan to, and follow up could remind them to do so. Michael noticed that some participants do not want to complete retrofits for circumstantial reasons, such as losing a job, a new baby, or other family situations. As circumstances change, a few of these homeowners may still complete upgrades within the year, and follow up could encourage them.

Not Everyone Participates

The 30 people I spoke with tended to be wealthier and more educated than city averages and were concerned about the environment, even those that did not complete upgrades. Though these statistics are not necessarily representative of all program participants, several interviewees believed that the program only reaches people who are already motivated. Certainly if CEE wants to "saturate participation" in eligible neighborhoods (Nelson et al. 2010), they must reach homeowners that are not motivated on their own.

One homeowner (Interview #4) found out about the program through her neighborhood association newspaper and said she hadn't heard about it through any other

channels. She questioned, “Minneapolis is nice that it has all of these neighborhood associations… but if you don’t look at the paper, do people know about it? I’m not sure.” Similarly, Corri Sandwick, who is on the board of the Audubon neighborhood association, said, “It seems like we've saturated the people that want to do it out of their own interest. To me it’s a question of how to get the next tier-- what do we need to do?” Corri described how her neighborhood had a burst of interest at the beginning and she would like to figure out how to inspire a second swell of participation.

Beyond failing to reach people that are not connected to their neighborhood organizations, the program does not have a lot of minority participants. Resource coordinator Michael Wachner (2011) noted that this could be a reflection of the neighborhoods that the program is working in so far, but could also be a language limitation, since Minneapolis has significant Hmong and Somali populations. Wachner suggested that there is potential for the program to expand to serve these communities in the future.

IMPROVING COMMUNITY ENERGY SERVICES

Community Energy Services, which intentionally addresses the complexity of decision-making and simplifies the retrofit process, improves on traditional efficiency programs. Yet this model can benefit from participants’ feedback and critiques, as well as new tactics to make energy efficiency resonate emotionally with participants. Since the program is in a pilot phase, this is a good opportunity for CEE to experiment with improvements. Aside from simply meeting their goals, improvements that increase energy savings will help CEE convince funders, especially utility companies, that the program is worth continuing. CEE can improve three critical areas: 1) make a *stronger argument for upgrades* by strengthening the social norms and the sales pitch for upgrades and improving key messages, 2) *target likely committed participants*, including new homeowners and knowledgable participants, and 3) conduct a *field experiment* to determine the most effective strategies. Table 2 summarizes current outcomes and recommendations for each step, and estimates cost and priority.

Table 2. Recommendations for Community Energy Services

Step	Current Outcomes	Recommendations	Cost	Priority
Marketing & Outreach	• Social norm—unknown impact • Marketing might reach only the most motivated	Make sure messages emphasize comfort and smart investment	Low/ none	High
		Use realtors and home inspectors for outreach	Medium	Low
Workshop	• Too little emphasis on upgrades • Some messages get confused	Stress the right messages and emphasize upgrades	None	High
		Create workshop for new homeowners and advanced participants	High	Low
Home Visit/ Completing Upgrades	• Personalized information, with specific guidance • Sales pitch is not convincing, finances are confusing • Tangible evidence is important • Process is still complicated for some	Create public signage & yard signs for upgrades to create social norms	Low/ Medium	Medium
		Run a neighborhood competition	Medium	Medium
		Use door hangers with message about upgrades	Low/ Medium	Medium
		Make a stronger sales pitch	Low	High
		Create a contractor script	Low	Medium
		Get neighborhood together (e.g. BBQ)	High	Low
Follow Up	• Most participants do not remember receiving follow-up • Specific information (e.g. on contractors) was helpful	Additional staff for follow up and/or automate some follow up	High	High
Financing	• Rebates make some measures a "good deal" • Inspires timing • Size of rebate matters	Restructure financial incentives	Medium	Low
Overall	--	Experimental design	High	Medium

Make a Stronger Argument for Upgrades

To increase the number of participants that complete upgrades, the Community Energy Services team needs to make a more convincing argument, with a simpler retrofit process and a compelling emotional rationale. CEE is currently testing one method to further simplify the process through a program called "Ready, Set, Go." At the workshop, homeowners ready to take immediate action sign up for a longer home visit at which CEE

collects enough information to spec the work. Participating contractors have agreed to honor CEE's estimate, so the homeowner only needs to pick a contractor and schedule the work, rather than getting several bids (Thommes 2011; Shen 2011). Even with the current process, the home visit can provide more information and direction by making the costs and payback clear. CEE should also make a stronger emotional argument; CEE must enhance social norms around upgrades, use messages that resonate when marketing the program and during the workshop, and pull heartstrings during the home visit.

Strengthen Social Norms

Although social norms are evident early in the program, when neighbors recruit neighbors and gather for the workshop, these norms break down at the home visit when the homeowner, alone in their house, decides whether to complete the recommended upgrades. CEE needs to enhance its downstream social marketing to convince homeowners to do their part, not for society or the environment generally, but for their community; the more specific the purpose and comparison, the more effective it is. An experiment conducted in several Phoenix, Arizona hotels compared the effects of four versions of hotel-bathroom placards asking guests to reuse towels. One version had an environmental rationale; the second asked for cooperation with the hotel (this was *less* effective than the environmental message); the third mentioned that the majority of guests in the hotel reused their towels; and the forth and most effective message was the most specific, stating that the majority of guests "in this room" reused their towels. The version of the message comparing guests to one another increased towel reuse by 33 percent compared to the environmental message (Tsui 2009).

A CEE webpage currently tracks the accomplishments of participating communities, showing the number of eligible households and completed home visits.[9] They should enhance this site to include upgrades and energy savings, and display this information in a prominent location in the neighborhood and publish it in the neighborhood newsletters. When a neighborhood association applies to join the program, it could set a target, either in energy savings or household participation. Some neighbors will take pride in contributing

[9] Community Energy Services Outreach Grant Challenge: http://www.mnenergychallenge.org/Community-Energy-Services/Outreach-Grant-Challenge.aspx

to the community's goal, while others will be motivated by guilt seeing others participating. In Jasper, Canada, the Jasper Energy Efficiency Program, a direct install program, erected a fluorescent sign in the middle of town that tracked savings from the program to create excitement and a social norm around saving energy (Fuller et al. 2010). CEE could capitalize on Jasper's signage idea. CEE currently gives out yard signs at the workshop that advertise the program, but they could also have a second yard sign or a sticker that gets placed on top of the original sign and says "We upgraded our home!" A yard sign or sticker specific to upgrades continues the neighborhood norm of participation from the home visit to the upgrades and makes upgrades visible to neighbors.

In addition to having each neighborhood set a target for themselves, CEE could inspire a friendly competition between neighborhoods. Boston ran an "Energy Smackdown" neighborhood competition to reduce greenhouse gas emissions, using a leadership council of prominent local members and special events to publicize the competition. The Smackdown achieved an average annual reduction of 14 percent, with the winning household reducing their energy use by 73 percent (Fuller et. al. 2010). CEE already runs the Minnesota Energy Challenge,[10] in which people join teams by community (business, congregation, school, neighborhood etc.) and pledge to take certain actions for efficiency and conservation. The Energy Challenge's website then tracks each group's savings. Though the program encourages participants to join the Energy Challenge, CEE could set up a special competition where each participating neighborhood could form a team and compete.

CEE can also borrow from the City of Houston's Power to the People program, which provides free weatherization to low-income residents. Houston partnered with participating contractors to market the program; when the contractors are weatherizing a home, they knock on neighbors' doors or leave doorknob hangers advertising the program (Fuller et al. 2010) – a tactic that could be combined with messages promoting social norms. The doorknob hangers can inform residents that their neighbor is completing upgrades through the program. Since Community Energy Services works with a handful of

[10] Minnesota Energy Challenge: http://www.mnenergychallenge.org.

contractors, they too could form this partnership to advertise the program and promote the norm of investing in upgrades.

The program could also physically bring participants together after the home visit. CEE or neighborhood associations could sponsor a BBQ or other fun event a month or two after the workshop with the theme of "together we can make a better neighborhood." People can talk about concerns and challenges regarding upgrades, and trade feedback on contractors. CEE staff could answer questions and even complete additional home visits on the spot. Contractors could also attend to schedule appointments and even do quick cost estimates.

A Better Sales Pitch for Upgrades

The Community Energy Services team needs to be more convincing when making recommendations during the home visit. Though the home visit teams see their main goal as implementing major upgrades (Boots et al. 2011), a strong motivational pitch specifically targeted to each homeowner at the end of the visit may encourage more people to invest. CEE staff is also considering using "Social Styles" (www.tracomcorp.com) training for the home visit teams so that they can make a pitch targeted to the homeowner's personality type. For example, including more technical details for analytical people and getting straight to the point for the driver personality type (Dewitt 2011).

The home visit team should understand each customer's interests—for example, if they are worried about upfront costs, if they would consider a loan, and how concerned they are about the environment, comfort or other motivating factors—either by discussing it with them during the home visit, or CEE could collect this information at the workshop. In addition, the home visit team should explain the upfront costs, energy and cost savings, payback and other benefits of the recommendations. They can ask how long the homeowner plans to stay in the home and help determine if the payback (after the rebates) makes sense. By making the finances clear and accessible, the program can avoid the confusion about costs and payback that several participants described. This may also make participants feel like the program is targeted to their needs.

CEE staff should be positive and enthusiastic about the recommendations. One home visit team member I saw in action used the phrase "if this were my house" to describe what she would recommend. This language reinforces that the recommended actions are the right thing to do and that other people, specifically efficiency experts, are doing them. This intangible support can coax participants to want to invest in efficiency.

If a recommendation for a major upgrade is made, staff should nudge the homeowner to call a contractor, even just to get a quote and make a more informed decision about proceeding. Staff should ask when the owner plans to do the next step, and tell the homeowner that someone from the program will contact them to see how the upgrades are coming along and if they have any questions. The Heath brothers describe how being as specific as possible when trying to build new habits is more likely to get someone to commit to a certain action (Heath & Heath 2010, 209). For example, getting a homeowner to commit to calling a contractor right after lunch the next day is more likely to work than simply getting the homeowner to promise to call.

The program could provide the homeowner with a script or checklist for them to use to call a contractor, where the home visit team fills any key information (e.g. the size of the attic or type of insulation needed). Some people, like Mary Ludington, who doesn't speak "builder speak," may be nervous about calling a contractor. Yet, even if the script is not providing new information, simply having it could nudge the homeowner to action. A study showed that providing college students with a map to the campus health center following an information session on tetanus resulted in more students going to the center for a tetanus shot, even though the students knew where the health center was located (Leventhal et al. 1965). Energy efficiency programs should experiment with small prompts, like a map or possibly a script, which may have a substantial impact on targets' behavior.

Improve the Workshop

Though most participants had positive comments about the workshops, there was a wide range of how much participants felt they got out of them, and many said they did not learn much. In addition, some of the participants took messages from the workshop that

were not intended. One homeowner, for example, said, “I didn't realize how much heat is being lost just from your outlets.” Though CEE does give out gasket seals to insulate outlets on exterior walls to save a small amount of energy, in fact, not much heat is lost through outlets. The program should be careful to stress the messages that they really want to hit home.

Though CEE staff seems worried about turning people off by saying that participants might need to invest significant amounts of money, CEE risks making people think that they can achieve significant energy savings from small actions, like adding gasket seals. The workshop can encourage upgrades without being scary. CEE should communicate the norms of upgrades, specifically saying that recommendations for upgrades are made to about half of all households, and that many people take advantage of rebates and financing to invest in their home and make it more comfortable. As more people complete upgrades, specific numbers about how many upgrades were completed, and how much energy they are saving, should be shared.

Better Messages

The program needs to sell homeowners on the idea that upgrades are an improvement. People generally do not like to be told that there is something wrong with their house, and efficiency upgrades are not perceived as something to brag about, in contrast to a kitchen remodel or another type of visible home improvement (Wilk & Wilhite 1985). During the workshop, CEE emphasizes comfort, making smart choices and good investments, themes that could be brought out in marketing the program and explicitly tied to home improvements.

CEE can use return on investment (ROI) in addition to or instead of payback, encouraging the homeowner to compare efficiency to other types of investments, rather than just as a home improvement. Efficiency upgrades often have an ROI that is much higher than other market investments. For example, wall insulation has an estimated ROI of 27 percent annually, attic insulation an ROI of 16 percent and weatherstripping and caulking at 31 percent, whereas typical mutual funds perform around 10 percent (Gates 1983).

In addition, one lesson from the behavioral sciences is that people tend to try to avoid losses, even if it means forgoing larger gains. This is one reason that people are hesitant to invest in efficiency, especially because the upfront costs are significant for uncertain future gain. However, it could be effective to turn this thinking around by framing the program benefits in terms of avoided energy and financial losses, rather than future savings (Ashby et al. 2010). Though CEE tries to talk about "keeping more of your money" at the workshop, this is not carried through to the other steps in the process, including their program website and the home visit. Also, though CEE aims to get participants to identify as people that save energy (Nelson et al. 2010), they need to strengthen this emotional motivation. People do not want to be wasteful or to mismanage their home. Messages need to play to homeowner's desire for nest building and speak to their self-worth.

Target Likely Committed Participants

By targeting homeowners that are likely to be committed, or early adopters, CEE can increase the number of households that complete upgrades, while also strengthening the social norm of investment, which may inspire less committed participants down the road. Specifically, CEE should target new homeowners and people that are already knowledgeable about efficiency. These categories of homeowners are more likely to feel emotionally invested in energy efficiency.

At least six participants that I spoke with had bought their house in the past few years, including two that had a realtor or home inspector recommend an energy audit. Some participants bought their house knowing that it needed work and expected to invest in upgrades. Katie Anthony was typical; she explained, "We just bought our house, we closed in August, and were interested in improving the efficiency and wanted to see what was out there… it was clear to us, because both my husband and I are into energy efficiency and environmental sustainability, that it was a good value-add for our house to do that right away before we moved in." This echoes findings from a recent telephone survey where participants reported that they would be "amenable to an energy-efficiency home improvement project" when buying a new home (Action Research Inc. 2010, 8). CEE could

coordinate with realtors and home inspectors to market the program. This outreach strategy could be combined with tailored messages and perhaps a targeted workshop just for new homeowners. The outreach and workshop could focus on themes like "taking care of your new home" and provide information about maintaining a home and planning for routine major upgrades, like replacing a furnace or water heater. For new homeowners that are not prepared to invest immediately, this will educate them about efficiency and encourage them to plan for future investments.

In addition, CEE could offer an advanced workshop and/or home visit to target new participants with substantial background in energy, *and* people that attended the basic workshop, but want to take further action. This might reinvigorate participants that have not yet completed upgrades, but are still interested and would complete them the second time around, as well as committed participants that only took a single action. An advanced home visit could include an infrared analysis (which at least one homeowner asked about), additional direct install measures and suggestions for tougher behavioral changes for dedicated customers. CEE could charge more for this type of advanced audit, though some or all of the cost could be rebated back if the homeowner completed recommended upgrades. The higher price for the home visit would make the owner commit upfront, and they might be more likely to follow through on recommendations, a tactic that could be used with the current program set up. With more at stake, this rebate structure provides emotional motivation for the owner to complete upgrades.

Conduct a Field Experiment

The Community Energy Services program is in a good position to plan experiments as an ongoing part of the program, especially as staff that focused on designing the program can transfer their attention to improvements. As CEE continues to develop its program database and track participants' energy use, it should continually track outputs and energy savings outcomes. This information could help the home visit team develop more accurate estimate about the costs, energy savings and payback of recommended upgrades.

In addition, CEE can use a randomized trial to test small changes in program design. For example, the program could randomly assign participants to a few groups that vary in

the amount of time between the home visit and follow up (say one week, three weeks and six weeks) to determine the optimal amount of time between the home visit and follow up contact, both from the participants' view (judged through interviews or focus groups) and to maximize the number of people that complete upgrades (data that the program is already collecting). Other ideas include: varying the message that the home visit team uses (such as the stronger sales pitch suggested above), varying the workshop presentation to put a stronger emphasis on upgrades and home investment, and offering an extra rebate to a randomly selected group for combined wall and attic insulation or for completing upgrades within two months of the home visit. This kind of experimentation echoes the steps in "Community Based Social Marketing," an approach CEE has followed. The Community Based Social Marketing process starts with selecting a target behavior (investing in efficiency upgrades, for example), identifying barriers and benefits to the behavior, and developing a program to address the barriers that is tested on a small scale. Though CEE has developed this program thus far, they are missing the final steps of the process: conducting a systematic evaluation to determine effectiveness and revising the program based on the evaluation results (McKenzie-Mohr & Smith 1999).

Though interviews and focus groups can provide valuable feedback, they depend on participants' ability to recognize and communicate the reasons for their actions. People are often "unable to identify the true cause of their behavior" (Nolan et al. 2008, 922), and, in fact, tend to self-justify actions.[11] Comparing controlled groups of people through a randomized experiment allows the program to judge what actually leads to greater investment in efficiency and more energy savings. In a white paper for the California Energy Commission, Michael Sullivan (2009, 1) writes, "Our inability to impact important consumer behaviors stems not from a lack of interesting theories about how to alter consumer behavior, but from a lack of practical experience in applying these theories." He argues that this is because there has been little experiment-based research regarding energy efficiency. This type of experimental design would be invaluable for CEE to improve

[11] For example, a study of bettors at a racetrack showed that people are more confidant of their horse's chances of winning after placing a bet than they are immediately before (Knox & Inkster 1968, cited in Cialdini 2009, 52).

its program, and also for the many other efficiency program implementers around the country struggling with similar issues.

CONCLUSIONS

People are more likely to adopt energy-efficient behaviors under three conditions: if they see it as a benefit to themselves (e.g. through increased comfort or cost savings), if energy use is made visible, and if information is conveyed in a meaningful and personal format (McMakin et. al. 2002). Community Energy Services addresses all three conditions, improving on previous energy efficiency programs and providing a promising model that, once improved with a stronger emotional argument for upgrades, could be a breakthrough to significant reductions in energy use. Program Director Carl Nelson claims there is no other program in the country now that successfully gets homeowners to invest in improvements. He recognizes that although the program gets people to participate in home visits, it is less successful at prompting major home improvements (Nelson 2011). The program currently falls short of both its own goals and of the level of participant commitment needed to significantly reduce residential energy use. At the program's current rate, 7 percent of eligible households participate in a home visit and 17.5 percent of them complete upgrades; this equates to a little more than one percent of homes in participating neighborhoods that invest in efficiency because of the program. Though this is less than half of what is needed to meet Minnesota's efficiency targets, these rates have continually increased since the program launched in the fall of 2009. If CEE continues to improve Community Energy Services, it can achieve significant energy savings. It will take this kind of sustained effort over many years to close the efficiency gap for Minneapolis homeowners, and for most Americans.

Supporting Policy Mechanisms

Though Community Energy Services model improves on previous residential programs, this type of voluntary program alone can only do so much to reduce energy use. Additional programs and policy mechanisms can work in tandem to address some of the remaining barriers that exist even with a strong residential efficiency program. For

example, for participants concerned about upfront costs, an on-bill financing program, where the homeowner repays the cost of upgrades through an extra charge on their utility bill, could eliminate the actual cost barrier and the perception of risk. Even for people adverse to loans, on-bill financing might be more attractive because the monthly payment is less than the cost savings from increased efficiency, so participants' utility bills remain the same, or may even be lower, while repaying the loan.

In addition, though several homeowners I interviewed had purchased their home with the expectation of investing in efficiency upgrades, most homebuyers do not. A few U.S. cities and the state of Wisconsin have residential energy conservation ordinances, which require a homeowner to implement certain energy-efficiency measures upon sale or when a rental license is renewed. This type of ordinance would ensure that homeowners invest in some efficiency upgrades on purchase or sale of their home. A program like Community Energy Services that provides technical and financial assistance would support homeowners in this process, helping the homeowner determine the most effective actions and, ideally, convincing them to go beyond the required measures and make their new homes as efficient and comfortable as possible. A residential efficiency ordinance could persuade some homeowners that did not complete upgrades because they were not sure how long they would stay in their home and were concerned about the payback. This type of requirement could help a homeowner recoup their investment when they sell their home, especially if supported by a home efficiency rating system.

Finally, proper energy pricing, at the federal and state level, is essential to encourage energy efficiency. Feedback from the homeowners I spoke with and previous research show that cost savings do not create a strong incentive because energy costs are a small part of household expenditures. Higher energy prices would drive more people to participate in efficiency programs. Indeed, the Bonneville Power Association in the Pacific Northwest found that steep increases in electricity costs during the 1980s made consumers more aware of their energy consumption and more likely to participate in Bonneville's efficiency programs (Fuller et. al. 2010). Proper pricing is also essential to prevent a "rebound effect" where increased consumption more than cancels out any energy savings achieved through efficiency. Despite efforts by the U.S. and European countries to reduce greenhouse gas emissions, overall both carbon output and energy consumption have

continued to increase as we plug in more personal electronics, air-conditioners and other energy consuming appliances (Owen 2010). Without increases in energy prices, efficiency alone may not reduce the total amount of energy we consume. A full suite of complementary programs and policies is necessary to address total energy consumption. Paired with residential ordinances, a home energy rating system and proper energy prices, voluntary programs are essential to support and motivate homeowners to invest in major efficiency upgrades.

Beyond Minneapolis: Community Energy Services in Other Contexts

Other organizations that implement residential energy efficiency programs should consider replicating and improving the Community Energy Services model. Though CEE operates in a liberal, urban environment, the fundamental program design could be replicated in a wide range of locations. Participants in Minneapolis were concerned about the environment, yet they cited many reasons that they had invested in efficiency, with comfort and saving money trumping the environment. This implies that the same basic program could work in other political climates. In fact, the non-profit Climate and Energy Project reduced energy use through a competition among six towns in Kansas. The organization focused on thrift, patriotism, spiritual conviction and economic prosperity (with no mention of the environment or climate change) to rally residents to conserve energy. A grain farmer who organized local leaders for the program said, "Whether or not the earth is getting warmer, it feels good to be part of something that works for Kansas and for the nation" (Kaufman 2010). When framed appropriately for the target audience, a comprehensive residential energy program should work in any part of the country.

Minneapolis is also a very cold climate, where high heating bills are a big concern. However, Minnesota's average electricity price ranks only 24th among the 50 states (U.S. EIA 2010).[12] More notably, a Pew Research Center study found that 44 percent of Americans find it difficult to afford their utility bills (Kohut, Doherty & Dimock 2008), indicating that high energy costs are a widespread concern.

[12] As of December 2010, Minnesota had an average residential retail electricity price of ¢10.38/kWh, only slightly less than the U.S. average of ¢11.04 (http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_a.html).

Several participants noted that they appreciated the program's honest advice, which CEE is able to provide because of its non-profit status. Though utilities often run this type of energy efficiency program, they may need to work harder to gain residents' trust. One way they can do this is by partnering with community organizations and cities. CEE takes advantage of Minneapolis's neighborhood association structure; neighborhoods were clearly marked in the 1990s through the Neighborhood Revitalization Program and each has its own neighborhood association. However, even in places without this structure, program implementers can work with other types of community groups. The City of Houston's Residential Energy Efficiency Program, for example, partnered with churches and multi-service community centers to market their low-income weatherization program (Fuller et al. 2010).

Programs in a wide variety of locations and contexts that aim to reduce residential energy use should mimic CEE's basic program design, a one-stop model that combines technical and financial assistance and partners with community organizations. They should, however, pay close attention to their target audience and figure out how to make the process simple and easy, while also providing emotional motivation by making efficiency tangible, making it personal and making it a community effort.

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PARTICIPANT INTERVIEWS

Major Upgrades Completed

Gerry Tyrrell, Corcoran neighborhood. Interview 2, by phone on January 11, 2011.

Homeowner in the Corcoran neighborhood. Interview 3, by phone on January 13, 2011.

Homeowner in the Corcoran neighborhood. Interview 4, in-person on January 13, 2022.

Angela Corbett, Audubon neighborhood. Interview 6, in-person on January 14, 2011.

Tracey Deutsch, Kingfield neighborhood. Interview 7, in-person on January 15, 2011.

Corri Sandwick, Audubon neighborhood. Interview 9, in-person on January 16, 2011.

Katie Anthony, Kingfield neighborhood. Interview 10, in-person on January 16, 2011.

Mary Ludington, Kingfield neighborhood. Interview 11, in-person on January 17, 2011.

Tom von Fischer, Kingfield neighborhood. Interview 12, in-person on January 17, 2011.

Leah Huyser, Waite Park neighborhood. Interview 13, in-person on January 17, 2011.

Homeowner in the Waite Park neighborhood. Interview 14, in-person on January 17, 2011.

Nic Baker, Audubon neighborhood. Interview 17, in-person on January 18, 2011.

Kris Leveille, Waite Park neighborhood. Interview 18, in-person on January 18, 2011.

Kelly Johnson, Waite Park neighborhood. Interview 19, by phone on January 19, 2011.

Karen Kenny, Kingfield neighborhood. Interview 30, by phone on January 27, 2011.

Amy Arcand, Corcoran neighborhood. Interview 20, in-person on January 19, 2011.

Clare Sorman, Audubon neighborhood. Interview 22, in-person on January 19, 2011.

Homeowner in the Kingfield neighborhood. Interview 24, by phone on January 20, 2011.

Elizabeth, Waite Park neighborhood. Interview 25, in-person on January 20, 2011.

Jill Catherwood, Fulton neighborhood. Interview 26, by phone on January 19, 2011.

Adam Hurlbut, Audubon neighborhood. Interview 28, by phone on January 19, 2011.

No Major Upgrades Completed

Megan Bergseth, Longfellow neighborhood. Interview 1, in-person on January 9, 2011.

Sima Higginson, Northrup neighborhood. Interview 5, in-person on January 13, 2011.

Anandram Seriram, Waite Park neighborhood. Interview 8, by phone on January 16, 2011.

Leah Jo Huseby-Krieger, Kingfield neighborhood. Interview 15, in-person on January 18, 2011.

Heather McPherson, Audubon neighborhood. Interview 16, by phone on January 18, 2011.

Todd Bennington, Audubon neighborhood. Interview 21, in-person on January 19, 2011.

Katie Snow, Audubon neighborhood. Interview 23, by phone on January 19, 2011.
Joe Brown, Waite Park neighborhood. Interview 27, by phone on January 19, 2011.
Homeowner in the Waite Park neighborhood. Interview 29, by phone on January 24, 2011.

APPENDIX A: RESEARCH METHODS

To gain insight into the Community Energy Services program, I conducted open-ended interviews with nine key CEE staff and 30 structured interviews with program participants. Because CEE was concerned about distributing participant contact information, they would not allow me to contact program participants directly, requiring instead that the participants opt into the interviews. Because participants opted in, rather than being selected at random, they are not a representative sample of all program participants. Indeed, several interviewees were involved either with their neighborhood association's program application or in marketing the program to their neighbors, and overall were likely the more motivated participants.

To recruit the interviewees, a CEE staff member emailed the 124 participants in Fulton, Kingfield, Corcoran, Logan Park, East Calhoun, Audubon, Waite Park and Bryn Mawr neighborhoods that had been contacted by either a resource coordinator or loan staff, selecting for homeowners that had upgrades recommended. The Community Energy Services program operates in 34 Minneapolis neighborhoods and these eight were selected because they are geographically spread out throughout the city and give a range of different income-levels. Of these 124, 64 had completed upgrades. Homeowners were offered a $20 Target gift card to participate in an interview. Twenty-eight responded to the recruitment email and two other program participants (in Longfellow and Northrop, respectively) were identified through personal contacts. I interviewed all thirty homeowners, 18 in-person and 12 by phone and each interview lasted about 30 minutes.

The interview questions were designed to address hypotheses of what barriers homeowners might face and what attitudes and circumstances would impact their decisions to complete retrofits.

Interview Recruitment Email

<<First Name >>

Thank you for being part of Community Energy Services! We have been contacted by a graduate student from MIT who is studying various residential energy efficiency programs across the country. **She is hoping to interview participants about your experience and home's energy use**. Any information you share is confidential and you may opt out of participation at any time. **As a thank you for your time, we are giving you a $20 gift card to Target to each volunteer!**

If you are willing to participate in an interview, please complete this contact form or call Neely Crane-Smith at 612-335-5852. We will then pass along your contact information to Stephanie, who will contact you to schedule an interview.

If you have any questions, please contact Neely at ncranesmith@mncee.org or 612-335-5852. Thank you in advance for your feedback!

Interview Script

Introduction

I'm a graduate student in the Department of Urban Studies and Planning at MIT and I'm doing some research on residential energy efficiency programs. In Minneapolis, I'm working with the non-profit organization the Center for Energy and the Environment on their Community Energy Services program, and would like to get your feedback about your experience.

In this interview I will ask you some questions about your experience with the program, your general attitude about energy and the environment, and about your home. Please don't feel there are any wrong answers to these questions – my goal is to get as accurate a picture as possible of how homeowners viewed their experience with this program, including your motivations for participating.

I expect that this interview will last about 40 minutes. (If by phone: Neely will mail you your $20 Target gift card that you get for agreeing to this interview.) I have a consent form for you to sign—this enables you to keep any information anonymous and reminds you that

participation in the interview is voluntary. Also, I would like to audiotape this interview so I can make sure I've captured your responses accurately. Is that okay with you?

Program Experience

1. To start off, how did you first hear about the program?
2. Do you remember why you decided to attend the energy workshop?
3. What themes, if any, do you remember from the workshop?
4. What was your reaction to the workshop? Do you remember how you felt after the workshop?
5. When Community Energy Services completed your home visit, do you remember what they recommended that you do?
6. What was your reaction to these recommendations?
7. After your home visit, did anyone from the program follow up with you regarding the recommendations? If so, can you describe this?
    a. How were you contacted? Do you remember by whom?
8. What recommendations have you acted on?
    a. Have you completed other upgrades for energy efficiency either before or after your participation in the Community Energy Services program?

Attitudes and Motivations

Interview Questions for Participants that Have Completed Upgrades:

1. Can you explain why you ended up making these upgrades? What do you remember motivated you?
    a. What were the primary emotions that spurred you to complete the upgrades?
2. How did you feel once the upgrades were completed?
3. Did you encounter any difficulties in the process?
4. Have you made any other changes due to your participation in the program? If so, what?
5. Have you talked to any of your neighbors or friends about these upgrades?

    a. Probe: Can you tell me about these conversations?
6. Do you feel like you've saved energy or money through your participation in the program?
    a. If yes: how so?
    b. If they've saved money: how do you plan to use this extra money?

Interview Questions for Participants that Have Not Completed Upgrades:

1. What are some reasons that you have not completed in any upgrades?
    a. Probe: Which were the most importance concerns?
    b. Can you describe any challenges that you face to completing the steps?
2. Is there any reason that you can think of that the program could give you that would convince you to complete some or all of the recommendations?
3. Is there any type of incentive or assistance (financial, help scheduling contractors etc.) that program could provide that would help you complete some or all of the recommendations?
4. Have you talked to any of your neighbors or friends about the Community Energy Services program? Can you tell me about these conversations?
5. Do you feel like you've saved energy or money through your participation in the program?
    c. If yes: how so?
    d. If they've saved money: how do you plan to use this extra money?

General Attitudes

Now I'd like to ask you some general questions about your attitudes and actions. Again, there are no right or wrong answers; I am just trying to get a sense of what is important to you.

1. Did you use CFLs before you attended the workshop?
2. How often do you try to conserve energy? (Never =1, sometimes, frequently, almost always)
3. In deciding to conserve energy, how important is it to you (all on a 4 point scale from 1= not at all to 4 =extremely):
    a. that using less energy saves money

b. that it protects the environment
c. that it benefits society
d. that a lot of other people are trying to conserve energy
e. that you would be more comfortable in your home

4. Are there other environmental activities that you do in your household? (E.g. do you recycle? Do you try to conserve water?)
5. What do you think is the most important thing you can do to reduce your energy use?
6. Do you talk to your friends or family about environmental or energy issues?
7. Do you identify as an environmentalist?

<u>General Household Information</u>

Finally, I would like to ask you a few general questions about your household so that I can compare among homeowners. None of these answers will be cited in any reports with identifying information.

8. Can you tell me a little about your household—how many people live here? Who most often makes decisions about home improvements?
9. How long have you lived in this house? In this neighborhood?
10. How long do you plan on staying in this house?
11. What is the highest level of education that you have completed?
    i. Less than high school
    ii. High school/GED
    iii. Some college
    iv. 2-year college
    v. 4-year college
    vi. Masters
    vii. Doctoral/PhD
    viii. Professional degree (JD, MD)
    b. Others in your household?
12. Can you tell me what your combined household income is?
    i. Less than $30,000

ii. $30,000-60,000
iii. $60,000-90,000
iv. $90,000-120,000
v. $120,000-150,000
vi. $150,000-180,000
vii. $180,000-210,000
viii. Over $210,000

13. If you were in charge of the Community Energy Services program, is there anything you would change?
14. Is there anything that you would like to mention before we finish?

Thank you so much for taking this time to talk to me today. We know you are busy and appreciate your help. I know this interview will contribute to what we learn from the study.

APPENDIX B: INTERVIEWEE DEMOGRAPHICS

Of the 30 program participants I interviewed, 21 had completed at least one of the recommended upgrades and 9 had not. Since only 10 percent of program participants complete the recommended retrofits, this confirms a bias in who chose to participate in an interview. The majority of interviewees (23 out of 30) were women. Only one participant lived with roommates rather than a partner. Though I did not ask participants' age, though most were either younger couples (including new homeowners, and those with young children) or older couples, often retired. The seven neighborhoods included in this study have a slightly higher median household income than the Minneapolis average ($37,974 in 2000), shown in table 3. Most interviewees lived in the Audubon, Waite Park and Kingfield neighborhoods.

Table 3. Distribution of Neighborhoods and Average Neighborhood Incomes

Neighborhood	Median Household Income	# of Participants	Percent
Audubon	$45,090	8	27%
Waite Park	$46,317	8	27%
Kingfield	$51,935	7	23%
Corcoran	$33,393	4	13%
Fulton	$77,371	1	3%
Longfellow	$34,156	1	3%
Northrop	$53,092	1	3%
MINNEAPOLIS	$37,974		

Average income for Minneapolis and neighborhoods from the 2000 US Census.

In addition to the neighborhoods being slightly higher income, the participants I interviewed were much wealthier than the city average of $37,974 per household, shown in Table 4. The majority had an income above $90,000, and only one interviewee was in the less than $30,000 category, and both her and her husband were currently enrolled in graduate school.

Table 4. Household Income of Interviewees

Income Level	# of Interviewees	Percent
>$30,000	1	3%
$30-60,000	5	17%
$60-90,000	9	30%
$90-120,000	10	33%
$120-150,000	3	10%
$150-180,000	0	0%
$180-210,000	1	3%
Would not say	1	3%

Related, 90 percent of the interviewees and their partners (a total of 58 people), had a completed a college degree or higher level of education (shown in Table 5), compared to about 40 percent of city residents (CLR Search 2010).

Table 5. Highest Level of Education Completed by Interviewees and Partners

Highest Degree Completed	Number of Participants/Partners	Percent
PhD	4	7%
Professional	6	10%
Masters	22	38%
More than college/ Mid-masters	4	7%
Bachelors	16	28%
Associate	1	2%
Some college	5	9%
TOTAL	58	100%

Of those that completed upgrades, attic insulation was the most common measure completed: 17 participants insulated their attics, while eight did not. Table 6 shows a count of how many of each type of recommendation was made (according the interviewees' memory), and how many homeowners completed them and how many have not yet. Wall insulation was another common recommendation, but only one of the seven participants actually completed it.

Table 6. Upgrades Recommended and Completed

Measure Recommended	No. Times Recommended	Completed	Not Completed
Attic insulation/sealing	17	17	8
Furnace/boiler replacement	6	3	3
Refrigerator replacement	2	2	0
Windows replaced/refurbished	3	2	1
Wall insulation	7	1	6
Ceiling fan	3	1	2
Water heater	3	1	2

Note: Participants received more than one recommendation.

These participants were all generally environmentally-conscious, though to different degrees, and were all generally interested in saving energy and/or money through

efficiency, even those that did not complete retrofits. When asked if they considered themselves to be an environmentalist, half said yes and two said somewhat. Of the thirteen that said no, several of them specified that they hoped to live up to that standard, while others said that they were environmentally minded, but were not extreme about it or simply did not like the label or being labeled. When asked how often they try to conserve energy, 16 said "almost always," 15 said "frequently," and only one said both "sometimes" and "frequently." Twenty-seven of the participants used CFLs before attending the workshop in at least some of their fixtures; only three did not use any. When asked if they considered themselves to be an environmentalist, more than half said yes or somewhat. Of those that said no, several specified that they hoped to live up to that standard, while others said that they were environmentally minded, but were not extreme about it or simply did not like being labeled.