

Re:Energize CORVALLIS

EVALUATING A COMMUNITY SUSTAINABILITY PROGRAM



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QUICK SUMMARY

MAIN MESSAGES: FINDINGS

1. Participants report that the program is effective in motivating behavior change, resulting in monetary savings, environmental conservation and an increased sense of community – particularly for those who re-enroll.
2. Participants are more likely to complete easy, one-time, and program-supported actions.
3. Renters, apartment dwellers, females, lower income earners, and those with some college or an associate's degree were significantly more likely to complete and re-enroll in the program.
4. Providing targeted support and other forms of motivation to participants is an important component of environmental sustainability programs that focus on behavior change.
5. Clear communication and easy access to information are important components of community based environmental sustainability programs.
 - a. What constitutes program completion
 - b. Community marketing efforts
 - c. Website tailoring of action choices, and

MAIN MESSAGES: RECOMMENDATIONS

1. Clarify and simplify what constitutes program completion, perhaps by separating from the post-completion survey for a more accurate tracking of participants who completed selected actions.
2. Provide regular, targeted program support to participants, as well as recognition to those re-enrolling.
3. Encourage peer-to-peer competition to increase enrollment, completion, and re-enrollment.
4. Enhance branding efforts to ensure community members are aware of the focus on encouraging pro-environmental behavior.
5. Improve existing efforts to categorize potential actions on the website by using multiple criteria (e.g., renters who would like easy actions), potentially filtering choices by pre-enrollment survey responses. Consider the addition of an “action of the month” that accounts for seasonal variation.

EXECUTIVE SUMMARY

BRIEF PROGRAM OVERVIEW

As part of a 2011 grant from the EPA that aided in the creation of Energize Corvallis, the Corvallis Environmental Center developed and implemented the Campus and Communities Take Charge program with the goal of reducing greenhouse gas emissions by encouraging residents to adopt energy-saving behaviors. The Corvallis Environmental Center designed Energize Corvallis programs to focus on and target varying levels of engagement. Communities Take Charge represents the low-level engagement portion of Energize Corvallis by focusing on easily implemented energy-saving behaviors. Specifically, Communities Take Charge asks participants to choose 3-5 energy-saving behaviors and implement them for 1 month, tracking the participants' attitudes and completion through surveys issued at the time of enrollment and time of completion.

This study concentrated on the Take Charge program goals to increase long-term behavior change and replicate the program. To achieve these goals, three priorities were identified: program assessment, market analysis, and data analysis. Program assessment analyzed participants' ongoing behavior change, program completion and re-enrollment, and participants' opinions of program design. Case studies were selected and best practices identified to inform future replication or expansion of the Take Charge program. The Pre- and Post-survey instruments were analyzed quantitatively for demographic information on program participants as well as to inform research questions on the difficulty of completed actions. In accordance with these goals, we have derived five specific research questions (RQ):

1. Do participants continue selected behaviors beyond program completion and why?
2. What aspects of the program design did participants like, and what would they like to see changed?
3. What are common characteristics of participants and attributes of the program that relate to program completion? What are common characteristics of participants and attributes of the program that relate to re-enrollment in the program?

METHODOLOGY

To better evaluate the Take Charge program and glean information on its effectiveness we chose to pursue a mixed-methods approach to the research. This approach included analysis of the survey responses by participants from the pre- and post-survey instruments completed via the Take Charge website, interviews of past program participants and Teaching Assistants from the GEO-300 class, and through thematic analysis of case studies on successful environmental behavior-change programs. Common themes were collected and analyzed from each separate method to inform the findings and recommendations in this paper.

FINDINGS

1. Participants report that the program is effective in motivating behavior change, resulting in monetary savings, environmental conservation and an increased sense of community – particularly for those who re-enroll.
2. Participants are more likely to complete easy, one-time, and program-supported actions.
3. Renters, though more likely to complete and re-enroll in the program than homeowners, report more difficulty sustaining behavior.
4. Providing targeted support to participants is an important component of environmental sustainability programs that focus on behavior change.
5. Competition and participant recognition are important practices in similar programs.
6. Clear communication and easy access to information are important components of community based environmental sustainability programs.
 - a. What constitutes program completion
 - b. Community marketing efforts
 - c. Website tailoring of action choices, and
 - d. Availability of program support materials
7. It is important to tailor program actions to participant's interests.

RECOMMENDATIONS

1. Clarify and simplify what constitutes program completion, perhaps by separating from the post-completion survey for a more accurate tracking of participants who completed selected actions.
2. Provide regular, targeted program support to participants, as well as recognition to those re-enrolling.
3. Encourage peer-to-peer competition to increase enrollment, completion, and re-enrollment.
4. Enhance branding efforts to ensure community members are aware of the focus on encouraging pro-environmental behavior.
5. Improve existing efforts to categorize potential actions on the website by using multiple criteria (e.g., renters who would like easy actions), potentially filtering choices by pre-enrollment survey responses. Consider the addition of an “action of the month” that accounts for seasonal variation.

CONCLUSION

The evaluation of the Campus and Communities Take Charge program provided insight into the strengths of the program, and identified potential areas where improvements could be made. These insights and findings were researched through a mixed methods approach covering best practices of similar programs and the participant demographics and self-reported experiences with the program, which were learned through analysis of the pre- and post-survey

data as well as through interviews with program participants. The findings revealed that Communities and Campuses Take Charge already engage in many of the best practices of similar programs, but identified potential low-cost improvements that the program could foster to improve the completion rates of the program, resulting in a greater impact on sustainable behavior change. While this list of recommendations is by no means exhaustive, it provides numerous optional data-driven courses of action that are likely to improve the impact of the Take Charge program.

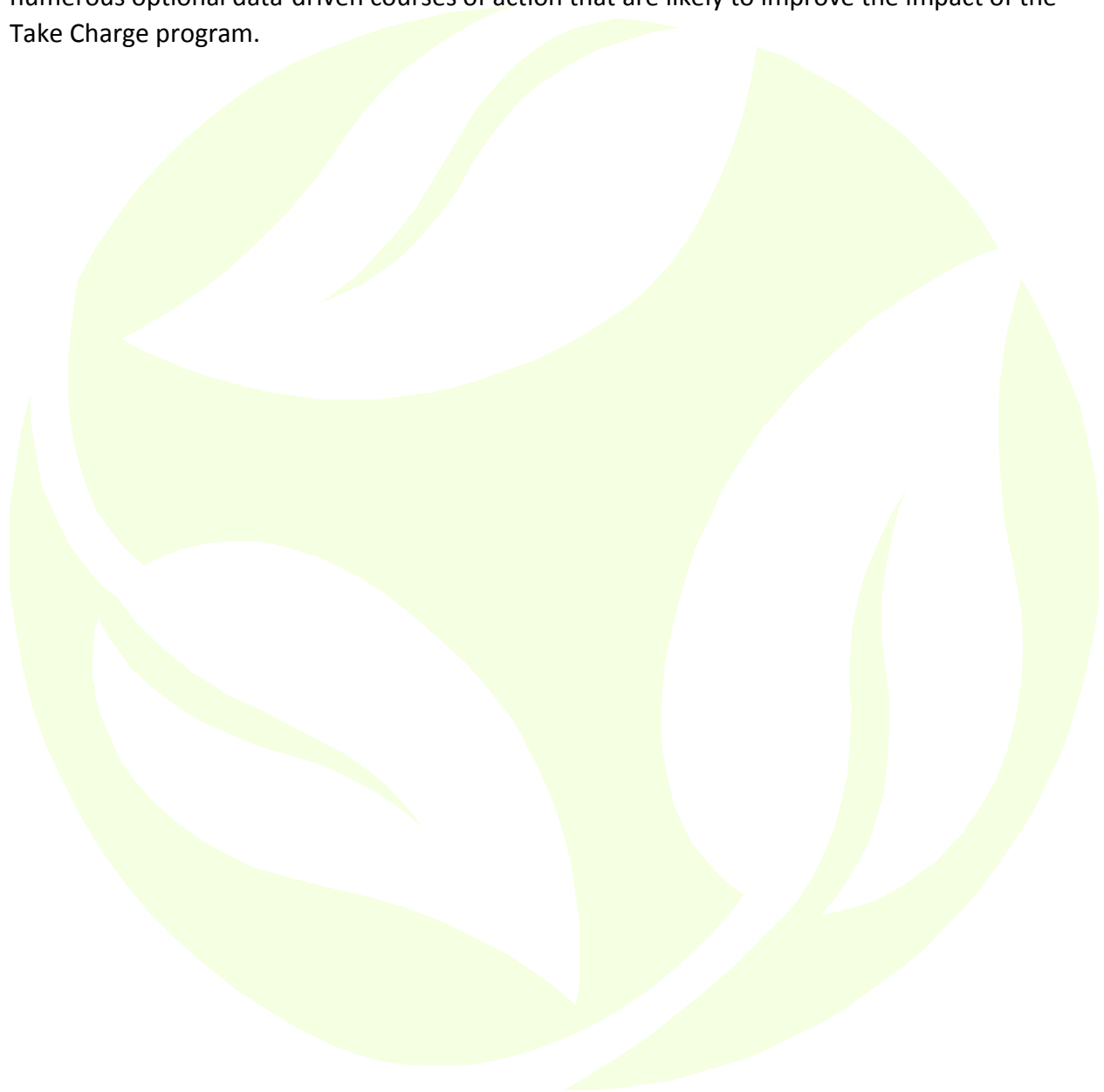


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1 INTRODUCTION

1.1 BACKGROUND

As part of a 2011 grant from the EPA that aided in the creation of Energize Corvallis, the Corvallis Environmental Center developed and implemented the Campus and Communities Take Charge program with the goal of reducing greenhouse gas emissions by encouraging residents to adopt energy-saving behaviors. The Corvallis Environmental Center designed Energize Corvallis programs to focus on and target varying levels of engagement. Communities Take Charge represents the low-level engagement portion of Energize Corvallis by focusing on easily implemented energy-saving behaviors. Specifically, Communities Take Charge asks participants to choose 3-5 energy-saving behaviors and implement them for 1 month. At its conception, Communities Take Charge outlined 5 program goals.

Communities Take Charge Program Goals:

1. Enroll 10% of Corvallis Residents
2. Save Approximately 18,000 Tons of Carbon Dioxide
3. Increase Energy Saving Behavior in the Long-Term
4. Increase Sense of Community for Program Participants
5. Fine-Tune the Program and Replicate it Regionally or Nationally

1.2 RESEARCH OVERVIEW

This study concentrated on the Take Charge program goals to increase long-term behavior change and replicate the program. To achieve these goals, three priorities were identified: program assessment, market analysis, and data analysis. Program assessment analyzed participants' ongoing behavior change, program completion and re-enrollment, and participants' opinions of program design. Case studies were selected and best practices identified to inform future replication or expansion of the Take Charge program. The Pre- and Post-survey instruments were analyzed quantitatively for demographic information on program participants as well as to inform research questions on the difficulty of completed actions. In accordance with these goals, we have derived five specific research questions (RQ):

1. Do participants continue selected behaviors beyond program completion and why?
2. What aspects of the program design did participants like, and what would they like to see changed?
3. What are common characteristics of participants and attributes of the program that relate to program completion? What are common characteristics of participants and attributes of the program that relate to re-enrollment in the program?
4. What are the best practices of similar programs, and how do they compare with this program?

This study assessed long-term behavior change, factors that supported or hindered program completion and re-enrollment, strengths of the program, best practices from similar programs, participants' opinion of program design, and the participant-reported difficulty level of the behaviors in regards to successful completion.

2 LITERATURE REVIEW

2.1 LONG TERM BEHAVIORAL CHANGE

When promoting environmentally friendly behavior it is important to consider whether the behaviors you induce will continue in the long term. This aspect of conservation behavior is referred to in the literature as durability ("Changing Behavior and Making it Stick: The Conceptualization and Management of Conservation Behavior," 1993; Fisher & Irvine, 2010). The studies that have investigated behavior durability of sustainability based behaviors have found that it is rare for behaviors to continue beyond program completion ("Effecting Durable Change: A Team Approach to Improve Environmental Behavior in the Household," 2004). This lack of durability can be partly explained by the fact that many of the interventions that produce the quickest and easiest changes in behavior are ineffective at producing long term change ("Changing Behavior and Making it Stick: The Conceptualization and Management of Conservation Behavior," 1993). For example, straight forward methods like prompting, material incentives, social pressure, and targeting one behavior have been found to be nondurable ("Changing Behavior and Making it Stick: The Conceptualization and Management of Conservation Behavior," 1993; Fisher & Irvine, 2010). However, there has been movement within the literature to find behavior change methods that produce durable results.

Many of these durable behavior changes share a common factor in the encouragement of commitment as part of the behavior change. When participants commit to practice more sustainable behaviors it proves an effective way to create durable behavior change (Abrahamse, Steg, Vlek, & Rothengatter, 2005; "Changing Behavior and Making it Stick: The Conceptualization and Management of Conservation Behavior," 1993, "Commitment and Behavior Change: A Meta-Analysis and Critical Review of Commitment-Making Strategies in Environmental Research," 2011). Commitment is only effective at producing change if it is individual based as group change diffuses the responsibility ("Changing Behavior and Making it Stick: The Conceptualization and Management of Conservation Behavior," 1993). Lokhorst et al. ("Commitment and Behavior Change: A Meta-Analysis and Critical Review of Commitment-Making Strategies in Environmental Research," 2011) theorized that commitment causes behavior change to be internalized, which provides the impetus for maintaining the behavior in the long term. This is promising for Communities Take Charge because the program is largely based on individuals committing to enact environmentally friendly behaviors. The importance of individual commitment is hard to overstate when choosing interventions to produce durable change.

2.2 PROGRAM PARTICIPATION AND COMPLETION

Prosocial behavior is defined as behavior with the sole intended purpose of helping another (Ariely, Bracha, & Meier, 2009; Ashraf, Bandiera, & Jack, 2012; Lacetera, Macis, & Slonim, 2012). As such, there are distinct motivations that are involved in engaging in prosocial behavior (Ariely et al., 2009). Whereas incentives can increase participation and response rates in research by disinterested parties, those who engage in prosocial behavior in its purest form are motivated by altruism. The research suggests that there is a competition between these motivating factors in encouraging prosocial behavior, and as such, incentivizing said behavior financially or through lottery, prizes, or even charitable donations can actually reduce participation rather than increase it (Ariely et al., 2009; Bowles & Polanía-Reyes, 2012; d'Adda, 2011; Fuster & Meier, 2010; Gneezy, Meier, & Rey-Biel, 2011). The reasons for this reduction are numerous. Economic theorists attribute it to motivation crowding, suggesting that financial incentives and other motivations like altruism are substitute goods rather than complimentary goods, meaning that they compete with other incentives and motivations (Bowles & Polanía-Reyes, 2012; Lacetera et al., 2012). Other research has found that incentives interfere in other ways, by disrupting essential norms of trust that are key to prosocial behavior (Gneezy et al., 2011) or interfering with other successful motivating factors like norm enforcement. The latter refers to societal pressure to engage in the activity, which is diminished in its power when people received cash incentives (d'Adda, 2011).

Participation and completion rates of behavior change programs are higher when participants make pledges to complete the behavior (Abrahamse et al., 2005; Abrahamse, Steg, Vlek, & Rothengatter, 2007; Katzev & Johnson, 1983). Furthermore, providing tailored communication and feedback periodically to participants bolsters completion rates (Abrahamse et al., 2007). This communication can serve a dual purpose, as it provides the participants with the knowledge that program managers are observing them, at least indirectly. The Hawthorne Effect is a well-known generic behavior change phenomenon that can occur precisely because people know they are being observed. The Hawthorne Effect has been confirmed as influential in certain environmental stewardship programs (Schwartz, Fischhoff, Krishnamurti, & Sowell, 2013).

2.3 ACTION DIFFICULTY

According to research, (Poortinga, Steg, & Vlek, 2004; Steg & Vlek, 2009), many studies have successfully explained environmental behavior using the assumption that people make rational decisions by weighing the costs and benefits of a set of choices. This theory, in economics, is known as rational choice theory. The highly cited paper by Diekmann and Preisendörfer (2003) combines the rational choice perspective with the individual motivation perspective, which results in the interesting revelation that the effects of internal and external factors are not additive. This study is an empirical evaluation of the low-cost hypothesis which “predicts that the strength of effects of environmental concern on environmental behavior

diminishes with increasing behavioral costs” (Diekmann and Preisendörfer, 2003). Their cost index includes three behavior-specific variables: cost, time commitment, and inconvenience. This study provides evidence that the low-cost hypothesis is true, which “points to general limits to attitude research (in high-cost situations) and to general limits to rational-choice theory (in low-cost situations)” (Diekmann and Preisendörfer, 2003).

The research by Diekmann and Preisendörfer (2003) and the results of studies drawing from economics suggest that behavior-specific variables are important and consequently that the research question concerning the difficulty of environmental behaviors is worthwhile. Research also points to cost, time commitment, and convenience as important variables to consider when assessing difficulty.

2.4 COMMUNITY BASED SOCIAL MARKETING

The Community Based Social Marketing (CBSM) approach uses techniques and concepts borrowed from commercial marketing to advance social ideas and generate changes in collective behaviors (Peattie and Peattie, 2009; McKenzie-Mohr, 2000). It is argued that CBSM holds a higher probability of inducing behavioral response and promoting sustainable behavior compared to other information-intensive campaigns with a similar goals (McKenzie-Mohr, 2000). CBSM is seen as an alternative approach to direct information provision, and is identified as having the potential for a considerable reduction in consumption behavior (Peattie and Peattie 2009). This behavioral change approach has a multitude of academically backed examples, especially in shaping pro-environmental behavioral shifts (Kennedy, 2010; Lopez et al. 2010). As such, research is in agreement on the importance of pursuing sustainable behavior changes to achieve short-term climate change goals using CBSM techniques (Dietz, Gardner, Gilligan, Stern, & Vandenbergh, 2009; Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007; McKenzie-Mohr, 2000; Owens & Drifill, 2008; Peattie & Collins, 2009).

Dietz et al (2009) finds that the most effective interventions usually have three components: (1) policy tools that provide information and incentives, (2) social marketing that includes media appeals, participation, and community participation networks; and (3) address multiple levels including households, businesses and communities. Mckenzie-Mohr (2000) is less explicit about the selection of sustainable actions, but proposes the process should be based on answers to three questions:

1. What is the probability that the action will bring about desired change?
2. What are the barriers for each of the actions?
3. What is the class of behavior that is being promoted?

Social and behavioral norms have been shown to greatly affect how a person perceives their connection to their environment and community (Kaiser & Schultz, 2009; Tabanico & Schultz, 2007). Therefore, in the process of selecting, implementing, and reevaluating sustainable actions, studies have demonstrated that it is necessary to identify potential barriers

to implementation, defined as either being individual, or outside the individual (McKenzie-Mohr, 2000). As such, understanding the barriers to implementing behavioral actions is crucial to the success of social marketing-based projects (Lorenzoni et al 2007; Owens and Driffill 2008; McKenzie-Mohr, 2000).

While the literature is in agreement about the need to generate a selection of focused actions and identify the barriers to these actions, each optimal action was presented on a case-specific basis. This suggests that social marketing approaches require extensive tailoring to specific locales and populations in order to be successful and effective.

2.5 GAMIFICATION

Gamification is another component of environmental sustainability programs that utilizes multiple methods to target engagement and behavior change. Using game mechanics and design to promote behavior change and increase participation is an important component of behavior changing apps and websites. This practice uses entertainment engagement to make sustainable behavior fun and rewarding and has been shown to be an extremely successful marketing tool for behavior change. Gamification is a relatively new concept in successful business practices. According to Gartner, Inc., the world's leading information technology research and advisory company, by 2014 over 70% of Global 2000 organizations will have “gamified” apps (“Gartner, Inc Press Release,” 2011). Giving people rewards (like financial discounts and prizes) isn’t always the best method for recruitment and maintaining enrollment. What was initially an incentive becomes an inherent part of the product and no longer acts as a motivator. When it comes to behavior modification, gamification uses game mechanics and game design elements to influence and measure behavior change. WeSpire and the Frederick County Green Challenge both incorporate gamification components into their program platforms.

According to Zichermann and Cunningham (2008), a leading expert in gamification, there are four main components to gamified programs: *Status, access, power, and stuff* (SAPS).

1. *Status* is defined as the relative position of an individual to others and within social groups that are achieving higher levels of status, an important motivator. In order to provide participants with varied levels of status in gamified programs it is helpful to create a ranking system. This ranking system should provide status items or symbols, such as badges, levels, and leaderboards. Ranking must be visible to other players in the game to be meaningful and hold value.
2. *Access* is used to distinguish between different status levels as well. Individuals with higher levels of status within the game have more access to new products or higher levels within the game of which individuals with lower levels of access do not.
3. Assigning *power* levels to different players in the game give the game operator more control. For example, if an individual had a high level of participation they could be a moderator within the game, thus increasing their status. This would give them both

power and status benefits while at the same time providing the game operator with free labor.

4. *Stuff* is the least important component of gamification, however, “freebies” can still be a powerful motivator. “Freebies” create a new issue once they are given, as the incentive to continue participation is gone. Players tend to value status, access, and power in a game environment, and are all extremely cost effective ways to drive participation and behavior change.

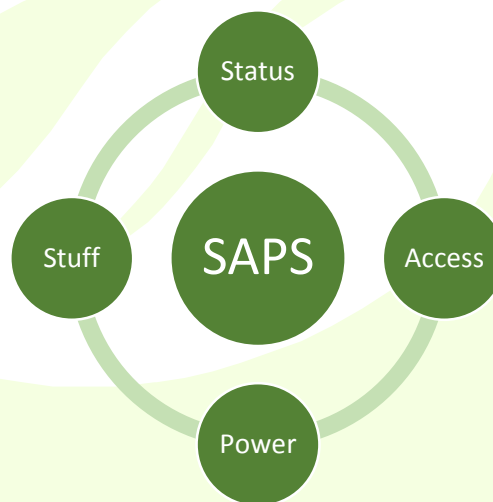


Figure 1: The four main components of gamified environmental sustainability programs

When rewards are combined with social media outlets, they allow for continuous feedback with a focus on achievements. This allows individuals to see what others have achieved. One of the most common methods for designing a game framework involves mechanics, dynamics, and aesthetics (the MDA framework). The mechanics are the functioning components of the game and allow the game operator to guide the actions of the players. A player’s interactions with those mechanics determine how a player is able to behave within the game. Finally, the aesthetics of the game allow the player to feel and influence the player’s emotions. These three parts of the framework should lead to a social engagement loop causing motivating emotions that in turn lead to re-engagement.



Figure 2: Social engagement in loop gamified programs

2.6 UTILITY PARTNERSHIPS

The third practice in environmental sustainability programs focuses on allowing participants to easily access their energy use information (Thaler & Tucker, 2013). One form of utility partnerships occurs when a utility provider agrees to increase accessibility to a consumer's energy use information. The user has the choice to privately evaluate his or her energy usage data, or release it to a third-party ("Green Button," 2014). An example of a third-party is a software-as-service company, such as Opower, that analyzes usage data and recommends energy-saving techniques ("Opower," 2014). Additionally, gamification and Community Based Social Marketing programs can act as a third-party and incorporate utility partnerships in their program platforms to show tradeoffs for different energy uses.

A partnership with a utility company can augment sustainable behavior intervention programs in three key areas. First, most utility partnerships are structured in a way that allows for programs to track participant's energy and resource consumption in the aggregate. This makes following the process of emission reductions less opaque, and allows for better tracking and verification of program effectiveness. Secondly, at the participant level, reductions in emissions can be tracked through web applications and translated to monetary savings. These web applications suggest improvements in regiments of energy consumption, and help consumers understand and manage their energy usage ("Green Button," 2014, "Opower," 2014; Irwin, 2013). Thirdly, information obtained from utility partnerships can be used to increase the effectiveness of other best practices, such as peer motivation and competition. For example, participants in programs with utility partnerships can use apps that allow them to compete against Facebook friends to lower carbon emissions ("Green Button," 2014, "Opower," 2014)). However, the major obstacle to utility partnerships is that it requires the participation of an area utility provider. This participation often requires the voluntary adoption of a common

technical standard, such as “Green Button” that allows participants to access energy usage information from the utility providers.

The Green Button Initiative is a common technical standard developed through a public and private partnership that allows utility companies across the country to release energy usage information through web-based platforms. Third party developers then can provide energy users with ways to analyze energy usage, save money, and become better educated about energy-efficiency retrofits and investments. Since energy usage information is the feedback mechanism, for users to benefit, they must engage actively in behavioral change (“Green Button,” 2014)). Pacific Power, Corvallis’s local utility, has a Green Button program in place that enables customers to download monthly household or building energy usage information (“Pacific Power Joins ‘Green Button’ Initiative,” 2012).

3 DATA AND METHODS

To better evaluate the Take Charge program and glean information on its effectiveness we chose to pursue a mixed-methods approach to the research. This approach included analysis of the survey responses by participants from the pre- and post-survey instruments completed via the Take Charge website, interviews of past program participants and Teaching Assistants from the GEO-300 class, and through thematic analysis of case studies on successful environmental behavior-change programs. Common themes were collected and analyzed from each separate method to inform the findings and recommendations in this paper.

3.1 INTERVIEWS

To better understand whether participants continue selected actions and to gather general opinions about the program, we conducted 16 interviews with Campuses and Communities Take Charge participants. As an additional measure of program participant feedback, we interviewed two Geology (GEO)-300 teaching assistants to get a sense of common experiences. Students in the OSU GEO-300 class, “Sustainability for the Common Good”, enrolled in Campuses Take Charge as one of their assignments. At the end of the program, students were required to submit an essay reflecting on their experiences. These assignments were graded by the teaching assistants for the course and were the source of their feedback during the interview. Interviews are particularly well-suited to these types of retrospective research questions as they allow us to engage with the participants after their involvement has ended. They also allowed us to gather more nuanced information than possible with a survey.

We restricted our sampling frame to 2013 program participants (N=2874) to ensure the experience was relatively recent. Non-completers were defined as participants who only took

the pre-survey, completers as those who took both the pre- and post-surveys, and re-enrollers as those who took the entrance survey twice.¹

Within each of these groups, we initially sampled 5% of participants (N= 145). Six people (4.1%) responded to initial interview² requests. An additional 10% of participants in each group (N=430) were sampled in an attempt to generate more responses. Interviews were requested for each person in the sample via email on three separate occasions from Friday, April 25th to Monday, May 12th 2014. In the end, 29 people responded to interview requests. Of these, 16 (3.7%) were reached for an interview, including 4 non-completers, 9 completers and 3 re-enrollers.

Interviews were conducted from Monday, April 25th to Friday, May 16th, 2014 using a semi-structured interview protocol that was customized to non-completers, completers and re-enrollers. On average, interviews lasted approximately 20 minutes, ranging from 10 minutes to 30 minutes. Eight interviewers asked questions related to action difficulty, maintenance of actions beyond program participation, and perceptions of the program (see 8.6 for Interview Survey Instrument). Each interview was recorded with permission from the interviewee and interviewers took notes throughout the interview process. Pre-configured questions and prompts ensured consistency among interviews, while also allowing space for flexibility. Immediately following each interview, the interviewer summarized their notes and recorded themes into the prepared survey instrument.

Based on relevant literature and responses to pre/post surveys, we developed an initial set of potential respondent themes but also used techniques for open coding to account for emerging or unanticipated themes.

3.2 ENTRANCE AND EXIT SURVEY ANALYSIS

To better understand intention to continue the environmental behavior, participants characteristics that lead to program completion and re-enrollment, and program characteristics in the matter of the least and the most difficult actions, we worked with Participant Information and Implemented Action datasets drawn from pre/post surveys with program participants that included questions about program completion and re-enrollment, selected actions, pre/post action difficulty and participant demographics (i.e. home ownership, housing type, education, sex, and income). The Participant Information dataset is particularly well suited to answer the first, third, and forth research questions of this research, as it contains the demographic information of the participants along with other required relevant information. Meanwhile, the

¹ For re-enrollers, we kept only the most recent participation attempt, so that each individual had only one entry in the sampling frame. We also used this most recent attempt as the basis for our interview questions.

² Initially, participants in our sample were asked to choose between an interview and focus group. Due to low interest in the focus group option (N=4), we ended up interviewing those who chose this option and eliminating this option from future communications.

Implemented Action dataset is suitable to answer the second research question, which sheds light on difficulty of actions which participants undertook.

The datasets used in this research were derived from merged Campus and Community datasets for analysis. Each dataset contained the pre- and post-survey results for each participant. While the implemented action dataset consisted of participants for the year 2013 the take-charge dataset consisted of participants for the year 2011, 2012 and 2013. For consistency and due to limited demographic data availability we restricted our analysis to participants of the year 2013 for research questions four and five while we used data the full range of years to inform the first two research questions. Data cleaning particularly included dropping duplicate records³. Our data cleaning and merging efforts resulted in two relevant datasets for analysis: the participant information dataset and the implemented actions dataset.⁴

Participant information dataset (N=5586⁵)

The participant information dataset included information from pre/post surveys on program completion, re-enrollment, intention to continue selected actions (rated on a 5-level scale from 1 as “definitely will maintain the changes” to 5 as “I don’t know if I will maintain the changes”), reasons for program enrollment (open-ended) and participant demographics (home ownership, housing type, education, sex, and income).⁶ Using this information, we were able to categorize participants into our 3 categories of interest: (1) non-completers, or participants who completed only the pre-survey (36%); (2) completers, or participants who completed both pre- and post-surveys (57%); and (3) re-enrollers (7%).

For each of these categories a comparative analysis was done based on their demographics. Student’s t-tests were used to test for significant demographic differences between participant categories. Further intentions of participants to continue the program were analyzed.

Implemented actions dataset (N=4694)

³ Unique ID’s of participants with very close submission and completion dates were considered duplicate records. For example, UID that registered or had two submissions on May 12, 2013 but at different times i.e. 7.19 pm and 7.55 pm, were excluded from the analysis and labeled as duplicated results.

⁴ Attempts to merge these two datasets were unsuccessful, as the implemented actions dataset’s observations were not consistent with the participant information dataset’s observations.

⁵ 1286 participants of Campus Take Charge and 4300 participants of Communities Take Charge

⁶ Participant age was also requested, but this question was missing 83% of responses and thus dropped from our analysis.

The implemented actions dataset contains information about each of the 3-5 actions selected by participants⁷, including pre/post action difficulty (rated on a 5-level scale from very easy to very difficult) and explanations of why actions were difficult (open-ended).

We restricted our analysis to actions that made up at least 1% of all selected actions (N=28). From the 28 most frequent actions, similar or duplicated actions were combined, leaving 18 final actions of interest⁸ (**Error! Reference source not found.**). The mean action difficulty was determined for each action. The total number of times any of these 18 actions were selected is N=4,694.

For this sample, there was far fewer descriptive answers given by participants which explained why each action was difficult, as this step was optional. The total number of user-defined responses for the eighteen actions was N=786. Open-ended responses in both datasets were categorized using an iteratively developed coding scheme. One coder coded all the entries and a second coder double-coded a subset to establish inter-coder reliability, yielding a Krippendorff's alpha of 0.9315 (which is considered strongly indicative of reliability) for why actions were difficult⁹. Table 1 contains a full list of all variable measurements and descriptive statistics.

<i>Descriptive statistics</i>	<i>Question(s)/categories</i>	<i>Number of participants</i>	<i>Response rate</i>
<i>Participant information dataset</i>			
<i>Total N= 5586; Total N with demographic information (2013 data)=2902</i>			
<i>Residence</i>	Rent	58%	51%
	Own	29%	
	Other	5%	
	I prefer not to answer	8%	
<i>Type of house</i>	A mobile home	1%	49%
	A one-family house detached from any other house	47%	
	A one-family house attached to one or more houses	6%	
	A small apartment building (with 2 to 9 apartments)	9%	

⁷ Participants had an option to write-in actions, many of which were already among the options provided by the program and thus recoded.

⁸ Please refer to Appendix 8.4

⁹ The first subset of 73 entries (9.29% of the sample) yielded a Krippendorff's alpha of 0.7808 (where 1.0 indicates perfect inter-rater reliability). The two coders discussed discrepancies, made revisions to the coding scheme, and analyzed 73 more entries. The second round of coding achieved an alpha of 0.9315.

	A medium apartment building (with 10 to 49 apartments)	6%	
	A large apartment building (with 50 or more apartments)	6%	
	Other	8%	
	I prefer not to answer	16%	
Education	Some high school	3%	51%
	High school graduate	7%	
	Some college	39%	
	Associates degree	10%	
	Bachelor's degree	19%	
	Master's degree	8%	
	Professional school degree	1%	
	Doctorate degree	4%	
	I prefer not to answer	10%	
Sex	Male	52%	50%
	Female	46%	
	Other	2%	
Income	\$0 to \$25,000	50%	51%
	\$25,000 - \$50,000	9%	
	\$50,000 - \$75,000	6%	
	\$75,000 - \$100,000	3%	
	\$100,000+	3%	
	I prefer not to answer	29%	
Age Range	17 or younger	2%	18%
	18-29	88%	
	30-44	5%	
	45-59	3%	
	60 or older	2%	
	I prefer not to answer	0%	

Implemented Action Dataset

Total N= 4694

Table 1 Variable measurement and descriptive statistics

3.3 CASE STUDIES

The aim of our case studies was two-fold: (1) to determine the best practices of sustainable behavior change programs and (2) to elaborate specific lessons learned for the Communities and Campus Take Charge programs to increase participation. Case studies are particularly well-suited to research question 5 (refer to 1.2 Research Overview).

We used a linear-analytic case study structure to elaborate specific lessons learned from the programs. The method is a standard approach for composing research reports. The

sequence of subtopics starts with a review of the literature on environmental sustainability programs that implement behavior change. The subtopics then proceed to cover the findings from the data collected, and the recommendations based off of the findings. This structure is applicable to explanatory, descriptive, or exploratory case studies (Yin 2011).

Based on our survey of the literature on encouraging behavior change and increasing participation in sustainability programs, we selected three areas of best practices to structure case study selection: Community Based Social Marketing, Gamification, and Utility Partnerships. Using Google searches combining “community-based sustainability program” and our four selected areas of best practices, we generated a list of 51 potential case study programs (see Appendix 8.2 for this list). All cases had a program website that cites behavior change aimed at sustainability as a primary goal. These websites were evaluated to determine program size, location, goals, and level of success. We selected cases within each of these three best practice areas based on ease of access for a total of six case studies (see Appendix 8.1 for information on selected cases).

For each case, we gathered relevant documentation from the program website and conducted a semi-structured interview with a knowledgeable insider.¹⁰ A total of seven interviews were conducted between May 9th and May 29th. On average, interviews lasted about 30 minutes, ranging from 9 to 45 minutes. Our 4 interviewers asked questions related to the three best practices and unique characteristics of the programs (see Appendix 8.3 for our interview protocols). We relied on extensive note-taking to capture participant responses.

The six chosen cases were:

Vermont Home Energy Challenge (VHEC): Provides technical assistance, rebates, and other financial incentives to help Vermont households and businesses reduce their energy costs with energy-efficient equipment, lighting, and approaches to construction and major renovation. Additionally, VHEC partners with contractors, suppliers, and retailers of efficient products and services throughout the state. The program incorporates Community Based Social Marketing.

Frederick County Green Challenge (FCGC): Guides, rewards, and recognizes households for saving energy, adopting green lifestyle practices, and using renewable energy. The program is composed of three sub challenges that participants can enroll in. The program incorporates Community Based Social Marketing and gamification.

¹⁰ The requirements for potential interviewees within the selected cases were individuals had a broad working knowledge of the program and a clear understanding of how the best practices were implemented. For smaller programs most individuals had a clear understanding of all aspects of the project, while for larger programs directors within the different departments were a better option and a more selective approach was necessary. As long as the potential interviewees fulfilled these requirements the finalized selection of the interviewees was left up to the discretion of the organizations themselves.

WeSpire: works with companies to encourage environmental sustainability in the work place. It combines dynamic content, social levers, and gamification to capture people's imagination and produce meaningful results.

Opower: Software-as-service company that partners with utility companies to deliver services that promote energy efficiency. Opower provides users with personalized information about power usage, and offers ways to save energy and money through feedback mechanisms

Pacific Power: Electric utility company with service throughout northern California, southeastern Washington and Oregon. It is a provider for the Corvallis area, serving residential customers, businesses, and Oregon State University.

Charge Ahead Durham: Community based environmental sustainability program that offers weekly "Take Charge" actions. These actions focus on waste, energy, and water conservation. Uses components of Community Based Social Marketing.

4 FINDINGS

1. Participants report that the program does a good job of motivating behavior change, resulting in monetary savings, environmental conservation and an increased sense of community – particularly for those who re-enroll.

The program motivated participants to continue sustainable actions thus leading to participants reporting behavior change. This finding was explicitly evident from the surveys, which indicated that 63% of the participants felt that they would definitely maintain the changes that they made under the program while only 0.3% of the participants indicated that they would definitely not maintain the changes they undertook in this program (see Figure 3).

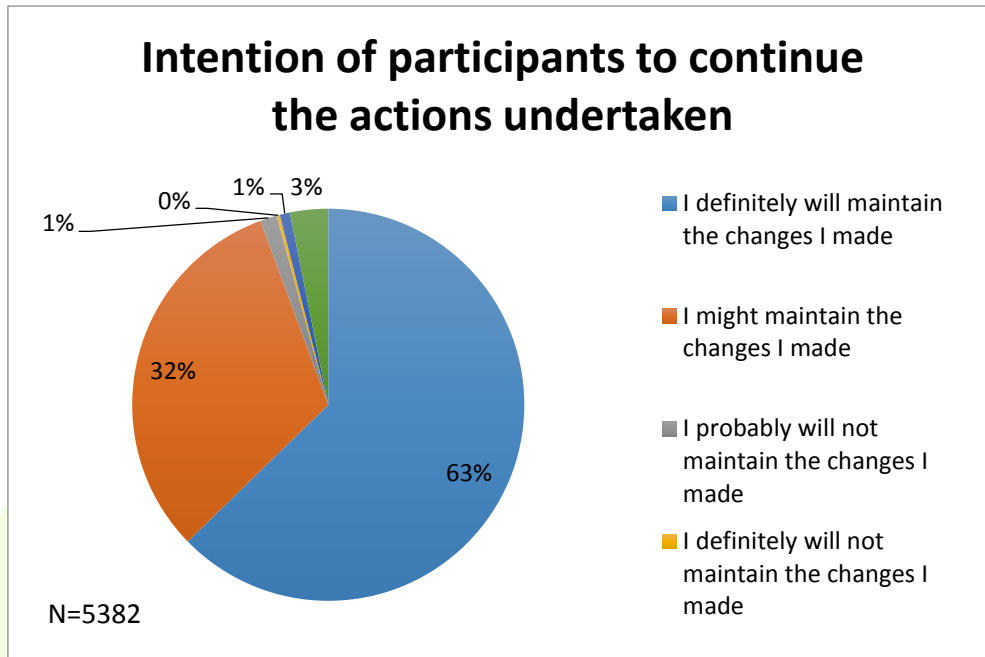


Figure 3 Intent to continue actions after program completion.

However, despite strong intentions to continue sustainable actions undertaken during the program, participants showed a low rate of reenrollment (7%) and program completion (36%).

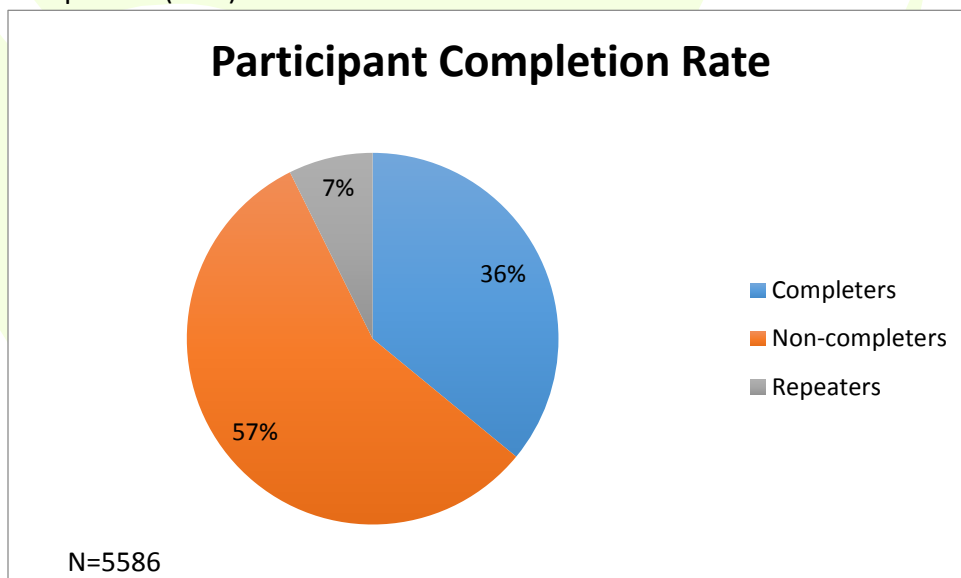


Figure 4: Participant completion rates

Interviews with participants indicated that, out of the 46 total actions selected by these participants, 36 were either successfully completed (for one-time actions) or continued at the time of interview. Thus, only 10 actions were not continued after program completion (or in

some cases non-completion). This large proportion of completed actions held across the three categories of participants (completers, non-completers and re-enrollers).

When asked why they chose to continue their actions, a majority of interviewees cited economic (16) and environmental (13) reasons, but a few cited better health (3) and community reasons (3). Interviews conducted with the GEO-300 course teaching assistants similarly reported that the students continued the actions for environmental and economic reasons.

More than 30% of interview respondents cited that they liked the environmental benefits that came from doing their actions. Interviewees discussed how they enjoyed the motivation to participate in pro-environmental behaviors that the program provided, and felt that this led to additional motivation to complete actions. For example, one participant noted that, “It was something that needed to be done; the program was the impetus to do it.” Another used the program to turn attention towards how consumption may affect the environment: “We banned beef from our home and switched to only organic and farm-raised meat.” Some felt that the program held them accountable for the environment and made them begin to consider how their actions affected the planet: “It was a good time to take an inventory, for global warming, and to do my part to take care of the earth”.

More than 70% of those interviewed noted the economic benefits of program participation, a sentiment represented in all three categories of respondents: program completers, non-completers, and re-enrollers. One interviewee simply wanted to “save money on natural gas,” while another had someone come to tune their furnace and was able to then learn how to clean the filter on their own. This participant is now doing this cleaning monthly to save money. Additionally, a non-completer noted that they continue to use a refillable water bottle on a daily basis in order to save money that would ordinarily be spent on single use bottled water.

Interviewees who received the free light bulbs and aerators were pleased with the support that they got from the program, and the teaching assistants who evaluated the opinions of many students who participated also found that people enjoyed the light bulbs. Three participants directly stated that they liked to know they were saving energy. One noted that as their other light bulbs go out, “I am now consistently switching to energy efficient light bulbs.” Additionally, one interviewee connected the idea of being aware of their energy consumption and its impact on their pocketbook: “I want to be energy conscious, and it saves money.”

Finally, a few interviewees pointed to the feeling of community created by participation as a reason they enjoyed the program. “We feel like we are contributing to carbon reduction and doing what we hope our neighbors would do also.” An interviewee also pointed to the program as similar to a public pledge; and, by signing up for actions, they were “making a public promise” that allowed them to keep the actions in mind. Some felt that energy reduction was a

community enterprise claiming that, “Everyone should do their part to reduce their carbon footprints for the greater good.”

2. Participants are more likely to complete easy, one-time and program-supported actions.

The mean difficulty of the most frequently selected actions is relatively low ($\mu=2.7$, range = {1, 5}). This indicates that participants who complete the program prefer to choose relatively easy actions (Figure 5).

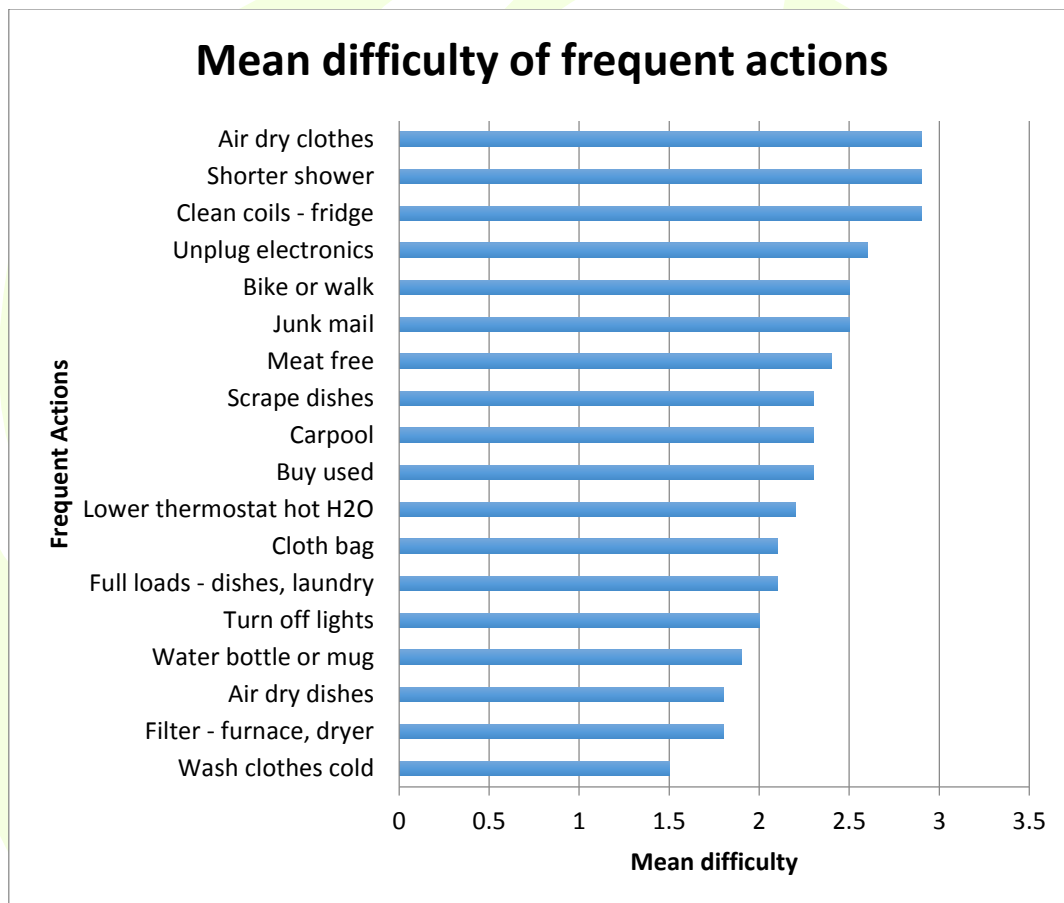


Figure 5 Most commonly selection actions, mean difficulty.

In addition, as described above, interviewees particularly enjoyed receiving program support to complete actions and that influenced their ability to continue selected actions. Can we add some data here from interviews about one-time vs. continued actions.

- Renters, apartment dwellers, females, lower income earners, and those with some college or an associate's degree were significantly more likely to complete and re-enroll in the program.

The relationship between demographics and status of completion as well as re-enrollment was analyzed using the participant information dataset restricted to 2013 (N=2,902). This analysis revealed that both completers and re-enrollers tend to have common characteristics in terms of housing ownership, income levels, gender and education. The data show that renters, apartment dwellers, females, lower income earners, and those with some college or an associate's degree were significantly more likely to complete and re-enroll in the program.¹¹ Figure 6 and Figure 7 show that renters were more likely to complete and re-enroll in the program (response rate=51%). Similarly, other demographic characteristics were analyzed using relevant data which have been explained in detail in Appendix 8.4.

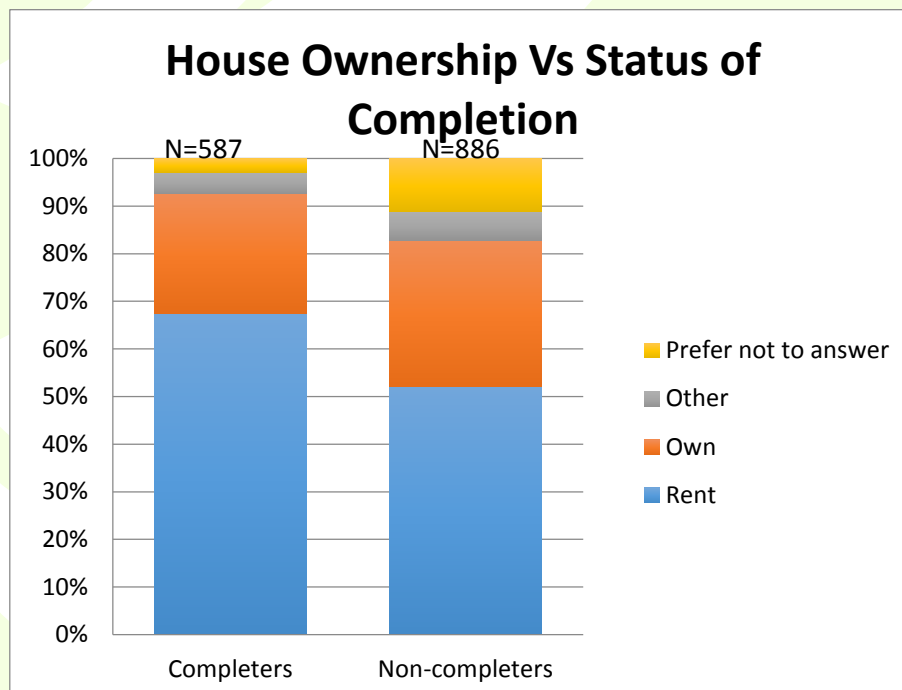


Figure 6 Residence influence on completion

¹¹ T-tests showed a significant difference in demographic characteristics between completers and non-completers ($p < 0.05$) and between enrollers and re-enrollers ($p < 0.1$).

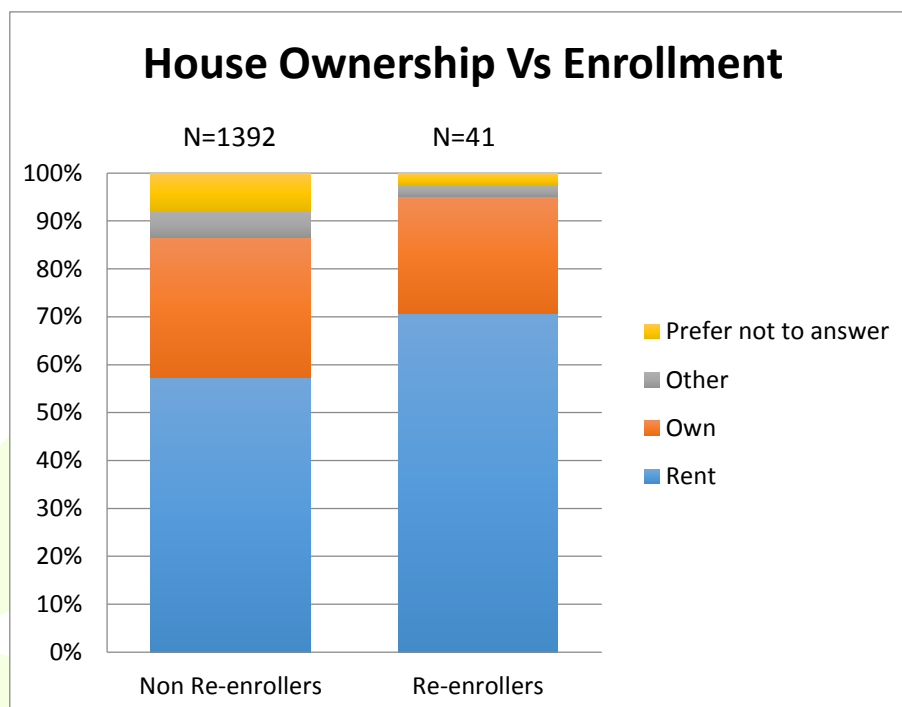


Figure 7 Residence influence on enrollment

4. Providing target support and other forms of motivation to participants is an important component of environmental sustainability programs that focus on behavior change.

Interviews found that targeted support (e.g., bike/bus route maps for those choosing to drive less, meat-free recipes for those choosing to go meat-free), participant recognition, and peer-to-peer competition are more motivating than monetary incentives (e.g., coupons).

Targeted support as a method to encourage participation was a theme that ran across several of our case study programs. The Vermont Home Energy Challenge (VHEC) utilized a program component devoted to best practices for task completion. In addition, VHEC provided supplies for completion (either free of charge or at discounted prices) and small community grants for special projects or for community competitions. The Frederick County Green Challenge (FCGC) also had a substantial targeted support component within its program. A great deal of information on how to complete tasks was accessible to participants, and parties were used to help promote the program and share ideas for task completion. When the FCGC had access to grants and other sources of financial aid, they implemented larger projects with more targeted support, such as refrigerator exchanges and solar panel pushes. Special incentives that were directed at task completion and energy-saving were extremely effective at driving program participation.

Charge Ahead Durham provided support in the form of "freebies". For example, participants were given shower timers and reusable bags to support environmentally sustainable actions. The program asked for the help of local donors and partnered with

local businesses such as a local used book store, where participants' books were sold at discounted prices.

The VHEC also found from exit surveys that offering prizes for the winners of community competitions provided very little incentive to participate. Rather, providing grants and supplies for completion of tasks or other forms of targeted support was found to increase motivation. The FCGC found initiatives or actions that were most successful were those that offered direct support for completion. For example, this ranged from rebates for installation to supplies for completion of actions. This information provides additional confirmation of the interview findings that demonstrate targeted supports more effective than prizes or unconnected incentives.

We also found through our case studies that competition and recognition were often intertwined in community engagement programs and served as an integral component of Community Based Social Marketing. Individuals are motivated to win competitions in order to gain community recognition. Both the VHEC and FCGC found peer-to-peer competition to be a factor in creating a more engaging program. FCGC specifically mentioned the use of "Green Teams" as a way to engage with neighborhoods or communities to foster community engagement. Both programs found that community recognition was superior to prizes, as prizes did not significantly improve the participant's likelihood of completion. FCGC found that awarding prizes publicly was helpful. This was done by holding a yearly banquet which promoted community recognition while marketing the program. Competition between other towns and cities was found to be less effective than smaller recognition-based competition within a community or city.

Charge Ahead Durham gave participants points for completing tasks but did not have a focus on competition. Participants could not see what others had achieved, which caused decreased pressure to compete. In hindsight, Charge Ahead Durham said they would have preferred an increased focus on competition to drive participation.

As discussed above, gamification allows people to interact in a game environment that encourages competition and recognition. WeSpire created a component in their program that allowed operators to determine the different levels of activity. Individuals with high levels of participation received recognition in the form of a personalized letter from the company's director thanking them for their efforts. Individuals with lower levels of participation may receive encouraging remarks or new options for participation. This personalized recognition was found to be very successful in the WeSpire program.

Outside of these personalized recognition methods, WeSpire also rewards participants in the game environment with badges and other gamified icons. When a participant completes a task, they are awarded badges on their profile that display their level of involvement, tying together competition and gamification. Personalized profiles allowed participants to see what actions their peers are completing in the game. In this way, knowing where you stand relative

to others encourages participation. FCGC also uses gamification in the form of icon recognition with the use of online medals and “awards” that were not monetary in value but instead visible to others on the website. These gamified components helped participants already in the program to increase motivation while at the same time encouraged new members to join.

WeSpire provided members with green name tags to be worn in the workplace as a symbol of a high level of participation in the program. Individuals who reached a certain level of activity throughout the program were given special recognition in the form a unique green name tag, acting as a great conversation starter that helped promote WeSpire and instill a sense of pride in individuals.

5. Clear communication and easy access to information are important components of community based environmental sustainability programs, particularly regarding:
 - a. what constitutes program completion;
 - b. community marketing efforts;
 - c. website tailoring of action choices

In terms of clarity in program completion, our case studies of both VCEC and FCGC found that these programs made task completion clear and distinctive in the form an online medal or a mailer of some sort of recognition/reward. The Charge Ahead Durham program plans to have a carefully chosen message to end the program on, which would encourage the ongoing practice of environmental sustainability. They plan to have grand prizes and participant recognition with the conclusion of their program.

Representatives from the VCEC said the most successful communities were ones with groups of community members that clearly communicated program information during recruitment. Certain community members were chosen and trained to communicate program goals and objectives along with information on how to complete program tasks.

In terms of tailoring of action choices, WeSpire divided actions into separate categories of waste, water, and energy reduction but also allows for side actions such as healthy eating and exercise. The amount of waste, water, and energy conserved is allocated in terms of easy to understand images, such as number of bath tubs of water or number of cars taken off the road. By using this method of measurement, WeSpire puts the consequences of participant’s actions into terms that are straightforward and simple to understand. This method of communication was found to be highly effective in motivating individuals to participate in the program.

The FCGC case study demonstrated extremely positive results from the use of a tailored “Actions of the Month” that fit the time of year and the targeted community. This allowed for increased participation, as well as a greater likelihood of completion. Additionally, framing tasks in a way that showed how to save participant’s money or energy was a substantial driver in success. Charge Ahead Durham found that extensive action lists were not as effective as assigning three tasks each week to participants. These tailored tasks focused on three broad

areas of environmental sustainability: energy use, waste management, and water conservation. By tailoring actions in this way, participants were motivated to engage in program actions.

WeSpire tailors its program platform to the needs of specific corporate clients, such as eBay, Unilever, MGM Resorts, Caesars Entertainment, and EMC. Because WeSpire operates in the corporate world, it provides services to a wide range of company interests in order to engage employees. A larger company with multiple offices may wish to have a competitive component in the program platform that promotes office competition.

WeSpire divides different actions in the program platform into multiple levels of difficulty, with the very advanced options hidden from lower level players. The various levels of achievement are displayed on participant's profiles, adding another area for recognition and peer motivation. WeSpire does not specifically offer "actions of the month" but does offer the chance to participate in special events. For example, on Earth Day, a day-long activity was set up for participants to earn points and boost their playing power.

5 RECOMMENDATIONS

1. Clarify and simplify what constitutes program completion, perhaps by separating from the post-completion survey for a more accurate tracking of participants who completed selected actions.

We recommend that Energize Corvallis separate its post-completion survey from a quick-and-easy program component that recognized when individuals complete their selected actions and instantly sends them a confirmation that their commitment has been recognized. This component could track action completion more accurately and would provide a simple and effective tool to supplement the survey instruments for tracking action selection. It would also provide immediate recognition of program completion to participants.

This simple change could be supplemented with an end of year banquet, where participants could be recognized for their achievements. Personalized letters from program directors could also be used to congratulate individuals for their sustainable practices.

2. Provide regular, targeted program support to participants, as well as recognition to those re-enrolling.

Interviewees frequently suggested an increased number of "gentle reminders" from the program concerning what they signed up to do and how they could complete their actions. Interviewees were unclear about what form these reminders should take – they only asserted that they shouldn't have to go to their junk e-mail folder.

The majority of interviewee's ideas centered on fine-tuning the support provided to program participants. Our analysis of survey responses as to why particular actions were difficult also highlighted the importance of targeted information and free giveaways related to

participants' selected actions as important drivers of change. For example, those signing up for cleaning clothes in cold water often cited a difficulty in terms of feeling like clothes were not getting as clean this way. Additional information from the program that demonstrates that you *can* clean clothes thoroughly with cold water would have been beneficial in this case. One interviewee also suggested having established branding and labeling on free products as a means of advertising the program.

3. Encourage peer-to-peer competition to increase enrollment, completion and re-enrollment.

Several interviewees, particularly the class Teaching Assistants (TA's), suggested changes that would promote the gamification of the program (i.e., pitting different Greek houses or neighborhoods/friends against one another, emotional reward system through the website, seasonal challenges, avatars, and user recognition). In addition, as discussed above, our case studies and relevant literature suggest that these are important methods to encourage enrollment, completion and re-enrollment.

4. Enhance branding efforts to ensure community members know the program is focused on encouraging pro-environmental behavior.

Recruitment ideas from interviewees revolved around increased advertising. One suggestion involved advertising on "Beaver's Movie Channel," a 24-hour movie station available to students living in dorms; recruiting through pre-established social networks (e.g., church groups, fraternity/sorority community); and recruiting apartment complex/rental property owners and superintendents as a means of helping renters meet goals. This is well supported both in the best practices of the selected case studies as well as within the literature.

5. The case studies also recommended the practices of competition and partnering with various institutions and social groups. group improve existing efforts to categorize potential actions on the website by using multiple criteria (e.g., renters who would like easy actions), potentially filtering choices by pre-enrollment survey responses. Consider the addition of an "action of the month" that accounts for seasonal variation.

Recruitment ideas from interviewees revolved around increased advertising. One suggestion involved advertising on "Beaver's Movie Channel," a 24-hour movie station available to students living in dorms; recruiting through pre-established social networks (e.g., church groups, fraternity/sorority community); and recruiting apartment complex/rental property owners and superintendents as a means of helping renters meet goals. Community involvement and support is evidenced further in the best practices from the selected case studies, as well as within the literature.

Energize Corvallis could also benefit from the use of a tailored "Actions of the Month" that fit the time of year and the targeted community. This can encourage participation and

increase the likelihood of completion. Additionally, framing tasks in a way that showed how to save participant's money or energy was a substantial driver in success. Energize Corvallis should focus on translating its purpose in a clear message that also communicates the benefits of energy saving behavior in terms of what it can do for participants personally.

6 CONCLUSION

Our evaluation of the Take Charge program provides insight into both its strengths and potential areas of improvement. Our findings reveal that, while the Take Charge program already engages in many of the best practices of similar programs, there are potential low-cost improvements that could be made to improve program completion rates and foster additional behavior change. While this list of recommendations is by no means exhaustive, it provides several courses of action that are likely to improve the impact of the Take Charge program and enhance its scalability to other locations.

6.1 STUDY LIMITATIONS

While the data analyzed in the course of this research was substantial, there were limitations that became apparent as the research concluded. Chief among these concerns was the low response rate for the interviews, which may be due to the transient nature of college communities, but could also be due to unclear communication between the participants and the program managers as to what event constituted program completion. Demographic data on participants was limited to 2013, as the surveys for the Take Charge participants changed that year.

6.2 ACKNOWLEDGEMENTS

We would like to specially thank the Energize Corvallis Program Coordinator, Carly Lettero, Graduate Assistant Dylan Bugden, and Dr. Hilary Boudet, who directed the Sociology 519 graduate students through the analysis and evaluation process. Further thanks to the interviewees from the Take Charge program and the coordinators and directors from the various case study interviews, as this process could not have been completed without their generous help.

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8 APPENDICES

8.1 SELECTED PROGRAM INTERVIEWEE INFORMATION

Date	Program Name	Interviewee	Interview Length (min)	Contact Information
5/14/2014	Vermont Home Energy Challenge	Paul Markowitz	25	(802) 279-8544, pmarkowitz@veic.org
5/16/2014	Fredericks County Green Challenge	Linda Orr	45	(301) 600-6864, LOrr@frederickcountymd.gov
5/9/2014	WeSpire	Holly Battelle	39	holly.battelle@wespire.com
5/27/2014	Opower	Kari	9	703 778 4544
5/27/2014	Pacific Power	Clint	16	1-888-221-7070
5/29/2014	Charge Ahead Durham	Megan Carroll	28	mcarroll@dconc.gov

8.2 ENVIRONMENTAL SUSTAINABILITY PROGRAMS

Program Title	General Description	Location	Website
Eco Reps	Campus P2P	Upenn	http://www.upenn.edu/sustainability/programs/eco-reps
Eco Reps	Campus P2P	Upenn	http://www.upenn.edu/sustainability/programs/
Eco Reps	Campus P2P	Babson College	http://www.babsonsustainability.blogspot.com/
Eco Reps	Campus P2P	UWM – Burlington	http://www.uvm.edu/ecoreps/
Eco Reps	Campus P2P	Various Locations	http://www.aashe.org/resources/peer-peer-sustainability-outreach-campaigns
Ways to Save, Burlington	Consumer Behavior	Burlington, VT	http://www.waytosaveburlington.com/ , Contact City of Burlington, WI https://www.youtube.com/watch?v=uYtYJdftDLM
Solarize Portland	Solar Volume Purchasing	Portland, OR	http://www.portlandoregon.gov/bps/article/405686

S3C	End-User Behavior	Europe	http://www.s3c-project.eu/
Fort Collins, Muni	Muni Supported Efficiency Programs	Fort Collins, CO	http://swenergy.org/publications/documents/EE_at_Fort_Collins_Utilities_Feb_2013.pdf , http://www.fcgov.com/utilities/sustainability-leadership/what-were-doing
Cambridge Energy Alliance	comprehensive carbon reduction program	Cambridge, MA	http://cambridgeenergyalliance.org/residents
San Diego Energy Challenge	Energy Saving Competition	San Diego, CA	https://www.sdenergychallenge.com , defunct would have to call...
Simple Energy	Company	n/a	http://www.simpleenergy.com
Opower Energy Efficiency	Company	n/a	http://opower.com/solutions/energy-efficiency
myPower, Berkeley	Campus Initiative	Berkeley, CA	http://sustainability.berkeley.edu/mypower
Vermont Home Energy Challenge	Statewide Challenge	Vermont	https://www.encyvermont.com/for-our-partners/Community-Partners/Vermont-Home-Energy-Challenge/Town-Participation
Change Our 2morrow	School-sponsored Initiative	Nationwide	https://alcoa.c2es.org/challenge
Energy Impact Illinois	Energy Efficiency Program	Illinois	http://energyimpactillinois.org/residential/?reload=y
Boulder EnergySmart	Energy Efficiency Program	Boulder, CO	https://bouldercolorado.gov/pages/energysmart-for-residents
Denver Energy Challenge	Energy Efficiency Program	Denver, CO	http://www.denverenergy.org
Sustainability at UTC Building and Industrial Systems	environmental sustainability program	National	http://www.naturalleader.com/
Noresco United Technologies	environmental sustainability program	National	http://www.noresco.com/behavior.html
Greenovate Boston	environmental sustainability program	Boston	http://greenovateboston.org/
Behavior based energy efficiency (BBEE) programs	environmental sustainability program	National	http://www.bpa.gov/energy/n/behavior.cfm

American Council for an Energy-efficient economy	environmental sustainability program	National	http://www.aceee.org/about/programs/behavior
Consortium for Energy Efficiency	environmental sustainability program	National	http://www.cee1.org/content/who-we-are
City of Santa Cruz GreenFocus	environmental sustainability program	Santa Cruz, California	http://www.cityofsantacruz.com/index.aspx?page=1544
Green Homes Challenge	environmental sustainability program	Frederick, Maryland	https://www.frederickgreenchallenge.org
Green Outlet App	environmental app	National	http://www.keylime314.com/page5/index.html
greenMeter App	environmental app	National	http://hunter.pairsite.com/greenmeter/
Light Bulb Finder App	environmental app	National	http://www.lightbulbfinder.net/
Sustainable Connections	environmental sustainability program	Bellingham, Washington	http://sustainableconnections.org/energy/energychallenge/copy_of_residential
Texas' Biggest Energy Saver Competition	Energy Savings Competition	Texas	http://www.biggestenergysaver.com/
Leaffully	environmental sustainability program	National	https://leaffully.com/
Greenbean recycle	environmental sustainability program	National	https://www.gbrecycle.com/
WeSpire	environmental sustainability program	International	http://www.wespire.com/
MyEnergy	environmental sustainability program	National	https://www.myenergy.com/
Charge Ahead Durham	environmental sustainability program	Durham, North Carolina	http://www.chargeaheaddurham.org/
OmPower	energy management software	global	http://opower.com/
Green Button	utility partnership	national	http://www.greenbuttondata.org/
Ecodog	energy management software	San Diego, CA	http://ecodoginc.com/ecodog/contact.htm

Planet Ecosystems	energy management software	San Francisco	http://planetecosystems.com/
Weatherbug	energy management software	Germantown, MD	http://weatherbughome.com/
Pacific Gas and Electric Company	utility partnership	California	http://www.pge.com/myhome/addservices/moreservices/greenbutton/
Connecticut Light and Power	utility partnership	Connecticut	http://www.pge.com/myhome/addservices/moreservices/greenbutton/
Pacific Power	utility partnership	Oregon	https://www.pacificpower.net/greenbutton
Nest	energy management software	National	https://nest.com/
Bidgely	energy management software	National	https://www.bidgely.com/
Plotwatt	energy management software	National	https://plotwatt.com/
Cornell Sustainability	Campus/Community CBM	Ithaca, NY	http://www.sustainablecampus.cornell.edu
Sustainability at Chico,	Campus/Community CBM	Chico, CA	http://www.csuchico.edu/sustainability/
EDIS, University of Florida	Campus/Community CBM	Gainesville, FL	http://edis.ifas.ufl.edu

8.3 CASE STUDY SURVEY INSTRUMENT

- 1) In your opinion, what were the goals of the program?
 - Note: We are trying to get at if they think their program is successful. If they don't go into detail in their responses:
 - a) What do you feel were the most important goals?
 - b) Do you feel that you met the goals?
- 2) In your opinion what strategies did the program use to change behavior?
 - Note: Question may change slightly depending on the type of program. If they don't go into detail in their responses:
 - a) What strategies worked best?
- 3) What do you think were the strengths of the program?
- 4) Do you think there are areas for improvement?
 - a) Lessons learned?
- 5) Have you done any program evaluation?

- a) Did you collect any feedback from participants?
- b) Did the feedback align with your views of the program?

8.4 DIFFICULTY LEVELS OF MOST COMMONLY SELECTED ACTIONS

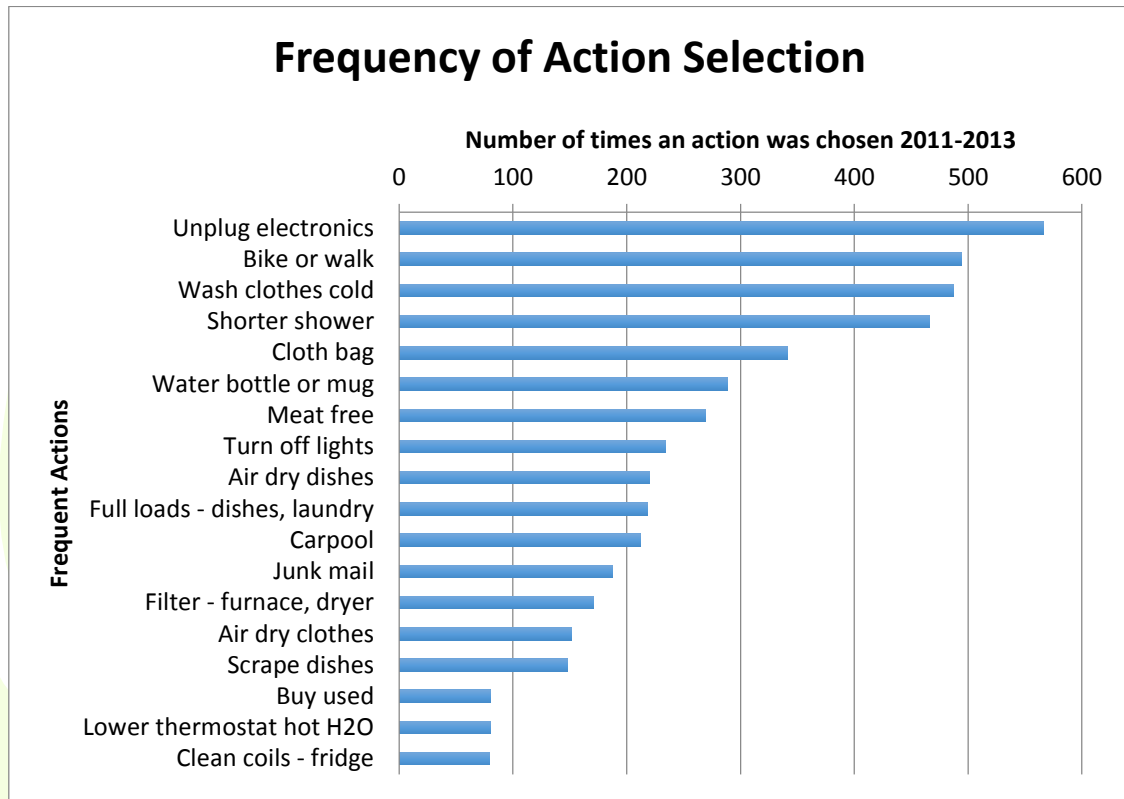


Figure 8 Most commonly selected actions

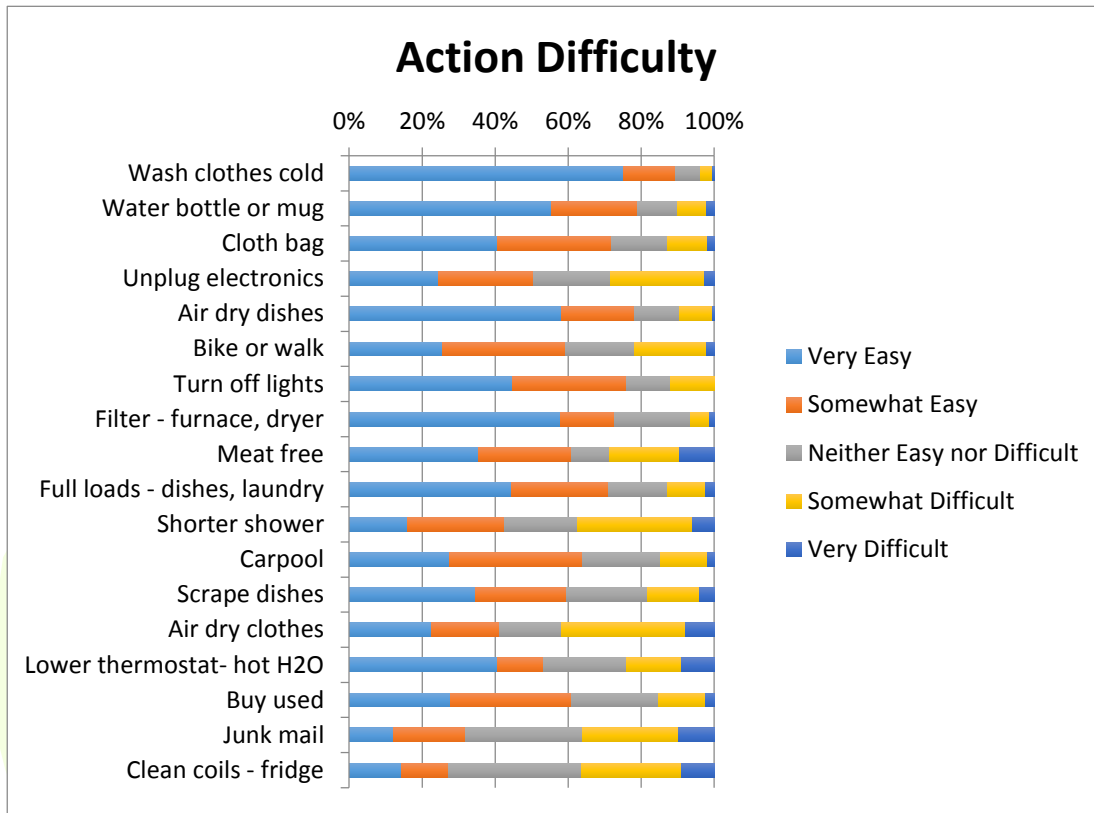


Figure 9 Post-completion reported difficulty for most commonly selected actions.

The graph above shows the most frequently chosen actions and their respective levels of mean action difficulty as perceived by the participants. The actions ranked highest as “very easy” include: washing clothes in cold water, air drying dishes, replacing filters in furnace/dryer, and using a reusable water bottle/mug. The actions ranked highest as “very difficult” include: cleaning coils, lowering the thermostat, removing junk mail, and going meat free occasionally.

Action	Frequency	Example
Action specific	211	lack of items, more information
Inconvenience	185	air dry clothes, refrigerator coils
Forgot	144	unplug electronics, less meat
Weather	41	air dry clothes, bike or walk
Roommates	19	turn off lights, wash full loads

Table 2 Coding of open-ended survey responses regarding why actions are difficult

Action	Theme 1	Theme 2	Theme 3	Theme 4	Theme 5
Unplug electronics	Forgot/Habit	Inconvenience			
Bike or walk	Weather	Inconvenience	Bike broken	Carry items	Hills and darkness
Clothes cold water	Forgot/Habit	Not clean enough	Stains		
Shorter showers	Feels good	Already do this	Time to clean/shave		
Cloth bag	Forgot	Inconvenience	Don't have		
Water bottle	Forgot/Habit	Inconvenience			
Less meat	Forgot/Habit	Inconvenience	Meals prepped for me	Few options	
Turn off lights	Forgot/Habit	Roommate Interference			
Dishes air dry	Inconvenience	Manually stop cycle	Roommate Interference		
Wash full loads	Roommate Interference	Inconvenience	Gross	Run out of items	Appliance inefficient
Carpool	Inconvenience	Schedule			
Junk mail	Inconvenience	Forgot	It didn't work	Social Security Number	No contact info
Replace filters	Inconvenience				
Clothes air dry	Inconvenience	Weather	Limited space, no drying rack	Do not fully dry	
Scrape food	Forgot/Habit	Inconvenience	Gross	Hard to clean	
Buy used	Few options	Lack of quality	Costly		
Thermostat hotH2O	Not allowed; rents	Inconvenience	Don't know how		
Clean fridge coils	Inconvenience				

Table 3 Five most common themes per action, including action-specific responses

8.5 PARTICIPANT DEMOGRAPHICS AND COMPLETION

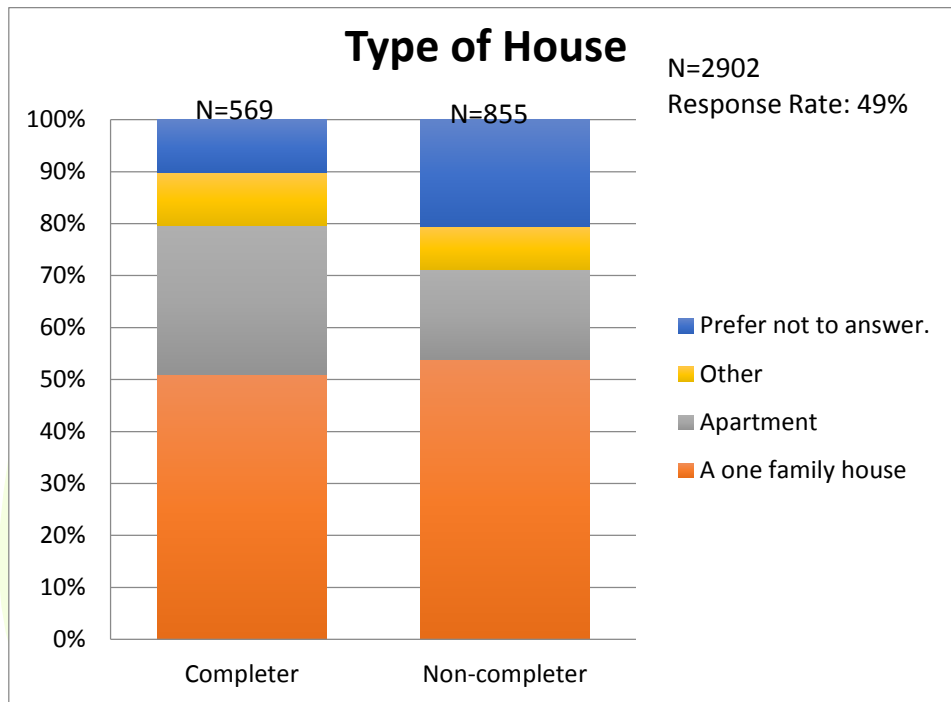


Figure 10 Housing Demographics

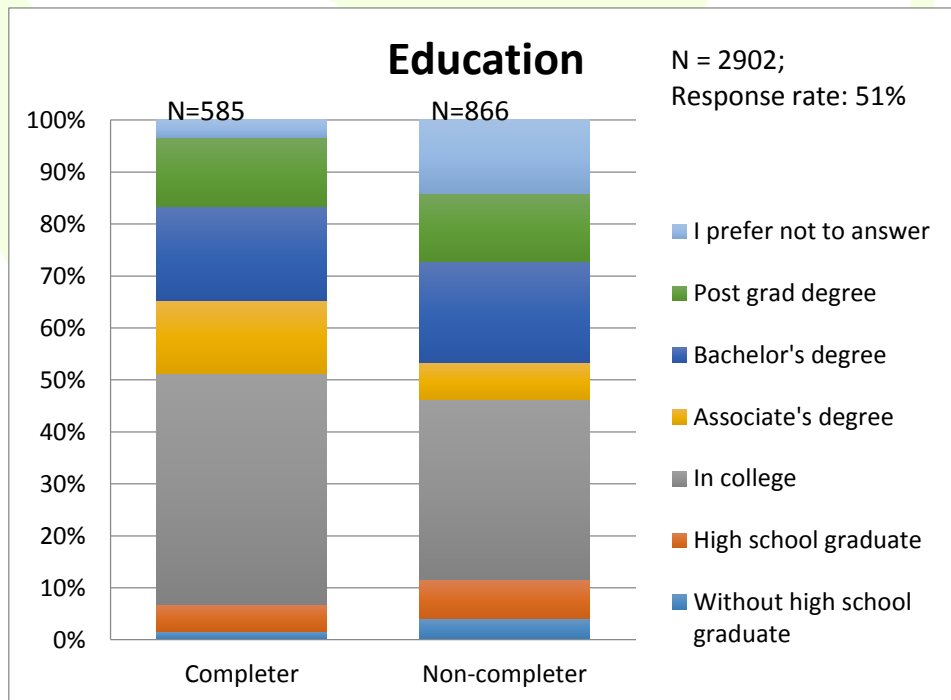


Figure 11 Education Demographics

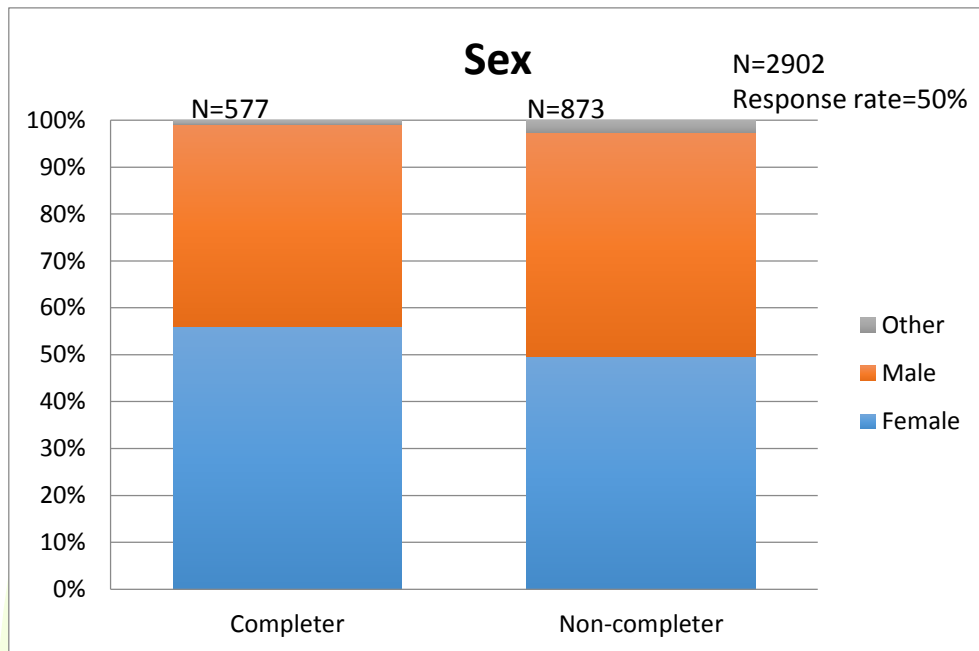


Figure 12 Gender demographics

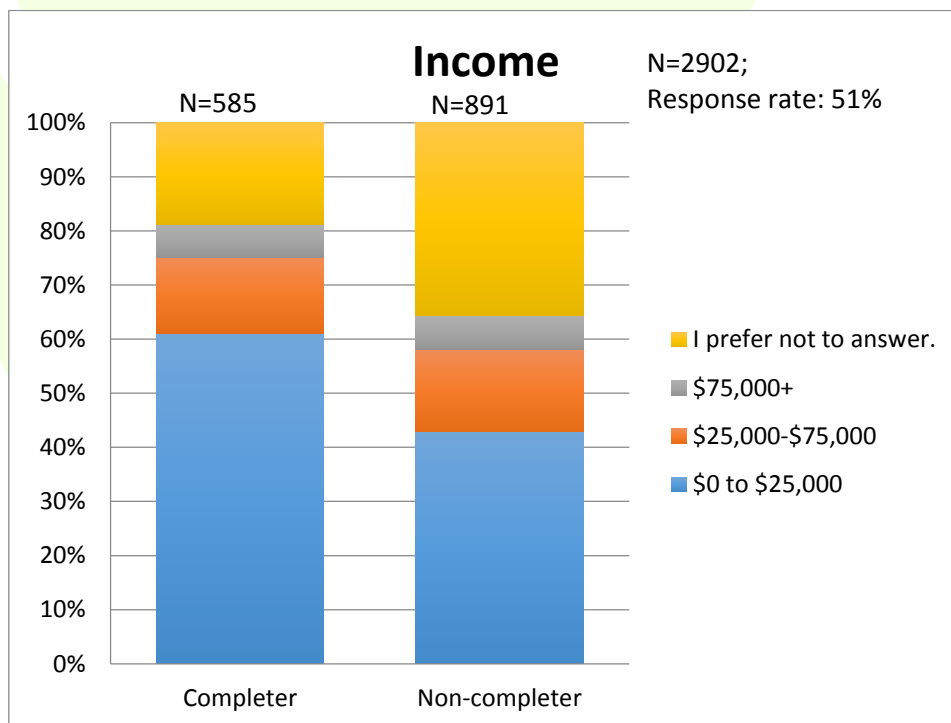


Figure 13 Income demographics

8.6 INTERVIEW SURVEY INSTRUMENTS

(Interview questions in normal typeface, instrument branching and coding in italics, probing questions or explanatory dialogue in bold)

“Completer”

1. How did you first hear about Communities Take Charge?

Someone came to my house, Online, Community events, In a class, Other

2. Why did you decide to sign up for Communities Take Charge?

Environmental reasons Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

I see that you selected the following energy-saving actions; (1), (2), and (3). I'm going to ask you a few question about those actions.

3a. Did you continue [Action 1] after the one-month program period? If so, for how long? *(If they did not continue, go to A. If they continued, go to B)*

Yes, No,

If Yes, How long?

3b. *[If they stopped]* What made it difficult to continue the action?

Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns, Did not have a good understanding of how to complete action, Difficulty with communication methods, Don't know, Other

3c. Is there anything that could be changed about the program that would make [Action 1] Easier in the future? * **Probe:** What would that change be?

3d. *[If they continued:]* What made it worthwhile to continue the action?

Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

3e. Was there anything about your involvement with Communities Take Charge that made [Action 1] easier? *(Free answer)*

4. Did you continue [Action 2] after the one-month program period? If so, for how long? *(If they did not continue, go to A. If they continued, go to B)*

Yes, No,

If Yes, How long?

- 4A-1. [If they stopped] What made it difficult to continue the action?
Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns, Did not have a good understanding of how to complete action, Difficulty with communication methods, Don't know, Other
- 4A-2. Is there anything that could be changed about the program that would make [Action 2] Easier in the future? * **Probe:** What would that change be?
- 4B-1. [If they continued] What made it worthwhile to continue the action?
Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other
- 4C. Was there anything about your involvement with Communities Take Charge that made [Action 2] easier? (Free answer)
5. Did you continue [Action 3] after the one-month program period? If so, for how long? (If they did not continue, go to A. If they continued, go to B)
Yes, No,
If Yes, How long?
- 5A-1. [If they stopped] What made it difficult to continue the action?
Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns, Did not have a good understanding of how to complete action, Difficulty with communication methods, Don't know, Other
- 5A-2. Is there anything that could be changed about the program that would make [Action 3] Easier in the future? * **Probe:** What would that change be?
- 5B-1. [If they continued] What made it worthwhile to continue the action?
Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other
- 5C. Was there anything about your involvement with Communities Take Charge that made [Action 3] easier? (Free answer)
6. How do you think we could encourage more people to complete the exit survey?
7. If you were directing Communities Take Charge, how would you encourage more people to participate in the program multiple times?
8. Is there anything we haven't discussed that you liked about the program?
9. If you were the Director of Communities Takes Charge, what would you do to improve it?

"Re-Enroller"

3. How did you first hear about Communities Take Charge?

Someone came to my house, Online, Community events, In a class, Other

4. Why did you decide to sign up for Communities Take Charge?

Environmental reasons Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

I see that you selected the following energy-saving actions; (1), (2), and (3). I'm going to ask you a few question about those actions.

3a. Did you continue [Action 1] after the one-month program period? If so, for how long? *(If they did not continue, go to A. If they continued, go to B)*

Yes, No,

If Yes, How long?

3b. *[If they stopped]* What made it difficult to continue the action?

Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns, Did not have a good understanding of how to complete action, Difficulty with communication methods, Don't know, Other

3c. Is there anything that could be changed about the program that would make [Action 1] Easier in the future? * **Probe:** What would that change be?

3d. *[If they continued:]* What made it worthwhile to continue the action?

Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

3e. Was there anything about your involvement with Communities Take Charge that made [Action 1] easier? *(Free answer)*

4. Did you continue [Action 2] after the one-month program period? If so, for how long? *(If they did not continue, go to A. If they continued, go to B)*

Yes, No,

If Yes, How long?

4A-1. *[If they stopped]* What made it difficult to continue the action?

Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns,

*Did not have a good understanding of how to complete action,
Difficulty with communication methods, Don't know, Other*

4A-2. Is there anything that could be changed about the program that would make [Action 2] Easier in the future? * **Probe:** What would that change be?

4B-1. *[If they continued]* What made it worthwhile to continue the action?
Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

4C. Was there anything about your involvement with Communities Take Charge that made [Action 2] easier? *(Free answer)*

5. Did you continue [Action 3] after the one-month program period? If so, for how long? *(If they did not continue, go to A. If they continued, go to B)*
Yes, No,
If Yes, How long?

5A-1. *[If they stopped]* What made it difficult to continue the action?
Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns, Did not have a good understanding of how to complete action, Difficulty with communication methods, Don't know, Other

5A-2. Is there anything that could be changed about the program that would make [Action 3] Easier in the future? * **Probe:** What would that change be?

5B-1. *[If they continued]* What made it worthwhile to continue the action?
Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

5C. Was there anything about your involvement with Communities Take Charge that made [Action 3] easier? *(Free answer)*

6. How do you think we could encourage more people to complete the exit survey?
7. If you were directing Communities Take Charge, how would you encourage more people to participate in the program multiple times?
8. Is there anything we haven't discussed that you liked about the program?
9. If you were the Director of Communities Takes Charge, what would you do to improve it?
"Non-Completer"

1. How did you first hear about Communities Take Charge?
Someone came to my house, Online, Community events, In a class, Other

2. Why did you decide to sign up for Communities Take Charge?

Environmental reasons Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

I see that you selected the following energy-saving actions; (1), (2), and (3). I'm going to ask you a few question about those actions.

3a. Did you continue [Action 1] after the one-month program period? If so, for how long? *(If they did not continue, go to A. If they continued, go to B)*

Yes, No,

If Yes, How long?

3b. *[If they stopped]* What made it difficult to continue the action?

Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns, Did not have a good understanding of how to complete action, Difficulty with communication methods, Don't know, Other

3c. Is there anything that could be changed about the program that would make [Action 1] Easier in the future? * **Probe:** What would that change be?

3d. *[If they continued:]* What made it worthwhile to continue the action?

Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

3e. Was there anything about your involvement with Communities Take Charge that made [Action 1] easier? *(Free answer)*

4. Did you continue [Action 2] after the one-month program period? If so, for how long? *(If they did not continue, go to A. If they continued, go to B)*

Yes, No,

If Yes, How long?

4A-1. *[If they stopped]* What made it difficult to continue the action?

Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns, Did not have a good understanding of how to complete action, Difficulty with communication methods, Don't know, Other

4A-2. Is there anything that could be changed about the program that would make [Action 2] Easier in the future? * **Probe:** What would that change be?

4B-1. *[If they continued]* What made it worthwhile to continue the action?

Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

4C. Was there anything about your involvement with Communities Take Charge that made [Action 2] easier? *(Free answer)*

5. Did you continue [Action 3] after the one-month program period? If so, for how long? *(If they did not continue, go to A. If they continued, go to B)*

Yes, No,

If Yes, How long?

5A-1. *[If they stopped]* What made it difficult to continue the action?

Didn't feel like it, Forgot, Can't make a difference through individual actions, Don't think energy saving is important, Do not like to be contacted, Too busy, Too challenging, Confused, Financial concerns, Did not have a good understanding of how to complete action, Difficulty with communication methods, Don't know, Other

5A-2. Is there anything that could be changed about the program that would make [Action 3] Easier in the future? * **Probe:** What would that change be?

5B-1. *[If they continued]* What made it worthwhile to continue the action?

Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Sounded fun, Wanted a challenge, Don't know, Other

5C. Was there anything about your involvement with Communities Take Charge that made [Action 3] easier? *(Free answer)*

6. What is the main reason you chose to do the program more than once?

Environmental reasons, Community reasons, Economic reasons, Social pressure, Marketing/Campaigns, Incentives, Something to do, Had fun the first time, Wanted a different challenge, Don't know, Other

7. Is there anything we haven't discussed that you liked about the program?

8. If you were the Director of Communities Takes Charge, what would you do to improve it?

More Marketing/Campaigns, Increase Incentives, More actions, Other