DOCKETED

Docket Number:	16-OIR-02
Project Title:	SB 350 Barriers Report
TN #:	211049
Document Title:	Saving Energy with Neighborly Behavior: Energy Efficiency for Multifamily Renters and Homebuyers
Description:	From the abstract: "The focus of this report is on tenants -- who are often low-income 00 living in multifamily buildings that operate energy efficiency programs. However, we also were interested in seeing if any programs use similar tactics to target people who own their homes, either units in multifamily buildings or single-family houses. Therefore we focused on three groups: public housing authorities, community development organizations with multifamily housing portfolios, and counseling programs for first-time homebuyers. In this report we assess the key features of existing programs and make recommendations for improvements, both things that housing providers and advocates can use immediately and a wish list for the future. Finally, we include a framework of ideas for program administrators to consider when developing a behavior program in multifamily housing for the first time.
Filer:	Chris Wymer
Organization:	American Council for an Energy-Efficient Economy
Submitter Role:	Public
Submission Date:	4/14/2016 1:03:31 PM
Docketed Date:	4/14/2016

Saving Energy with Neighborly Behavior: Energy Efficiency for Multifamily Renters and Homebuyers

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May 2014

An ACEEE White Paper

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Acknowledgments

The authors would like to thank NeighborWorks for their assistance with this survey and for providing a wealth of information about the homebuyer education and counseling process. We would also like to thank Eric Mackres and Kate Johnson at ACEEE for reviewing this paper. Finally, thank you to Fred Grossberg, our editor, for his help with the editing and review process, and to Kate Hayes for a thorough final copy edit.

Abstract

Tenant engagement programs encourage the people who live in a multifamily property to change their behavior in order to achieve a goal. These programs are an attractive option for owners or managers who want to improve energy efficiency. They complement traditional programs that rely on equipment installations and upgrades to the physical building, and they can lead to significant energy savings even when managers cannot take traditional measures. A well-designed energy efficiency tenant engagement program can achieve an energy-use target relatively inexpensively while promoting a pro-environment attitude among tenants and minimizing the temporary displacement that is often necessary while new equipment is installed. However, tenant engagement programs are not always designed in a way that is consistent with the most recent research findings in behavioral science, sometimes resulting in disappointing participation rates and energy savings.

In late 2013 and early 2014, the American Council for an Energy-Efficient Economy (ACEEE) conducted a series of surveys and interviews to examine the current landscape of tenant engagement programs in the United States. The focus of this report is on tenants—who are often low-income—living in multifamily buildings that operate energy efficiency programs. However, we also were interested in seeing if any programs use similar tactics to target people who own their homes, either units in multifamily buildings or single-family houses. Therefore we focused on three groups: public housing authorities, community development organizations with multifamily housing portfolios, and counseling programs for first-time homebuyers. In this report, we assess the key features of existing programs and make recommendations for improvements, both things that housing providers and advocates can use immediately and a wish list for the future. Finally, we include a framework of ideas for program administrators to consider when developing a behavior program in multifamily housing for the first time.

Introduction

There are two main ways to save energy in a multifamily housing property. The first is to make changes to the physical environment through capital investments. These may involve relatively straightforward measures like installing LED light bulbs in common areas, or they may be more ambitious projects such as installing energy-efficient appliances or upgrading to windows with a high efficiency rating. The advantage of such physical improvements is that program administrators can clearly see their impacts. There is an obvious before and after, and the resulting energy savings are relatively easy to predict and document. The disadvantage is that improvements like these can be expensive and inconvenient, and the deeper retrofits are especially hard to justify if property managers have already taken the most straightforward measures. Is there room in the budget to spend thousands of dollars more—and potentially displace residents while installations take place—in order to get further reductions?

The second strategy involves changing the behavior of building staff and residents. Behavior change can significantly increase the energy savings in multifamily buildings. This was the conclusion of a 2010 report by the American Council for an Energy-Efficient Economy (ACEEE) that looked at more than 60 studies on giving feedback to residential customers (primarily in single-family homes) on their energy use, comparing their consumption to others, and offering them strategies to save energy (Erhardt-Martinez et al. 2010). Typical savings were 4–12%, depending on the approach used. We have found that behavioral strategies often appeal to program administrators because they offer a good deal of bang for the buck. Since they are relatively inexpensive compared to capital improvements, they are particularly attractive to public housing administrators and other affordable housing providers who often find funding to be a challenge.

Yet despite the lower cost, programs aimed at convincing tenants to change their behavior need a carefully crafted strategy if they are to be cost effective and save energy (or water, or waste, depending on the focus of the program). Pamphlets and signs encouraging behavior change may be inexpensive, but this type of information campaign does not result in substantial behavioral changes (Costanzo et al. 1986). Successful behavior programs use insights from social science research to produce better results than traditional campaigns. For example, they may make use of drivers like social norms, whereby individuals are motivated to change based on a perception that their peers are doing the same thing.

A substantial percentage of Americans live in multifamily buildings. According to the American Community Survey, over 17% of all occupied housing units are found in buildings of at least five units. Over 42% of renters live in buildings with five or more units (United States Census Bureau 2012). Energy efficiency programs aimed at people who live in multifamily buildings could lead to substantial energy savings.

Most studies of residential energy efficiency focus on single-family homes and on retrofits done by owners, not renters. This report addresses the research gap on actions that can be taken by renters in multifamily buildings. Its audience includes housing managers, advocates, program administrators, and others working in the affordable housing arena. It assesses existing programs and makes recommendations for improving them, both things that housing advocates can act on immediately, and a wish list for the future. It also includes a framework for program

administrators to consider when developing a behavior program in multifamily housing for the first time.

Methodology

This project began in the fall of 2012. ACEEE was working on a tenant behavior pilot project proposal addressing energy savings in multifamily housing and needed to have a better understanding of how energy efficiency was already being addressed in this sector. We asked approximately two dozen affordable housing providers to participate in a survey regarding their current energy efficiency programs. We collected, compiled, and analyzed the data from this survey for our own use, but as requests for our findings came in from other housing advocates, we realized this project needed to be formalized for public consumption.

Between late 2013 and early 2014, therefore, ACEEE conducted a more extensive series of surveys and interviews to examine tenant engagement programs in the United States. We surveyed three groups: public housing authorities, community development organizations with multifamily rental portfolios, and counseling programs for first-time homebuyers. The focus of this current report is on tenants (who are often low-income) living in multifamily buildings that operate energy efficiency programs. However, we were also interested in seeing if any programs used similar tactics to target homeowners, whether their homes were units in multifamily buildings or single-family houses.

Our findings are based on two surveys we designed for two separate groups: multifamily affordable rental providers, and homebuyer education and counseling programs. We also administered the former survey to the tenant engagement program managers who had participated in our 2012 study. We originally intended to report the results from this subgroup separately, but we eventually combined them with the rental providers' results. Additionally, we supplemented our research with a series of phone interviews, primarily focusing on public housing administrators. These interviews gave us a more nuanced understanding of the challenges and concerns associated with energy efficiency in public housing. All survey questions are included in the Appendix.

Figure 1 shows the locations of the organizations that responded to our surveys. Because of privacy concerns, some respondents—particularly public housing authorities—asked us not to identify their organization by name or location, so we omitted these programs from the map.

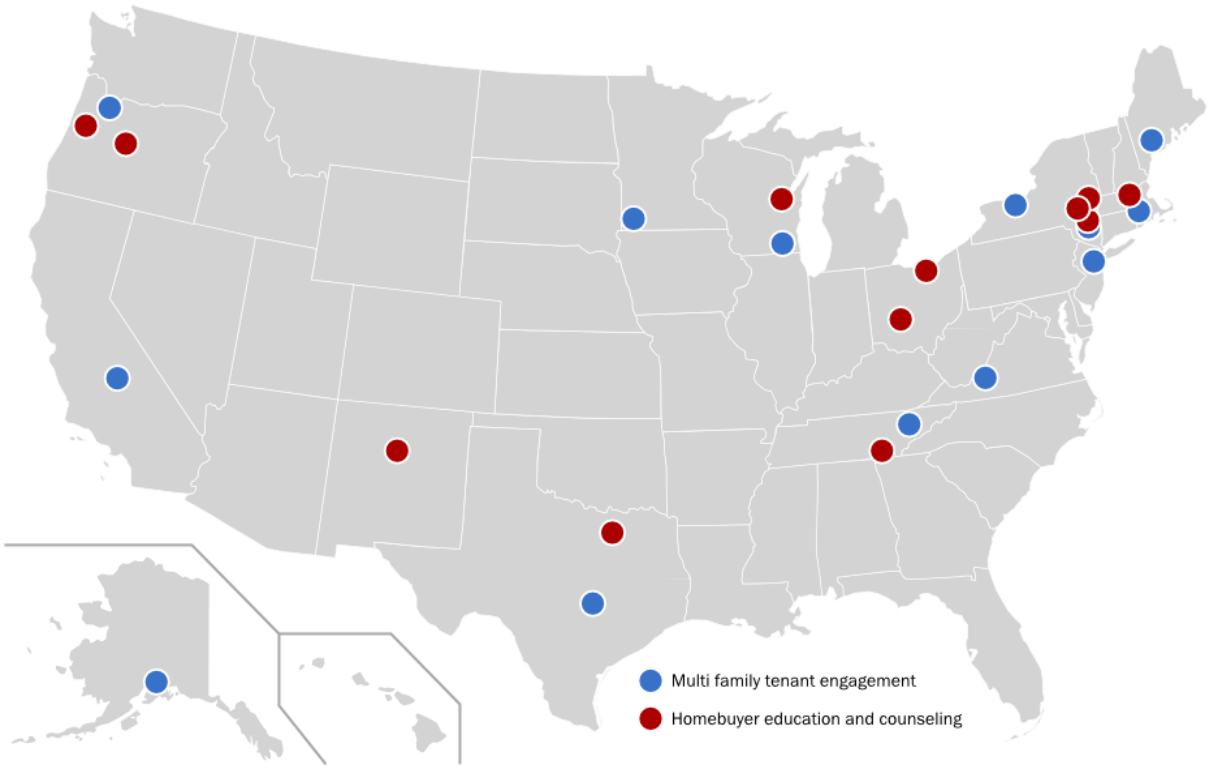

Figure 1. Locations of surveyed programs

The programs are distributed across the United States, with an area of denser concentration in the Northeast. Most climate zones are represented, from subarctic Anchorage, Alaska, to humid Austin, Texas, and many places in between. Programs operating in different climate zones have different challenges to consider, such as the necessity of air-conditioning (opening a window becomes less feasible with 80% relative humidity) or needing to heat buildings over long, severe winters.

Types of Behavior Programs

The people who are responsible for developing tenant engagement programs are often managers with a great deal of expertise in housing issues, but they are usually not familiar with behavioral science or energy efficiency. It is worth noting that people who work for organizations that provide housing assistance often have a background in social work and are therefore familiar with many social science concepts, but behavioral science is a separate, specific discipline. In this paper, we look at existing programs in light of the most current findings on effective behavior change programs. This section is intended to provide an overview of concepts that we will refer to throughout the paper.

There are three general categories of behavior programs:

- *Cognition*. These programs are primarily about conveying information to a particular audience. These efforts can be general, such as a billboard advertisement, or targeted to

an individual or group through such avenues as direct mail. Education and training programs also fall into this category.

- *Calculus*. These programs emphasize extrinsic benefits to program participation, such as financial incentives. The incentives can be part of the program, such as a prize or rebate, or derive from energy savings resulting from home energy audits, feedback programs, or energy-efficient appliance installations.
- *Social interaction*. These programs rely on the human desire to be social and to fit in with a group. Social interaction programs often promote peer-to-peer interactions through "eco teams" or peer representatives. (Mazur-Stommen and Farley 2013)

An ideal tenant engagement program would combine elements from the cognition, calculus, and social interaction categories. It would provide information about what energy efficiency is and how it can be accomplished, emphasize the benefits that individual tenants would see from engaging in energy-efficient behaviors, and create a community standard in which such behaviors are perceived to be the norm.

What Makes a Good Program?

Historically, the most common models of energy efficiency behavior change have been the attitude-behavior and rational-economic models. The attitude-behavior model assumes that people with positive attitudes toward energy efficiency will naturally gravitate toward energy-efficient behavior whenever possible. The rational-economic model is essentially the assumption that underlies all of classical economics—that people will always act rationally to maximize their economic well-being (Costanzo et al. 1986). By providing information about why energy efficiency is important and how people can benefit financially from it, the attitude-behavior model and the rational-economic model predict that people will respond by naturally engaging in energy-efficient behavior. If those two models hold true, it follows that the most effective method for causing behavior change should be the mass information campaign, a cognition program type.

Despite much promising research into how to leverage human behavior to effect changes in energy consumption, a 2000 ACEEE review found that from the 1970s through the 1990s, the default technique was a mass information campaign that often went unevaluated. "This reflects the assumption that information given is information received" (Egan 2000).

Evidence now suggests that neither the attitude-behavior model nor the rational-economic model adequately describes how behavior change actually happens. Several studies have shown that even people who are pro-environment and know about appropriate actions rarely change their behavior accordingly (McKenzie-Mohr 2000). Over the past several decades, entities including the federal government, various electric utilities, and nonprofit organizations have spent millions of dollars on information campaigns related to energy efficiency. Despite all of these efforts, the frequently cited "efficiency gap" (the gap between energy efficiency potential and actual energy efficiency measures) remains (e.g., Granade et al. 2009). Many of the factors contributing to the efficiency gap at the level of utilities and public policy go beyond the scope of what we discuss here. However it is clear that one cause of the gap is the fact that many people do not change their behavior in response to information campaigns the way program designers may have hoped or expected.

Historically, energy efficiency program designers often overlooked social interaction programs. In recent years, new theories of effective methods of behavior change have begun to emerge. One of the most compelling is community-based social marketing (CBSM). CBSM has a long history in public health and international development, but it began to get increased attention as a tool for promoting pro-environmental behavior after Doug McKenzie-Mohr published *Promoting a Sustainable Future: An Introduction to Community-Based Social Marketing* (1996). CBSM relies on research to identify barriers to and benefits of desired outcomes, enabling program designers to develop strategies that are relevant and appropriate to target populations. The first step in designing a CBSM project is to conduct research among the target audience, often through interviews or surveys. That way program designers can learn about the audience's beliefs, concerns, and values that program designers may have otherwise overlooked. For example, a property manager might turn to CBSM if he or she has been having trouble convincing tenants to turn out the lights when they leave their units. Through interviews, the manager learns that many tenants keep their lights on for safety reasons. With this knowledge, the manager can take tenant safety concerns into account to design a more effective program.

Results

The survey results include information from both the multifamily housing provider survey and the homebuyer education and counseling survey. We begin by looking at the characteristics of the properties where the programs are implemented, the size of the programs, and the demographics of the target population. Second, we look at how program managers designed their programs and which resources they used. Finally, we consider the structure and content of the programs themselves.

For our homebuyer education and counseling survey, we had a total of 15 respondents, and for the multifamily rental housing provider survey, we had 17 respondents. It is important to note that these surveys are not intended to be exhaustive or statistically significant, but to provide a qualitative look at the current state of multifamily energy efficiency programs.

Program Size and Scope

Tenant Engagement Programs

Most energy efficiency tenant engagement programs that we surveyed operate in properties that target low-income residents, as indicated in figure 2.

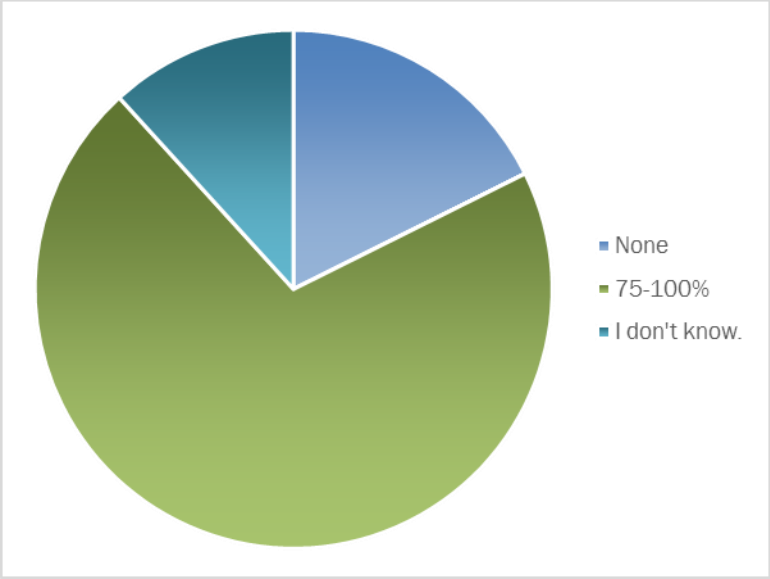

Figure 2. What percentage of units are designated as low-income housing or have maximum income requirements (not including Section 8 or equivalent)?

About 78% of respondents replied that 75-100% of the units under their purview are designated as low income. All except one respondent reported that at least some units are used for Section 8 housing. Some programs operate in properties with a more specific focus (for example, facilities intended to meet the specific needs of seniors or the disabled, or housing for farm workers), but most programs have a mix of singles, families with children, and seniors. Nearly all programs that responded operate in a mix of housing types—mostly mid-rise, high-rise, garden-style, and townhomes, with a small amount of single-room occupancy and manufactured housing. Two programs operate only in garden-style properties, and one exclusively in mid-rises. Each program targets from one to 129 properties, with an average of 36 properties per program. With one exception, each program targets at least 100 units.

Most of the programs have no full-time staff devoted to energy efficiency. The exceptions are two programs with one staff member who works full time on energy efficiency, one program with two such full-time staff, and one program with more than five. Programs generally rely on staff who work on efficiency projects only part-time; most have between one and five such staff members. Budgets for efficiency programs are generally small: most programs have annual budgets of less than $1,000 outside of staff salaries, though three programs reported budgets greater than $10,000.

Many respondents reported low program participation. One respondent used a variety of program strategies, including contests and rent discounts, but discontinued them because of low participation. Conversations with other program managers have revealed similar stories. Some housing providers we spoke with believe that the design of the building itself has an impact on participation rates. It is much easier to encourage tenants to attend meetings in properties with a community room, multipurpose room, or party space. Even buildings with a central lobby or laundry facilities where posters can be displayed are more conducive to

supporting tenant engagement programs than properties where tenants have little interaction with one another, as in a townhouse-style property where units open directly onto parking lots.

Many social scientists who study urban planning, particularly proponents of New Urbanism, agree that building design has a significant impact on the sense of community or the connection that residents feel to each other and to their neighborhood (e.g., Bothwell et al. 1998). There is evidence that residents with a greater sense of community are more likely to participate in tenant associations, local government, or other community actions (Chavis and Wandersman 1990). This suggests that energy efficiency behavior programs are also likely to see higher participation rates in properties where residents feel a greater sense of community.

The public housing authorities we spoke to generally had very large portfolios, often with dozens of properties and thousands of units. Though the popular image of public housing might be a medium- to high-rise housing project with a large number of subsidized units concentrated in one property, there is actually a great deal of diversity in public housing types. Large, highly visible properties can be a substantial portion of a public housing authority's portfolio, but there are also townhomes, duplexes, single-family homes, garden-style apartments, and subsidized units in properties that otherwise rent at market rates. The housing authorities we spoke with generally offer at least some form of energy efficiency tenant engagement to all tenants.

HOMEBUYER EDUCATION AND COUNSELING

Homebuyer education and counseling can have a few different formats: one-time workshops of various lengths, multi-class series, and one-on-one counseling sessions. About half of the survey respondents used a combination of these formats. Programs also varied widely in scope. The smallest counseling programs had about 50 clients annually, while the largest had as many as 6,500. The median number of clients was 162.5. Most of the programs reported that the majority of their clients were first-time homebuyers. As shown in figure 3, a significant portion of homebuyer counseling clients were low-income, but certainly not all.

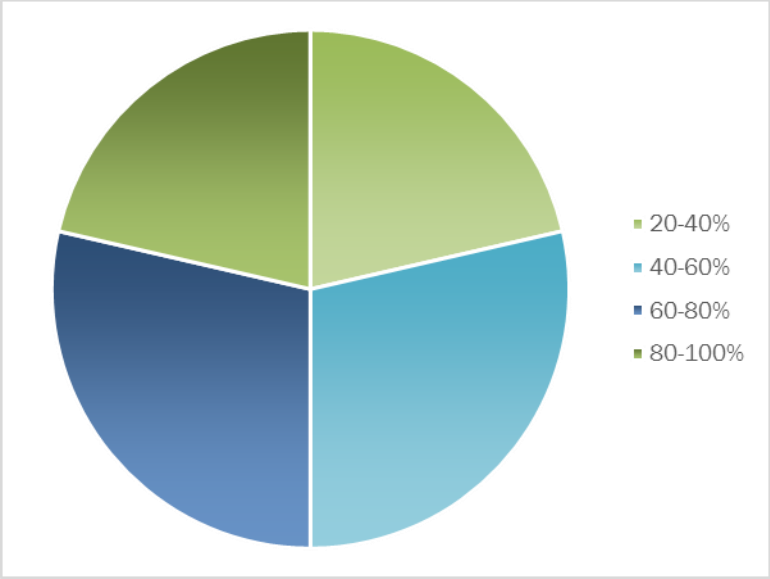

Figure 3. About what percentage of your clients do you consider to be low-income?

None of the homebuyer counselors reported that less than 20% of their clients were low-income, but only three organizations reported that 80-100% were low-income. This is because of the financial stability and significant savings required to purchase a home. While most multifamily tenant engagement programs primarily target low-income residents, homebuyer counselors can target a more affluent audience.

PROGRAM DEVELOPMENT

Because one of our goals is to show housing providers how to develop behavior-based energy efficiency programs, we were interested to see what resources program managers used to design them. The responses to the multifamily housing providers survey (see figure 4) suggest that some resources are already available (such as how-to guides), but that reliable sources of information are still generally lacking. Most program managers relied on personal communications when designing programs. About half of the respondents relied on conferences, workshops, or websites. Unsurprisingly, only four respondents relied directly on academic articles about behavior research. This is likely because most program managers do not have the social science training or affiliation with universities that would allow them access to existing academic literature. Only one respondent referred to books when designing their program; this suggests that relevant books are either not readily available or not widely publicized.

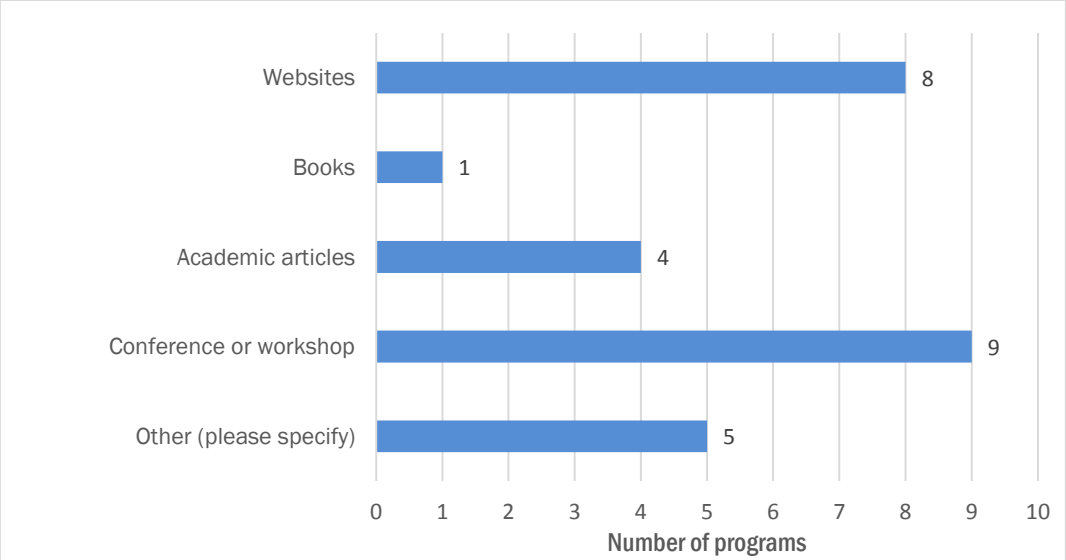

Figure 4. What kinds of information sources were used to develop the program? Select all that apply.

Since a substantial portion of program managers develop their programs through conferences, workshops, or websites, creating robust program development tools for these venues would encourage the development of well-designed, successful programs.

Who Pays the Bills?

The structure of utility bill payments can have a large impact on how successful a behavior program is. When tenants are responsible for paying their own utility bills, they have a much greater incentive to save energy, because they can see the immediate benefits of their actions in the form of lower monthly expenses. On the other hand, some buildings are master metered: that is, utility consumption is measured for the entire building at once and there is no way to break out unit-by-unit usage. In these buildings the landlord is usually responsible for utility expenses and passes along the aggregate costs to tenants through their rent. In general, older buildings are more likely to be master metered, and newer construction is more likely to have individually metered units.

Energy efficiency tenant engagement programs tend to be somewhat easier to implement in newer properties. Master-metered properties give rise to a split incentive, where the landlord rather than the tenant benefits financially from any energy savings. Tenants are much less likely to make an effort to save energy when they do not see the immediate financial benefits. Tenant engagement program managers in master-metered properties must work to overcome a perception that the purpose of energy efficiency is to save the landlord money.

In public housing and affordable housing properties, utility subsidy programs can distance tenants from their utility bills even when units are individually metered. In properties where tenants are responsible for paying their monthly utility bills, the housing program may provide tenants with a "utility allowance." Such a system can create a new split incentive problem, especially if the allowance is generous enough to cover the entire bill. Some housing groups

have attempted to get around this problem by adjusting utility allowance levels or offering additional incentives for program participation.

Because these programs can improve the quality of life for low-income tenants, we do not suggest that they should be eliminated, but they should be reformed. Tenants who do not directly pay their utility bills do not see the financial results of their energy savings as tenants in individually metered properties do. Therefore, energy efficiency programs in public and affordable housing cannot always rely on savings as an incentive.

Two-thirds of the multifamily housing providers surveyed reported that tenants are responsible for their own utility bills, though we were not able to determine what portion of those tenants receive a utility allowance. The remaining respondents reported that they operate programs in a combination of master-metered and individually-metered properties. Although public housing comprises master- and individually-metered properties, the public housing authority representatives we spoke with were unable to provide us with exact numbers.

PROGRAM DESIGN

Strategies Used

MULTIFAMILY TENANT ENGAGEMENT

We asked respondents to the multifamily housing providers survey about the strategies they used in their tenant engagement programs. All three behavior program types—cognition, calculus, and social interaction—were represented in their responses. A breakdown of program design elements is provided in figure 5.

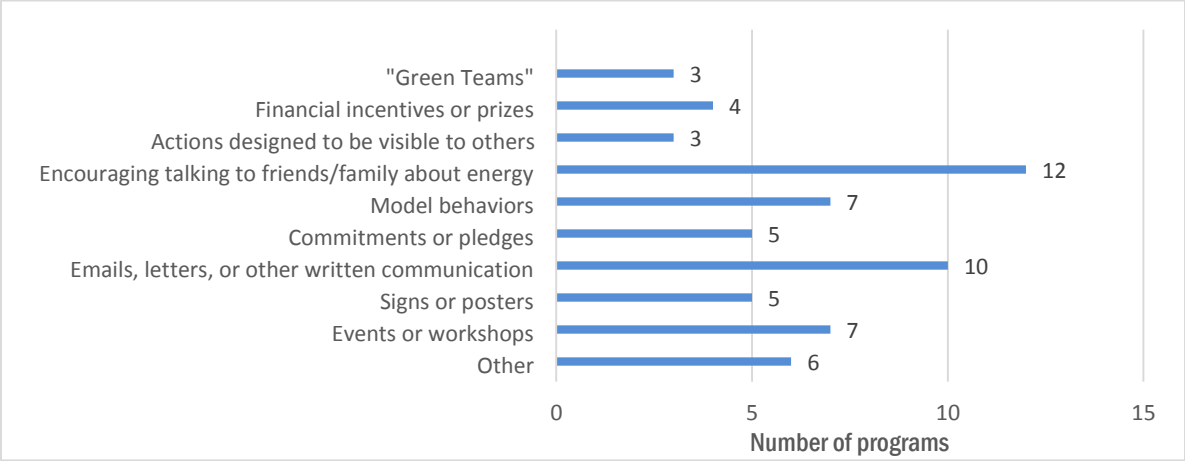

Figure 5. Tenant engagement strategies used by multifamily housing providers

About 70% of the programs included a cognition element, conveying information about energy efficiency. This occurred in a variety of ways, such as featuring a handful of green tips in tenant newsletters, placing posters in common spaces like recycling areas or laundry rooms, and giving energy efficiency pamphlets to new tenants when they sign their leases.

Calculus programs, which emphasize extrinsic rewards such as prizes or financial incentives, were much less common; less than 30% of programs involved such elements. Most of these were financial incentives or prizes, such as raffles, rent reductions, or other rewards.

Interestingly, social interaction programs were quite common, at least superficially. About 70% of respondents encouraged tenants to talk to friends and family about energy efficiency, but many did not hold participants accountable. Fewer programs relied on more sophisticated social interaction strategies. For example, five programs asked participants to make some kind of verbal or written commitment to saving energy, but none of the programs made these commitments visible to others. By keeping these commitments private, programs are not taking advantage of the power of social reinforcement.

"Green teams," groups of peer advocates for energy-efficient behaviors, were uncommon, appearing only three times. Green teams may be difficult to launch successfully because they require a core group of tenants who are committed to energy efficiency, have a sufficient amount of knowledge about desired behaviors, and have a social position that enables them to influence others. However, this strategy can be useful when program managers are having difficulty engaging the target population.

Implementation strategies varied within each program type. For example, we asked respondents to tell us how often they hold events or workshops related to energy efficiency. Most programs hosted annual or semiannual workshops on various green topics, often including issues like healthful eating and recycling in addition to energy efficiency. Infrequent events or workshops such as these can be effective if the primary goal is simply to convey information. However, attendance may be a problem, particularly in properties with little or no common space.

Written communication techniques also varied widely, including distributing booklets to all new tenants, displaying posters in laundry areas and other public spaces, and providing energy tips with regular tenant newsletters.

We also asked respondents to tell us how they market their behavior program. Catching tenants' interest is essential. Energy efficiency can be an abstract concept, so program designers must clearly answer the common tenant question, "Why should I care?" Responses to this question are displayed in figure 6.

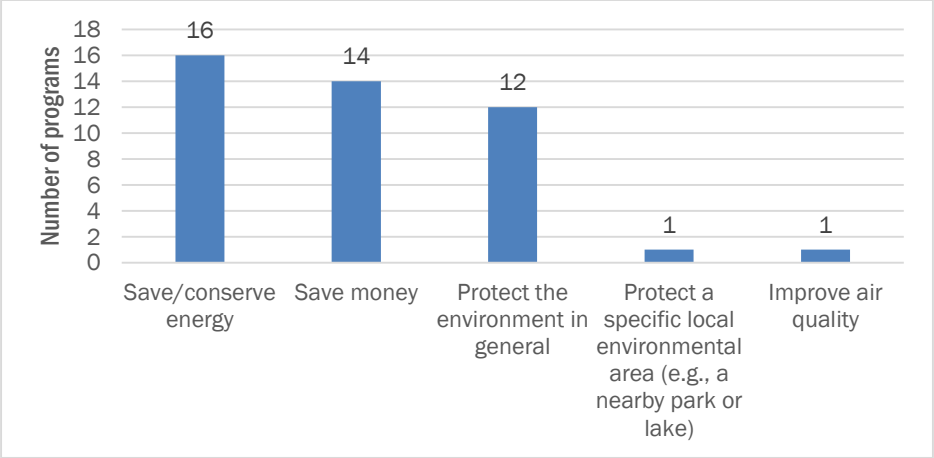

Figure 6. What are the goals of the program, as presented to tenants? Select all that apply.

This question allowed respondents to select all responses that applied, and most respondents selected two or three. Programs that operate in properties with a higher proportion of low-income tenants were more likely to include "save money" as a goal. Interestingly, the few programs that chose only one option usually selected "save/conserve energy" as the goal. These programs tended to be relatively simple, relying on distributed written material. As discussed earlier, such information campaigns rely on the assumption that program participants will always fully process and internalize the information they receive—which we now know is rarely the case (Egan 2000).

We were not able to obtain substantial data on participation in these simple programs. But we would expect lower participation rates from programs that emphasize *only* saving energy and not additional benefits like saving money or protecting the environment. Emphasizing multiple benefits for an action gives participants multiple avenues for participating. For instance, someone might not prioritize energy conservation, but if it can be linked to financial savings or quality of life, it might become much more important to the participant.

Some program managers offered games or challenges to promote energy efficiency, but this tactic is controversial. Public housing authorities implemented simple challenges (for example, a contest between buildings on a particular property to see which can recycle the most material over the course of a month) with some success. However, other program managers cited potential problems with violence in the community as a barrier to successful game- or challenge-based programs. They were reluctant to introduce a differentiating factor that could provide the basis for rivalry on the property. These anecdotes underscore the need for program designs that are appropriate to particular cultural contexts. Because CBSM relies on local research to identify barriers and benefits to desired outcomes, it would be an excellent strategy to use when designing a game- or challenge-based program.

Homebuyer Education and Counseling

Strategies that are appropriate for multifamily buildings, in which program managers can maintain a relationship with tenants, are not appropriate for homebuyer counselors, who have much more limited interactions with clients. Almost all survey respondents in this group

indicated that energy efficiency was a standard part of the education and counseling curriculum, with one program reporting that it was up to individual counselors to decide whether to include it.

As shown in figure 7, the most popular method of conveying information was to use handouts or other written material, and to offer classes on the topic.

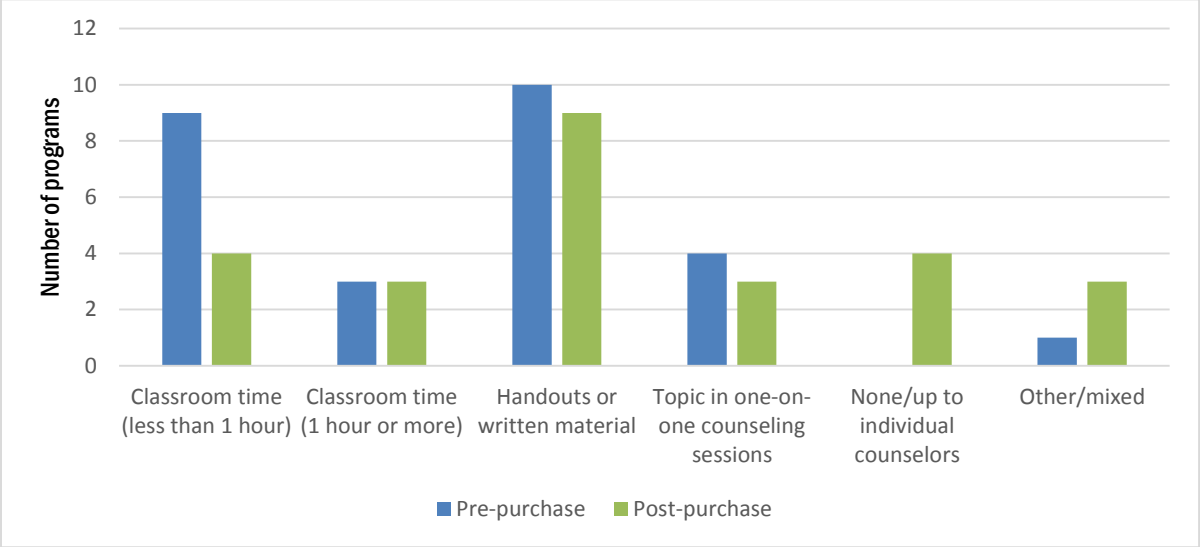

Figure 7. Inclusion of energy efficiency curriculum in pre- and post-purchase counseling

Most homebuyer education and counseling programs market energy efficiency to homebuyers as a way to save money. For example, in the book *Keeping the American Dream*, published by NeighborWorks and used in many counseling programs, energy efficiency is included in a section called "Saving Green ($) by 'Going Green" in the chapter on home maintenance and improvements. Energy efficiency also can come up in the context of general green living, often along with recommendations to use nontoxic cleaning products or set up an area for recycling. Figure 8 shows the relative prevalence of homebuyer education and counseling strategies.

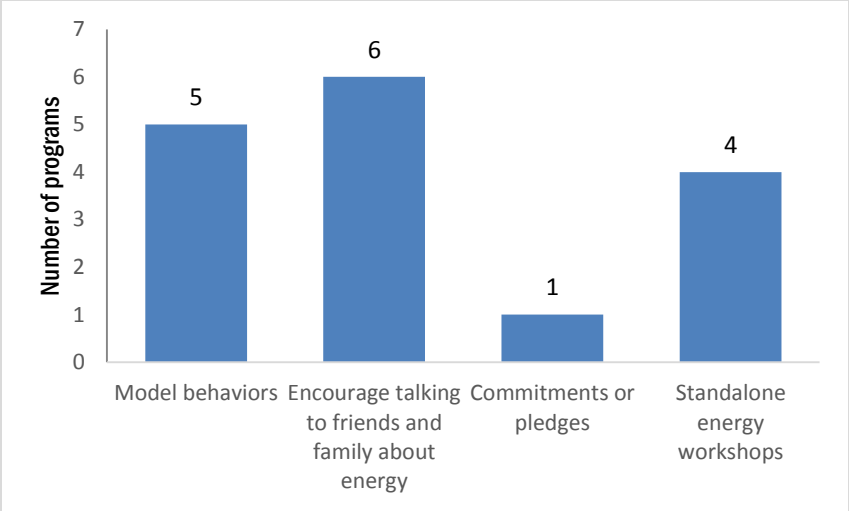

Figure 8. Strategies used in homebuyer education and counseling

Since most of the programs have a similar format—usually classroom education, often combined with one-on-one counseling—we asked about fewer specific strategies for promoting energy efficiency than we did in the other survey. In general, programs that use at least one of these strategies are likely to use more than one. About half of the programs that responded to the survey use none of the strategies shown in the figure. In our view, a well-designed classroom program with engaged participants can certainly encourage participants to save energy, but using behavioral strategies may help convince participants to be even more concerned about energy efficiency.

Behaviors Targeted

In the preliminary version of the survey, we found that programs addressed a range of behaviors, from 4 to 33. We were concerned that programs that targeted a large number of behaviors were diluting their message; generally, programs that target fewer behaviors are more successful (Vigen and Mazur-Stommen 2012).

For this version of the survey, we were interested in the specific behaviors that were emphasized by the most programs. We limited the number of selections respondents could make to prevent them from simply selecting all available choices. As shown in figure 9, nearly all respondents chose three behaviors, which may suggest that they were also promoting additional behaviors that we could not capture here.

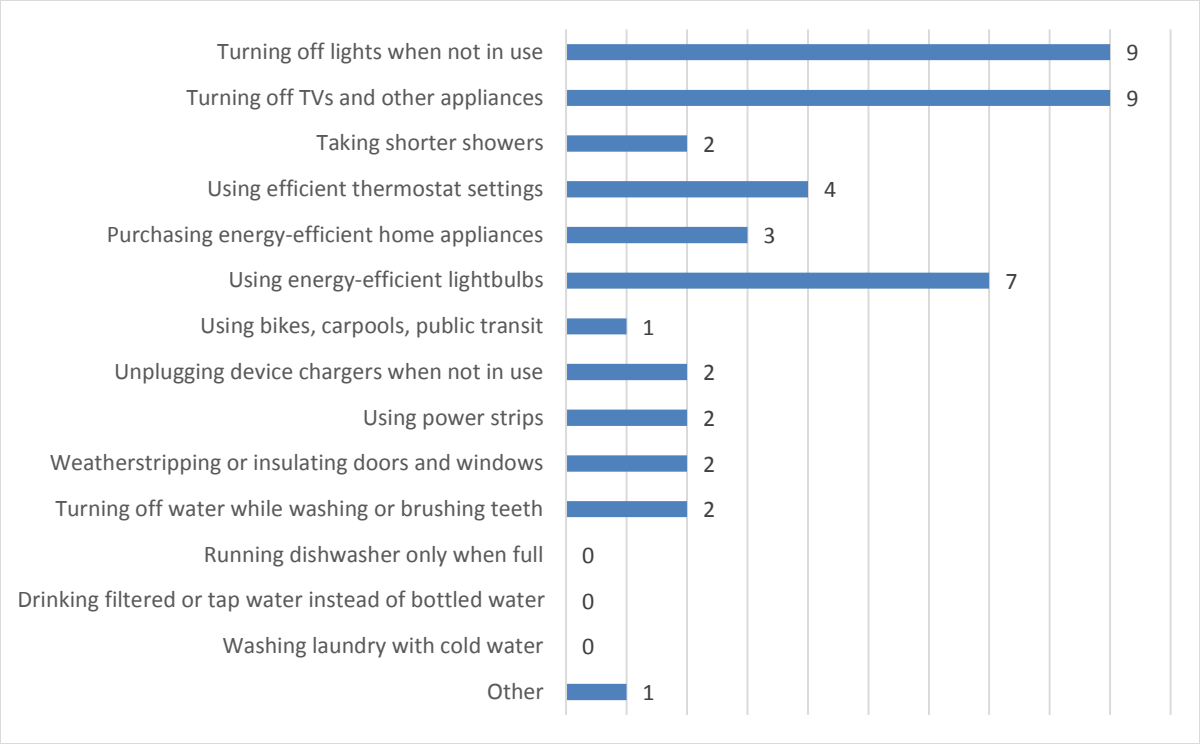

Figure 9. Which specific behaviors did the program target? Please select up to three choices.

As in our previous study, we found that the most popular behaviors included turning off lights and other appliances when not in use, as well as using energy-efficient lighting like CFLs or LEDs. There is some evidence that turning off lights and appliances is a popular behavior because of the perception that this is the easiest option (Attari et al. 2010). It is unclear why promoting energy-efficient lighting is such a popular option, but it may be due to extensive news coverage of CFL lighting, particularly in response to U.S. Department of Energy lighting regulations implemented in 2012.

Some of the other behavior choices we listed were less popular because they are higher-cost options or are inappropriate for a rental setting. It does not make sense to encourage low-income rental tenants to purchase energy-efficient kitchen appliances or to weather strip or insulate doors and windows; usually these actions are the responsibility of landlords. However, some of these options could be presented in a way that is relevant to tenants—for instance, tenants could be encouraged to look at ENERGY STAR™ ratings when purchasing televisions.

For the homebuyer education and counseling program survey, we allowed respondents to select up to five choices. We did this because people who own their own home have more behavior change options, such as purchasing energy-efficient home appliances or installing installation. Also, the format of homebuyer education and counseling is more conducive to presenting a broader array of topics. The responses to this question are shown in figure 10.

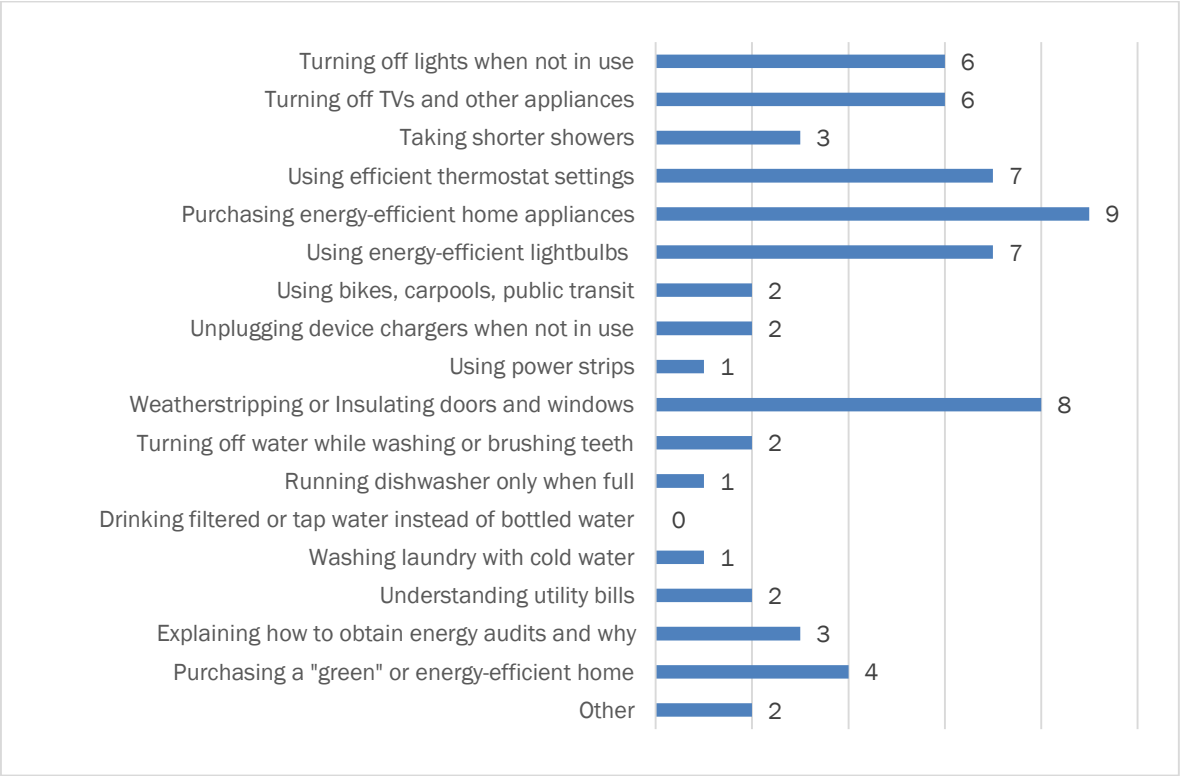

Figure 10. Which specific energy efficiency behaviors does your program address? Select up to five.

The relative popularity of the targeted behaviors is quite different for the homeowner counselors than for the multifamily programs. The most popular behaviors in homebuyer education and counseling are purchasing energy-efficient appliances and weather stripping or insulating doors and windows. This makes sense because these are actions that can have a strong impact and first-time homebuyers may not necessarily have given much thought to them while they were renting. Only about half the homebuyer education and counseling programs cited the actions that were most common in the multifamily programs—turning off lights and appliances and using energy-efficient lighting.

Savings and Measurement

Programs must have rigorous evaluation, measurement, and verification (EM&V) protocols in place to show how effective they are in terms of energy efficiency. This is particularly important for programs that partner with or are interested in partnering with utilities. Utilities have some flexibility in funding pilot projects or programs that do not have rigorous EM&V; for example, they may include them in their marketing or education efforts. However, in many states utilities are required to work toward specific energy-saving targets and have much more available funding for programs with demonstrated energy savings.

Slightly less than half of the respondents in the multifamily housing providers survey had any specific goals for energy use. The goals ranged from a nonspecific "beat the average" to specific

percentage reduction goals in electricity and water use. The same number of respondents collected a baseline of energy use prior to the program. Their methods for doing this varied from collecting a year of utility data and normalizing for weather, to simply using the state average as a baseline. Only four respondents indicated that they used a control group with which to compare program results. This is understandable given that many energy efficiency programs are part of larger tenant education and quality-of-life improvement efforts rather than rigorous randomized experiments.

A smaller percentage of respondents to the homebuyer counselor survey indicated that they include EM&V in their programs, perhaps because many of those programs are primarily educational and not concerned with what participants do with the information after they receive it. Only three respondents indicated that they have energy savings goals. One was interested in the number of completed retrofits, another was looking for lower power bills without any specified percentage or kilowatt-hour reduction, and the third was interested in participation in "home improvement energy loans." Only one program compared results with a control group.

For the programs that reported energy savings, the responses were promising but imprecise. Several of the multifamily housing programs reported that they had observed some reductions in utility bills and downward trending usage, but they did not feel that they had collected enough data to claim a definitive link between the program and any observed changes. Several other programs explicitly prioritized participation over changes in utility bills or energy consumption. Three of the homebuyer counselors indicated that they did have results on energy savings, but they did not indicate whether they observed any general trends.

One of the last questions we asked in both surveys was what resources would be needed to collect data on program results. We obtained a variety of responses. Some programs reported that they were collecting data on energy use, but their programs had not been running for long enough for them to see any trends. Some variation on "need more time" was the most popular response to this question. A few programs reported that they have had trouble obtaining energy-use data from local utilities, often because of concerns about tenant privacy.

Recommendations

Tools for Program Design

There is no central, easily accessible source that provides tools for program managers to use in designing programs. This paper does cite articles from a number of academic journals. However these are not usually the best resource for a multifamily property manager to consult when designing a behavior program. Not only is access to journal articles often prohibitively expensive for anyone who is not affiliated with a university, but these managers are usually experts in managing multifamily buildings and not in behavioral science.

We did find that many program managers use conferences or workshops and websites to develop their programs. We recommend that a comprehensive how-to guide for program developers be developed that builds on these resources. This guide should be available at no cost online, and it should be complemented by a series of conference presentations and workshops in various venues across the country.

Many homebuyer education and counseling programs use the NeighborWorks publication, *Realizing the American Dream* as the foundation for their curriculum. (Our survey did not find an equivalent for tenant engagement programs.) While some energy efficiency issues are raised in the book, ideally future editions of *Realizing the American Dream* and similar publications would give even greater emphasis to energy efficiency measures.

UTILITY INVOLVEMENT

About 82% of the participants in the multifamily housing providers survey responded that local utilities have no involvement in their tenant engagement programs. The remaining respondents indicated that their utility provided data about energy consumption in individual units, or that the utility was "somewhat" involved, with no additional information provided. Similarly, 80% of the participants in the homebuyer counselor survey indicated that utilities were not involved in their programs. The remainder reported that utilities provided funding, informational materials to customers, or referrals to the program.

Programs might be missing out on valuable resources by not working with local utilities. However in our report on the 2012 ACEEE survey, we identified several potential challenges to working with utilities on a multifamily tenant engagement program or a homebuyer education and counseling program (Vigen et al. 2012). These challenges include the following:

- Many programs targeting low-income residents try to promote a variety of desirable behaviors, such as eating healthily and increasing physical activity, as opposed to promoting energy efficiency exclusively.
- Utilities generally prefer to invest in programs with demonstrable results. The results of behavior programs can be challenging to measure for a variety of reasons.[1]
- It can be difficult to engage utilities in properties where only some or none of the tenants are responsible for their own utility bill, because a utility would likely only target customers with whom they have a direct relationship.

On the other hand, utilities have shown increasing interest in funding energy efficiency programs (Johnson and Mackres 2013). Although these are often focused on physical measures such as equipment installations, program designers may be able to leverage them to develop behavioral approaches. In addition, utilities may be able to draw on their marketing or education budgets (as opposed to efficiency program funds) to support behavioral programs (Mazur-Stommen and Farley 2013).

FUTURE RESEARCH

This paper applies behavioral science theory to residential energy efficiency. A growing body of evidence supports the efficacy of techniques informed by this field of study. However, no research has demonstrated the effectiveness of these techniques in multifamily buildings

[1] For more information about the challenges associated with measuring the effects of behavior programs, see http://www1.eere.energy.gov/seeaction/pdfs/emv_behaviorbased_eeprograms.pdf.

specifically. As more properties develop programs and gather data, researchers will be in a better position to compare the effectiveness of various multifamily programs.

Conclusion

Behavior programs can be a powerful tool for reducing energy consumption. Being low-cost interventions, they may be particularly useful to affordable housing providers and other organizations that work with low-income or otherwise disadvantaged populations. However they should not be the only energy efficiency programs implemented at a property. Landlords, housing authorities, and housing program administrators should run behavior programs in combination with upgrades to a building's physical structure, or after basic changes have been made. Instructing tenants to turn off the water when they brush their teeth has less impact if faucets consistently leak.

Most of the behavior programs we surveyed operate in properties that target low-income residents. However landlords and property managers of market-rate buildings should not overlook behavior programs as an energy-saving tool. A building's green orientation can be a selling point in the current market. Buildings with energy efficiency behavior programs may attract tenants with the prospect of saving energy, lowering their utility bills, and joining a like-minded community.

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Appendix: Survey Questions

MULTIFAMILY HOUSING PROVIDERS SURVEY

Introduction

First, thank you for helping us by completing this survey! Your responses will help advance research in strategic areas of behavior-change programs in multifamily buildings.

The responses from this survey will be used in a report that will be made available to the public. We know that many of you have privacy concerns, so unless you tell us otherwise, all information about your program in the report will be made anonymous.

This survey should take about 15 minutes to complete. We ask for your contact information only to verify any answers and (if you choose) to list as project supporters. Lastly, if you would rather complete this over the phone, feel free to contact Kate Farley, project lead, at kfarley@aceee.org or call 202-507-4031.

Thanks again!

Kate Farley

Behavior & Human Dimensions

American Council for an Energy-Efficient Economy

Contact and Program Information

1. What is the name of your energy efficiency program?

2. Program contact information (req. name, zip, e-mail)
   - Full Name:
   - Affiliation:
   - City/Town:
   - State:
   - Zip Code:
   - E-mail Address:
   - Phone Number:

3. Can we identify your program by name in our report?
   - No, all responses must be completely anonymous
   - Yes, the program's name and other identifying information can be used in the report
   - Identify by location only (city or county)
   - Identify by location only (state)
   - Other (please specify)

4. Does your program have a website?
   - No
   - Yes (Please enter URL)

5. Please list the organization(s) or institution(s) administering the program.

6. Is your local utility involved in the program? If so, how?
   No
   Yes (Please list utility and provide details)

About the buildings and occupants

Please provide information about the buildings, as best as you are able, in which the program was implemented. If you implemented different programs in different buildings, please pick ONE program and detail its implementation only.

1. In how many properties does the energy efficiency program operate?

2. Approximately how many units total are targeted by the energy efficiency program?
   Fewer than 10
   10–50
   50–100
   100–200
   200–500
   500+
   I don't know.

3. In what types of properties does your energy efficiency program operate?
   Garden-style
   Townhome
   Mid-rise
   High-rise
   Other/mixed (please explain)

4. What is the predominant tenant type in properties targeted by the energy efficiency program?
   Seniors
   Families with children
   Singles
   Other/mixed (please specify)

5. Approximately how old are the properties where the energy efficiency program operates? Please select a category below according to year built.
   2005–present
   1985–2004
   1965–1984
   1945–1964
   1944 or earlier
   I don't know.

6. Please select the most appropriate characterization of the location of the buildings where the program is run. Select all that apply. (Please see below for definitions of each category.)
   Urban

Suburban
Exurban
Rural
Other (please explain)

Urban: The densely populated core at the center of a larger metropolitan area

Suburban: Less densely developed land that is adjacent to the urban core

Exurban: A municipality or community that is separated from the main urban/suburban zone by rural land. May be considered an "outer-ring suburb."

Rural: An area that doesn't fit any of the above categories, characterized by low population density and large amounts of undeveloped or agricultural land

7. What percentage of units are Section 8 (or equivalent)?
None
1–25%
25–50%
50–75%
75–100%
I don't know.

8. What percentage of units are designated as low-income housing or have maximum income requirements (not including Section 8 or equivalent)?
None
1–25%
25–50%
50–75%
75–100%
I don't know.

9. What percentage of units currently house full-time students?
None
1–25%
25–50%
50–75%
75–100%
I don't know.

10. Any comments or other details about the buildings and occupants that participated in the program (we will ask about utility bills later in the survey):

Program design

The next few questions will ask about how the program was designed and a few details about the structure of the program.

1. For how many years has the tenant engagement program been operating?

2. What are the goals of the program, as presented to tenants? Select all that apply.
- Save/conserve energy
- Save money
- Protect the environment in general
- Protect a specific local environmental area (e.g., a nearby park or lake)
- Other (please explain)

3. What kinds of information sources were used to develop the program? Select all that apply.
- Personal communication with managers of existing programs
- Conference or workshop
- Academic articles
- Books about behavior program design
- Websites about behavior program design
- Other (please specify)

4. Please select the category that best describes your program.
- Direct financial incentives or rebates
- Nonmonetary incentives (e.g., gifts)
- Energy audits
- General community efforts
- Community-based social marketing
- Volunteer teams
- One-on-one counseling or interaction
- Social media
- Games, competitions, or challenges
- Workshops or seminars
- Other (please explain)

5. How many staff members work full-time (at least 30 hours/week) on the energy efficiency program?
- None
- 1
- 2
- 3
- 4
- 5 or more
- I don't know.

6. About how many staff members work part-time (fewer than 30 hours/week) on the energy efficiency program?
- None
- 1
- 2
- 3

4
5 or more
I don't know.

About how much time does part-time staff spend on the program each week?

7. What is the approximate annual budget for the program, excluding staff salaries?
0–$500
$501–$1,000
$1,001–$2,000
$2,001–$5,000
$5,001–$10,000
$10,001+
I don't know/unable to disclose

About the energy efficiency program (1/2)

These next questions will ask about the goals of the program, specifically what types of behavior change or actions the program asked tenants to engage in.

1. Which specific behaviors were targeted by the program? Please select up to three choices.
Turning off lights when not in use
Turning off other appliances (e.g., televisions, game consoles) when not in use
Taking shorter showers
Using efficient thermostat settings
Purchasing energy-efficient home appliances
Using energy-efficient lightbulbs such as LEDs or CFLs
Encouraging bicycling, carpooling, or public transportation use
Unplugging device chargers when not in use
Using power strips
Weather stripping or insulating doors and windows
Turning off water while washing or brushing teeth
Running dishwasher only when full
Drinking filtered or tap water instead of bottled water
Washing laundry with cold water
Other (please specify)

2. Has the program hosted any events or workshops?
No
Yes (Comment required. Please describe content and frequency, e.g. three workshops over three months).

3. Does your program use visual signs or posters?
No
Yes (Comment required. Please describe content and placement locations.)

4. Does your program use e-mails, letters, or other written forms of communication?
No

Yes (Comment required. Please describe form, content, and frequency)

5. Does the program ask participants for commitments or pledges to save energy?
Yes
No

6. If yes, are the pledges verbal, written, online, or otherwise public? (Select all that apply.)
Verbal
Written
Online
Public
Not applicable

About the energy efficiency program (2/2)

1. Does the program model the targeted behaviors? (e.g. using a workshop or tour to demonstrate installing a showerhead or turning off a power strip)
No
Yes (Comment required. Please describe action modeled and the context.)

2. Does the program ask tenants to talk to their friends and neighbors about energy-efficient behaviors, i.e., social diffusion?
Yes
No

3. Is the program designed to make actions taken by participants visible to others?
No
Yes (Comment required. Please describe how actions were made visible.)

4. Does the program use financial incentives (e.g. prize, rebate, rent discount) to prompt action?
No
Yes (Comment required. Please describe the incentive and the action it encourages.)

5. Does the program use a "green team" model by convening a group of regularly meeting tenants to lead engagement efforts?
No
Yes (Comment required. Please describe the work of the team.)

6. Does the program use any other strategies not listed? (e.g. energy reports, contests or games, festival or other events, social norms, home walk-throughs)
No
Yes (please specify)

7. Please describe any other strategies used to engage tenants in energy-saving practices in their units. Or provide additional details to the strategies above.

Utility bills and services

1. Who pays the electricity bill?
   - Tenant pays
   - Landlord or management pays
   - Other (please specify)

2. Is the electricity submetered? (i.e., usage is measured and billed separately for each unit)
   - Yes
   - No
   - Other (please specify, e.g. floors, but not units, are metered)

3. Who pays the natural gas bill?
   - The tenant pays
   - The landlord or manager pays
   - Not applicable (no gas service)
   - Other (please specify)

4. Is the natural gas submetered? (i.e., usage is measured and billed separately for each unit)
   - Yes
   - No
   - Not applicable (included in rent)
   - Not applicable (no gas service)
   - Other (please specify)

5. Do any of the units have any energy or fuel service other than natural gas?
   - No
   - Yes/some (please describe and specify fuel type)
   - I don't know.

6. Who pays the bill for this other fuel?
   - The tenant pays their portion only.
   - The landlord or manager pays.
   - Not applicable/I don't know.
   - Other (please specify)

7. Who pays the water bill? (Assume sewer fees are included.)
   - Tenant pays (submetered)
   - Landlord or manager pays
   - I don't know.
   - Other (please specify)

Climate controls

1. What type of fuel is used for heating in the properties targeted by the energy efficiency program?
   - Electricity
   - Natural gas

Other/mixed (please specify)

2. Are tenants able to control heating in their units?
Yes
No
Some
Other (please specify)

3. Are tenants able to control cooling in their units?
Yes (central A/C and metered)
Yes (window A/C)
No cooling available
I don't know.
Other (please specify)

Last page! Results and measurement

1. Has your organization been able to obtain access to tenant utility bills in order to monitor energy savings?
Yes
No
Some

2. Was a baseline of energy use determined?
No
Yes (please describe method)

3. Were there any specific goals for energy savings resulting from the program?
No
Yes (please explain)

4. Are any results available on savings resulting from the program?
No
Yes (please explain)

5. Please describe any results from the energy efficiency program. Feel free to use whatever terms are most compatible with your program, such as kilowatt-hours saved, percent reduction in energy bills, or participation in workshops.

6. Have you compared program results to any groups that did not use the program? (In other words, did you compare results to a control group?)
No
Yes

7. If no savings measurements are available, please list what resources would be necessary to complete an evaluation of your program.

8. Of all the things you've done to encourage tenants to consume less energy, what do you think has been the most impactful or helpful?

9. Any last comments or questions?

Thank you for completing our survey. For more questions about this survey, contact Kate Farley, project lead, at kfarley@aceee.org or call 202-507-4031. Visit http://www.aceee.org to sign up for e-mail updates from the Behavior and Human Dimensions program.

HOMEBUYER EDUCATION AND COUNSELING PROGRAM SURVEY

Introduction

First, thank you for helping us by completing this survey!

Your responses will to provide a broad view of the energy components of home-ownership and financial education programs across the United States and to advance research in strategic areas of energy behavior change.

This survey should take about 15 minutes to complete. We ask for your contact information only to verify any answers and (if you choose) to list as project supporters.
Lastly, if you would rather complete this over the phone, feel free to contact Kate Farley, project lead, at kfarley@aceee.org or call 202-507-4031.

Thanks again!

Kate Farley
Behavior & Human Dimensions
American Council for an Energy-Efficient Economy

Contact and Program Information

1. What is the name of your program?

2. Program contact information (req. name, zip, e-mail)
   - Full Name:
   - Affiliation:
   - City/Town:
   - State:
   - ZIP:
   - E-mail Address:
   - Phone Number:

3. Can we identify your program by name in our report?
   - No, all responses must be completely anonymous
   - Yes, the program's name and other identifying information can be used in the report
   - Identify by location only (city or county)
   - Identify by location only (state)

Other (please specify)

4. Does your program have a website?
   No
   Yes (please enter URL)

5. Please list the organization(s) or institution(s) administering the program.

6. Is your local utility involved in the program? If so, how?
   No
   Yes (please specify details)

About your clients

Please provide information about the buildings, as best as you are able, in which the program was implemented. If you implemented different programs in different buildings, please pick ONE program and detail its implementation only.

1. Approximately how many clients does your program work with annually?

2. About how many of your clients are under 30?
   0–20%
   20–40%
   40–60%
   60–80%
   80–100%
   Don't know

3. About how many of your clients are over 55?
   0–20%
   20–40%
   40–60%
   60–80%
   80–100%
   Don't know

4. About what percentage of your clients belong to racial or ethnic minorities?
   0-20%
   20-40%
   40-60%
   60-80%
   80-100%
   Don't know

5. About what percentage of your clients do you consider to be "low income"?
   0-20%
   20-40%
   40-60%

60-80%
80-100%
Don't know

6. About what percentage of your clients are first-time homebuyers?
0-20%
20-40%
40-60%
60-80%
80-100%
Don't know

7. Please select the most appropriate characterization of the location of your program. Select all that apply. (Please see below for definitions of each category.)
Urban
Suburban
Exurban
Rural
Other (please explain)

Urban: The densely populated core at the center of a larger metropolitan area
Suburban: Less densely developed land that is adjacent to the urban core
Exurban: A municipality or community that is separated from the main urban/suburban zone by rural land. May be considered an "outer-ring suburb."
Rural: An area that doesn't fit any of the above categories, characterized by low population density and large amounts of undeveloped or agricultural land

8. Any comments or other details about the clients who participate in your program?

Program design

The next few questions will ask about how the program was designed and a few details about the structure of the program.

1. What is the format of your program?
Classroom-based workshops or seminars
One-on-one counseling
Combination
Other (please specify)

2. Is discussion of energy efficiency part of the standard education and counseling curriculum in your program?
Yes
No
Up to individual counselors

3. How is energy efficiency information incorporated into your program for prepurchase clients?

Classroom time (less than 1 hour)
Classroom time (1 hour or more)
Handouts or written material
Topic in one-on-one counseling sessions
None/up to individual counselors
Other/mixed (please specify)

4. Does the program model the targeted behaviors? (e.g. using a workshop or tour to demonstrate installing a showerhead or turning off a power strip)

No
Yes (Comment required. Please describe action modeled and the context.)

5. Does the program ask clients to talk to their friends and neighbors about energy-efficient behaviors?

Yes
No

6. Does the program ask clients for commitments or pledges to save energy?

Yes
No

7. If yes, are the pledges verbal, written, online, or otherwise public? (Select all that apply.)

Verbal
Written
Online
Public
Not applicable

8. Does your program include any standalone workshops or seminars on home energy efficiency?

No
Yes (please provide details)

9. Does your program include post-purchase education and counseling for program participants?

Yes
No

10. If yes, is energy efficiency included in post-purchase education and counseling?

Yes
No

11. How is energy efficiency information incorporated into your program for post-purchase clients? Select all that apply.

- Classroom time (less than 1 hour)
- Classroom time (1 hour or more)
- Handouts or written material
- Topic in one-on-one counseling sessions
- None/up to individual counselors
- Other/mixed (please specify)

12. Which specific energy efficiency behaviors are discussed by your program? Select up to five.

- Turning off lights when not in use
- Turning off other appliances (e.g., televisions, game consoles) when not in use
- Taking shorter showers
- Using efficient thermostat settings
- Purchasing energy-efficient home appliances
- Using energy-efficient lightbulbs such as LEDs or CFLs
- Encouraging bicycling, carpooling, or public transportation use
- Unplugging device chargers when not in use
- Using power strips
- Weather stripping or insulating doors and windows
- Turning off water while washing or brushing teeth
- Running dishwasher only when full
- Drinking filtered or tap water instead of bottled water
- Washing laundry with cold water
- Understanding utility bills
- Why and how to obtain energy audits
- Purchasing a "green" or energy efficient home
- Other (please specify)

Last page! Results and measurement

1. Were there any specific goals for energy savings resulting from the program?

- No
- Yes (please explain)

2. Are any results available on energy savings resulting from the program?

- No
- Yes (please explain)

3. Have you compared client energy savings to any groups that did not participate in education or counseling with an energy efficiency component? (In other words, did you compare results to a control group?)

- No
- Yes

4. If no savings measurements are available, please list what resources would be necessary to complete an evaluation of your program.

5. Any last comments or questions?

Thank you for completing our survey. For more questions about this survey, contact Kate Farley, project lead, at kfarley@aceee.org or call 202-507-4031. Visit http://www.aceee.org to sign up for e-mail updates from the Behavior and Human Dimensions program.