

Multiple Solutions to a Complex Problem: Effective Strategies for Increasing Energy Efficiency in the Multi-Family Sector

Kathleen Gaffney, Jennifer E. Canseco, Nicolas Chaset

KEMA Inc.

Abstract

The multi-family housing sector is an untapped resource in many regions of the nation, and there exist unique barriers to achieving its energy-efficiency potential. This paper will offer a unique in-depth analysis of three different approaches that are being used in one region and provide an opportunity to compare and contrast alternate methods. The paper will assist program planners and policymakers in understanding the obstacles to delivering energy efficiency to the multi-family sector. Likewise, the paper will offer recommendations for how best to design and evaluate multi-family programs across the country.

The objectives of this paper are to:

- Identify barriers to reaching multi-family properties and delivering energy-efficiency programs to them;
- Describe three different approaches being used to reach this segment;
- Discuss the benefits and drawbacks associated with each of the approaches; and
- Present recommendations regarding effective strategies for reaching this sector.

The basis of this paper will be the results from recent evaluations of multi-family programs, including an innovative program that assists public housing authorities change their utility allowance to account for and encourage energy-efficient improvements; a targeted, small-scale program that provides energy audits, education and training, and equipment rebates to affordable housing properties; and a large-scale, comprehensive program that offers prescriptive energy-efficient equipment rebates to multi-family properties through multiple delivery channels.

Introduction

The State of California is among the leaders in the United States for the promotion of energy efficiency. It has allocated significant resources to many different residential energy-efficiency programs that provide financial incentives and education to encourage the installation of energy-efficient measures. Within these diverse residential programs, the multi-family housing market in general, and the affordable multi-family housing market in particular, remain relatively underserved in terms of program participation as well as dollars allocated. One reason for this is that the multi-family housing market poses some unique challenges for energy-efficiency programs that do not exist in other segments of the residential marketplace.

One major problem is the split-incentive barrier, where those purchasing the energy-using equipment are different than those who are paying for the use of this equipment. Owners of multi-family properties do not have an economic incentive to invest in energy-efficient measures that will primarily benefit the tenant. Other common barriers to greater energy efficiency in the multi-family sector include difficulty identifying energy-efficiency opportunities, lack of capital, lack of maintenance staff to install energy-efficient measures, and lack of time to focus on energy-efficiency options.

In addition to this split incentive barrier, there are additional barriers in trying to introduce energy efficiency into multi-family dwellings for low-income tenants. Affordable housing is subject to complex regulations governing rent levels and the amount of subsidies that low-income tenants receive to pay their utility bills. These subsidies are often based on average area utility costs and therefore neither landlords nor tenants have any economic incentives to invest in energy efficiency. Decisions to make improvements in multi-family housing are often subject to longer budget cycles and much more complicated processes and layers of decision making than exist in non-subsidized multi-family housing.

The Energy Action Program:

How It Works

- Hands-on account management via dedicated energy resource manager.
- Combination of incentives and low/no interest loans to reduce first cost barrier.
- Technical training for property owners/managers, maintenance staff and tenants.

This paper discusses three programs that have had some success targeting multi-family properties in California and identifies which elements of these programs may offer solutions that can be replicated in other regions. In the first section, we provide brief descriptions of each program. We then present findings from recent evaluations of these programs to highlight which elements were successful and which elements were not. In the final sections, we discuss lessons learned from studying the three programs and offer recommendations on how future programs can better address the relatively unique and diverse set of needs facing the multi-family

housing sector.

Program Descriptions

The **Energy Action Program**¹ is a comprehensive energy-efficiency incentive program aimed at the privately- and publicly-owned, multi-family affordable housing developments. The program is implemented in the Pacific Gas and Electric (PG&E) utility service territory, which includes northern and central California. However, the program concentrates its efforts in the San Francisco Bay and Central Valley areas of California. The program includes a wide array of financial incentives and financing options that have been custom-tailored to this specific market segment. In addition to capturing energy savings, the program has two broad policy objectives:

- Enhance the equity of the State's energy-efficiency portfolio by ensuring that the affordable multi-family housing community has efficient access to resources; and
- Continue to strengthen the technical infrastructure for energy-efficiency investment in the affordable multi-family housing market through a combination of technical training, diagnostic assistance, and peer-to-peer exchange.

The Energy Action Program is a hybrid, public/private partnership involving many stakeholders in both program design and implementation. The partnership includes the following organizations, most of which are locally based: ICF Consulting, California Coalition for Rural Housing (CCRH), Center for Energy and Environment (CEE), GRID Alternatives, kW Engineering, Local Initiatives Support Corporation (LISC), Non-Profit Housing Association of Northern California (NPH), and Strategic Energy Innovations (SEI).

The program's model relies on hands-on account management, where a full-time outreach manager—called an energy resource manager—serves as the point of contact for all participating property owners and managers. The energy resource manager works with the organizations in the partnership to recruit participants and oversees the work completed through the program.

To reduce the first cost barrier to property owners and managers, the program offers prescriptive and custom rebates coupled with no-interest loans for qualifying energy-efficiency upgrades. These upgrades also result in monthly energy cost savings that enable participating properties to allocate scarce resources to other pressing needs. The Energy Action Program covers a wide range of energy-efficiency measures common to multi-family housing, including some measures that are not addressed through other programs targeting this sector (e.g., outdoor reset/cutout controls).

Program offerings also include a variety of engineering services including onsite energy audits and technical assistance. These services introduce property owners and managers to the program and provide them with valuable, customized audit reports assessing opportunities for energy-efficient upgrades in their properties. The reports include details about rebates and other financial incentives

The Energy Action Program:

Targets and Goals

- Targets privately-owned, affordable multi-family housing.
- Public/private partnership involved in program design and delivery.
- Objectives include energy savings, equity, and development of sustainable infrastructure.

¹ The Energy Action Program is a partnership funded by the California ratepayers under the auspices of the California Public Utilities Commission (CPUC). For more information, go to www.energyactionresources.org.

available for the recommended measures. The program's engineering services serve as a tool for engaging property owners and managers and encouraging them to apply for rebates and install the measures.

Finally the program includes a training component that engages property managers, property owners, and maintenance staff. This component of the program seeks to develop a cadre of property managers and operations and maintenance staff with the necessary skills to maintain the energy saving benefits of the measures installed through the program. The idea is to develop a sustainable, onsite infrastructure that can identify additional opportunities for energy savings once the program has ended.

The **Designed for Comfort Efficient Affordable Housing Program**² targets publicly- and privately-owned affordable multi-family and single-family properties.³ Designed for Comfort is a third-party program designed and implemented by the Heschong Mahone Group, Inc. (HMG) and funded by the California Public Utilities Commission. It operates in the service territories of California's Investor-Owned Utilities (IOUs), which together account for about 80 percent of the state's residents.⁴ In addition to reducing energy consumption and coincident peak demand, the program's goals include the following:

- To reduce regulatory barriers to energy-efficiency through structural changes in the affordable housing industry;
- To encourage long-term energy savings (electricity and natural gas) by providing financial incentives for long-lasting energy-efficient upgrades;
- To increase owner-developers' knowledge of energy efficiency through design assistance and training; and
- To provide energy-efficiency information and assistance to public housing authorities.

The program works with local public housing authorities to encourage their adoption of an Energy Efficiency-Based Utility Allowance (EEBUA). The EEBUA is an alternative to the standard utility allowance—the subsidy that low-income tenants receive for their utility bills. If their local public housing authority adopts the EEBUA, owners or developers who achieve certain levels of energy efficiency in their new or existing affordable multi-family properties can collect higher rents. These higher rents are possible because the EEBUA has reduced the tenant's utility allowance to correspond with the reduction in utility costs that have been achieved by the energy-efficiency measures installed in the property. The tenants also receive a small benefit. As the example in Figure 1 shows, the reduction in utility costs should be large enough not only to offset the increase in rent, but also leave a few more dollars each month in the tenants' pockets.

**The Designed for Comfort Program:
*Targets and Goals***

- Targets publicly- and privately-owned, affordable multi-family and single-family housing.
- Objective is to reduce energy consumption and coincident peak demand.
- Objectives include increased access to energy-efficiency education resources for Public Housing Authorities and property owner-developers.

² For more information, visit <http://www.designedforcomfort.com>.

³ While the program also offers incentives to the single-family affordable housing sector, this paper focuses on the incentives available for affordable multi-family properties.

⁴ These utilities include Pacific Gas and Electric (PG&E), San Diego Gas and Electric (SDG&E), Southern California Edison (SCE), and Southern California Gas (SCG).

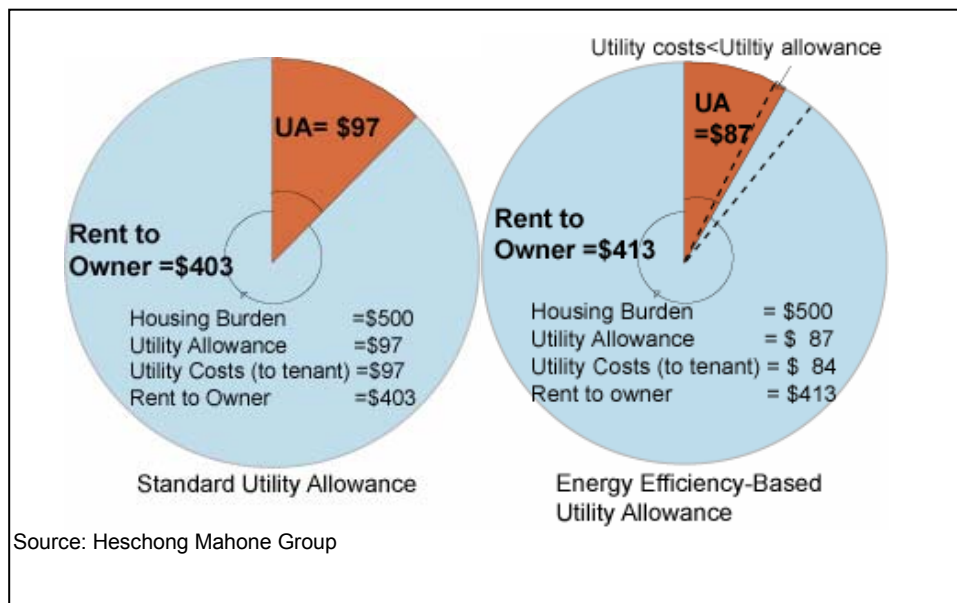


Figure 1. Example of an EEBUA

Although the EEBUA is designed to reward owners and developers of affordable multi-family properties with additional cash flow, the Designed for Comfort Program also offers additional prescriptive rebates to owners and developers whose properties meet the energy-efficiency standards set by the program. To qualify for either the EEBUA or these rebates, owner-developers must have their energy savings verified by a certified Home Energy Rating System (HERS) rater and requires analyses of baseline and proposed energy consumption performed by an energy consultant.⁵ The program subsidizes these analysis and verification costs. The program's focus on engaging the energy experts further reinforces its goal of effecting long-lasting change by increasing owner-developers' knowledge of energy efficiency.

The **California Multifamily Energy-efficiency Rebate (MFEER) Program**⁶ provides prescriptive rebates to multi-family property owners and managers for a wide range of retrofit energy-efficient improvements. Multifamily properties with two or more units are eligible. The program also operates in the service territories of California's Investor-Owned Utilities (IOUs). Program guidelines and incentive levels are consistent across the state. The program's goals include long-term energy savings, peak demand reduction, and equity. Unlike the Energy Action and Designed for Comfort Programs, however, the MFEER Program is not targeted solely toward affordable properties.

⁵ A HERS rating is an evaluation of the energy efficiency of a home, compared to a computer-simulated reference house (of identical size and shape as the rated home) that meets minimum requirements of the Model Energy Code (MEC). Note that a new HERS rating scale will be effective in July, 2006.

⁶ The California Multifamily Energy-Efficiency Rebate Program is funded by the California ratepayers under the auspices of the California Public Utilities Commission (CPUC).

The primary drivers of the California MFEER Program are installation contractors who are attracted by the program's prescriptive rebates. These contractors do their own prospecting for customers. Because some of the energy-efficient measures (e.g., compact fluorescent lamps) have relatively low equipment and installation costs, in some cases program rebates are sufficient for contractors not to charge for their services. For more expensive measures—such as central boilers—the incentives only cover a portion of the incremental costs. In addition to installing the energy-efficient measures, the contractors also usually fill out the rebate application forms on the customer's behalf.

These activities of the installation contractors are effective at mitigating many of the barriers to greater energy efficiency that multi-family property owners/managers face. These barriers include the split incentive barrier, difficulty identifying energy-efficiency opportunities, lack of capital, lack of maintenance staff to install energy-efficient measures, and lack of time to focus on energy-efficiency options. The contractors have been so successful at finding multi-family property owners that program rebates are often used up a few months after they become available. However, there are some disadvantages to this reliance on installation contractors, as explained later in this paper.

**The California Multifamily Rebate Program:
*How It Works***

- The program is primarily delivered through independent installation contractors who are attracted by the program's prescriptive rebates.
- The program also promotes its rebates directly to multi-family property owners and managers through multi-family trade associations and networks.

The California Multifamily Rebate Program: *Targets and Goals*

- Targets multi-family housing properties with two or more units.
- Not limited to affordable multi-family properties.
- Objectives include long-term energy savings, peak demand reduction, and equity.

In addition to relying on installation contractors to deliver the program, the program also conducts marketing and outreach to the California multi-family property sector. These efforts include making presentations before apartment associations, paying for advertisements in multi-family trade publications, and sending direct mailings to attract contractors—such as insulation or boiler contractors—that are currently underrepresented in the program. The program further increases its visibility by collaborating with other statewide and national energy-efficiency programs, such as the California Residential Appliance Recycling Program and the national ENERGY STAR® initiative.

Program Evaluation, Monitoring, And Verification

The economic and institutional barriers within the multi-family housing market pose challenges to energy-efficiency program implementation. Energy Action, Designed for Comfort, and the California Multi-Family Energy Efficiency Rebate Program approach the multi-family housing market from different program design perspectives. However, while each developed sophisticated approaches to overcoming these challenges, none of the programs succeeded in eliminating the obstacles entirely. To understand where each program was successful, where it fell short, and why, KEMA, under the sponsorship of the California Public Utility Commission, has undertaken comprehensive evaluation, monitoring, and verification efforts for all three programs. The remainder of this section discusses how each program addressed the challenges posed by this market, starting with the split incentive issue, and provides some measure of the programs' varying levels of success.

Program Challenges

Energy Action. The Energy Action Program was designed to help affordable housing properties overcome a number of barriers to implementing energy efficiency. These include lack of time, staff turnover, lengthy budget cycles, bureaucratic impediments, and perhaps most importantly, lack of capital. However, overcoming these barriers has been difficult. For example, the program has been unable to find a way to address the long budgetary lead times associated with subsidized housing. Many of the eligible properties are subject to budgetary cycles during which multiple levels of bureaucracy must approve changes, which requires budgetary cycles frequently spanning two or

more years. While the Energy Action Program lengthened its initial rebate reservation and application period to accommodate the properties' longer budget cycles, the period still is not long enough to allow some properties to participate.

The program also offers rebates and no-interest financing to help overcome lack of capital and split incentive barriers. In some cases rebate levels have been set to cover the whole cost of the energy-efficient measure, not just its incremental cost over a standard efficiency alternative. This higher incentive is paid to avoid the bureaucratic barrier of having to get signoffs from multiple parties for even the smallest expenditures.

Yet these financial incentives offered by the program have had mixed success. The program's no-interest loans were designed to reduce the long-term burden of financing more expensive energy-efficiency measures. However, few properties have used these loans. One representative of an Energy Action partner organization suggested that this may be due to property board members' and financiers' reluctance to have typically cash-strapped affordable housing properties take on additional debt.

The Energy Action Program also tries to train operations and maintenance staff in the hope that these staff will make improvements to their properties in the long-term. Yet this has proven very challenging. One problem is that low-income multi-family housing properties are generally understaffed and management and maintenance staff have multiple competing demands for their time. Another serious problem is high staff turnover. For these reasons, along with the administrative burden of conducting this training, the Energy Action Program staff decided to discontinue this training toward the end of the 2004–2005 program period and concentrate its efforts on recruiting properties into the rebate process.

Designed for Comfort. The Designed for Comfort Program approaches the split incentive dilemma from both a policy perspective and an economic perspective. On the policy side, the program develops an alternative to the standard utility allowance called the Energy Efficiency-Based Utility Allowance (EEBUA). The EEBUA allows affordable housing owners and developers to collect additional rent income while also reducing their own utility costs. The allowance also provides tenants with a reduction in their utility costs that more than makes up for the small increase in rent. On the economic side, the program offers financial incentives that provide affordable housing owners and developers with additional encouragement to make energy-efficient improvements.

To be successful the Designed for Comfort Program must persuade Public Housing Authorities (PHAs) to adopt the EEBUA. This has proven challenging. PHAs have been slow or unwilling to adopt the EEBUA for a number of reasons including:

- **Lack of an explicit HUD endorsement.** Many PHAs want to ensure that the influential U.S. Department of Housing and Urban Development (HUD) endorses any policies concerning utility allowances that they adopt. The Designed for Comfort Program sought, but did not initially get an explicit endorsement from HUD, and as a result many PHAs have been reluctant to adopt the EEBUA.
- **Failure to see the benefits.** The primary beneficiaries of the EEBUA are the affordable housing owners and developers. While some PHAs are very interested in seeing their owners and developers benefit in this way, others regard it as a lower priority when compared to other concerns they must address.
- **Funding cuts.** Cuts in Federal funding for affordable housing subsidies had two effects on the adoption of the EEBUA. First many PHA officials had to devote their attention to lobbying against the cuts when they were first proposed and this left them less time to focus on the EEBUA. Second when the funding cuts went through, many PHAs had to lay off staff, which made adoption and implementation of the EEBUA more difficult.

Yet another complication to program implementation is that each PHA has its own special needs and as a result the program marketing approach had to be customized for each. In addition, PHAs often have several levels of management without any clear hierarchy governing decision-making for a program like the EEBUA. Further, finding appropriate contacts at the PHAs and explaining the utility allowances and the EEBUA concept was time consuming.

To try to combat these problems, the Designed for Comfort Program has spent a lot of resources to provide the PHA with the necessary "hand-holding." The program has created customized EEBUAs for each PHA they have tried to recruit, provided the PHAs with tailor-made presentations so they can sell the EEBUA concept to their boards of director, and even offered to administer the EEBUA for PHAs with staffs of limited size. Yet despite these great efforts, PHA adoption of the EEBUA has been slow.

All these delays in PHA approval eventually forced the Heschong-Mahone Group to alter the original program design. Initially the program policy was only to give prescriptive rebates to affordable housing owners and developers who were located in the jurisdiction of a PHA that had adopted the EEBUA. These rebates were considered as a reward for those who had adopted and implemented the EEBUA. However, as the EEBUA adoption process dragged on, the program became concerned that it might not be able to achieve its energy savings goals in time. Therefore, HMG decided to allow qualifying affordable housing owners and developers to receive the incentives even if their jurisdictional PHA had not adopted the EEBUA. Although the program met most of its energy savings goals, most of the savings were achieved in areas where the EEBUA had not been adopted.

California Multifamily Energy-Efficiency Rebate Program. The Multifamily Energy-Efficiency Rebate Program addresses the split incentive barrier by providing incentive packages that are designed to be large enough so the property owners and tenants have to invest little or no capital to realize savings.

The primary driver of the program is a highly motivated group of installation contractors who are attracted to the program's prescriptive rebates. As noted, the program funds for financial incentives are often used up a few months after becoming available. This has forced the program to adopt rationing and reservation mechanisms to lengthen the period that the financial incentives are available.

Although these installation contractors have been very successful at identifying energy-efficiency opportunities in multi-family properties, there have been some drawbacks to this method of program delivery. The program has found it difficult to encourage diversity in the energy-efficiency measures that are installed. To be able to offer the energy-efficient measures to property managers/owners at little or no cost, many contractors rely on installers that do not have sophisticated technical skills. Therefore they prefer to promote energy-efficient measures that are relatively quick and easy to install—such as compact fluorescent lamps and programmable thermostats. The program has found it more difficult to attract contractors that install central boilers or more sophisticated lighting systems. Furthermore many property managers have expressed dissatisfaction with the quality of some of these “quick and dirty” installations.

The program has also had some difficulty recruiting large property management firms. Developing relationships with these companies is important not only because they have large property portfolios but also because they frequently acquire new properties. However, installation contractors who participate in the program have found it hard to obtain energy-efficiency projects with these large property management firms. Layers of bureaucracy make it difficult for contractors to locate the key decision-maker within these firms. These larger management companies also often have their own maintenance crews and are wary of using outside contractors.

On the other end of the spectrum, the program has also found it difficult to reach small multi-family properties. Smaller multi-family properties are naturally unattractive to the installation contractors that drive the program. Such smaller properties often do not have enough apartment units to offset contractor costs for marketing, administration, and travel. The program has been most successful in reaching properties in the mid-range of the size spectrum (100–250 units).

Program Successes

The Energy Action Program deals with the issue of reaching larger property management firms through a portfolio-level approach in which program staff establish contact with higher-level management in the management firms rather than directly contacting staff at the properties managed by these firms. In many cases, contact is established by the energy resource manager. This manager is a representative from a well-respected non-profit organization, the Local Initiatives Support Coalition (LISC), who is able to build relationships with the management firms and access many properties through one point of contact. Trust is a major barrier in working with low-income multi-family properties, and property representatives trust LISC because of their familiarity with the organization and/or their impression of LISC as an unbiased entity. After establishing initial contact with the properties, the outreach manager then acts as their advocate throughout the program process.

Because Energy Action was not solely a resource acquisition program, the energy resource manager's role is essential to the program's success. As an unbiased third-party, this manager may have more influence with affordable property managers than contractors who are perceived as just

trying to “sell something.” The energy resource manager and other program staff are instrumental in guiding property managers through the complicated process of obtaining engineering services, training, and rebates. Program partners report that without this “hand-holding,” far fewer properties would ultimately make energy-efficient improvements.⁷

The Energy Action Program has also had success offering no-cost measure installations during the 2004–2005 program period. These no cost measures allow some properties to participate in the program that otherwise would not be able to do so. They also allow other properties to install energy-efficient measures much more quickly than they would have if they had to pay for the improvements themselves. Although the Multi-Family Energy-Efficiency Rebate Program also offers no-costs measures, the Energy Action Program’s energy resource manager and other staff can provide some oversight of the contractors to insure higher quality installations.

The Designed for Comfort Program has been able to achieve its program goals, both in the number of public housing authorities adopting the EEBUA and the amount of energy savings acquired. However, as discussed above, this was achieved through significant changes in the program design. Recently the program was able to get a more explicit endorsement of the EEBUA concept from the U.S.

Department of Housing and Urban Development (HUD). This should accelerate the EEBUA’s adoption going forward. Finally the program has also had some success in its goal of increasing the awareness of energy efficiency among affordable housing owners and developers. A key catalyst of this has been the program’s requirement that these owners and developers use Home Energy Rating System (HERS) inspectors and other types of energy consultants. Positive experiences with these energy experts has led the owners and developers to regard them as a valuable resource that they can use on other energy-efficiency projects, even those outside the program.

The MFEER Program has been very successful in acquiring energy savings in the multi-family sector. The program has consistently been able to exceed its annual energy savings goals and demand for the program’s rebates far exceed supply. Furthermore the program has been able to achieve this with relatively low program marketing costs. This success is largely due to a group of installation contractors who have marketed the program aggressively. These contractors have combined the program’s prescriptive rebates with their own low-cost installation practices so that multi-family property owners/managers often pay little or no out-of-pocket costs for their energy-efficiency improvements.

Lessons Learned

A review of all three programs yields valuable lessons, including the following:

The most cost-effective way to acquire multi-family energy savings is to totally subsidize the cost of the energy-efficient measures. All three of the programs found that prescriptive rebates that totally or substantially covered the cost of the energy-efficient measures were the quickest and easiest ways to acquire energy savings in the multi-family sector. The opportunity to reduce their energy costs and improve their properties using little or no out-of-pocket costs has great appeal for owners and managers of multi-family properties. The rebates directly target the split incentive and lack of capital barriers. In addition, the rebates are crucial in attracting installation contractors who can help overcome other multi-family owner/manager barriers such as difficulty identifying energy-efficiency opportunities and lack of maintenance staff to install energy-efficient measures. Finally, for affordable multi-family housing in particular, rebates that fully cover equipment and installation costs can avoid the bureaucratic barrier of having to get signoffs from multiple parties for even the smallest expenditures.

However, using total-subsidy rebates can cause problems with quality control and measure diversity. For rebates to provide total cost subsidies, the energy-efficiency measures must have relatively low equipment and installation costs. This explains why compact fluorescent lamps and programmable thermostats accounted for a large proportion of the measures installed by the Multifamily Energy-Efficiency Rebate and Energy Action programs. The need to keep costs to a minimum can lead to “quick and dirty” installations and poor quality equipment.

⁷ It’s important to note, however, that despite the time and efforts of the resource manager and other program staff, a much higher proportion of properties were still unable to make the recommended improvements because of the other barriers described herein.

Yet the California programs also suggest possible strategies for mitigating these problems. To promote measure diversity, in 2006 SDG&E, one of the utilities participating in the Multi-family Energy-Efficiency Rebate Program, will offer a bonus incentive for energy-efficiency projects that use three or more different measure types. To discourage poor quality installations, the Multi-Family Energy-Efficiency Rebate Program has taken a number of actions. These include more frequent inspections of rebated projects, conducting post-installation customer satisfaction surveys, providing property managers/owners with manuals that help guide them in selecting contractors, requiring contractors to provide contact and warranty information for addressing post-installation problems, quickly responding to customer complaints and making contractors remedy the situation, and even gaining the authority to exclude noncompliant contractors from the program. However, it is important to note that while these actions reduced the prevalence of quality problems, these problems still exist. The energy resource manager used by the Energy Action Program can help police contractors on behalf of multi-family property owners and managers. Because this monitoring can be quite costly, contractors should be pre-screened and held to terms and conditions that ensure quality installations.

Frequent staff turnover can make energy-efficiency education in the multi-family sector problematic. However, introducing multi-family property owners and developers to the benefits of energy-efficiency consultants has some promise. Toward the end of its implementation period, the Energy Action Program dropped its training of multi-family operations and maintenance staff to focus on recruiting properties into the rebate process. Energy Action's training efforts were greatly hindered by high staff turnover and a possible lack of knowledge transfer among staff. The training was also expensive to administer, as it required in-depth technical information and technical experts to conduct the training seminars.

The evaluation of the Designed for Comfort Program, however, found that there might be more promise in the education of owners and developers of multi-family properties about the benefits of energy efficiency. There appeared to be lower turnover in this group of market actors. Furthermore, since these owners/developers are frequently acquiring and building new multi-family properties, or retrofitting existing ones, the education of these market actors should have broader and longer-term benefits. It is important to point out, however, that for this energy-efficiency education to have practical results, multi-family property owners and developers must know that there are experts available that can easily recommend energy-efficiency strategies for their properties. This is why there was great value in the Designed for Comfort Program showing developers and owners how useful that HERS raters and other energy efficiency can be. Many of the developers said that they had not used such experts before but were excited about using them in the future.

Systemic solutions, like Energy-Efficiency-Based Utility Allowances, have great theoretical promise, but require great time and patience to implement. The Designed for Comfort Program's Energy-Efficiency-Based Utility Allowance (EEBUA) is a very elegant and innovative way to attack the disincentives to energy efficiency that result from standard utility allowances. However, the program discovered that it was very difficult to get Public Housing Authorities to adopt the EEBUA, despite considerable 'hand-holding' on the part of the program. Hopefully HUD's recent explicit endorsement of the EEBUA concept will encourage PHA adoption in the future.

Affordable multi-family property owners/managers need program assistance in negotiating complex institutional barriers. Complex regulations, long budget cycles, and multiple layers of decision-making are all barriers that affordable multi-family property owners/managers face in addition to the conventional multi-family barriers (split incentives, difficulty identifying measures, etc.). Both the Energy Action Program and the Designed for Comfort Program found that it was important (albeit expensive) to provide a lot of 'handholding' to help these owners/managers negotiate this complex maze so that energy-efficiency improvements could be funded.

Cost-effectiveness should not be the only measure of success for programs targeting the low-income multi-family housing sector. Because of the unique financial and staffing challenges posed by this sector, a custom set of program evaluation rules may be necessary to ensure equal access to energy-efficiency program resources by low-income multi-family property managers. An equity-based approach to evaluating programs targeting this market sector should be considered.

Partnerships with respected and trustworthy housing organizations are highly beneficial, if not essential, to successful program implementation. Because of the trust issues within the low-income multi-family sector in particular, association with (or endorsement by) an established, familiar, and respected organization like HUD or LISC can only strengthen a program's potential for success within this market sector.

Programs must have long lifetimes to achieve energy savings in this market. The long budgetary cycles, high staff turnover, and intense financial pressures on multi-family property owners necessitate lengthy program periods. As evidenced by the Energy Action Program, even a two-year program period may not give the properties enough time to include energy-efficient upgrades in an upcoming budgetary cycle.

Recommendations

Results of these three program evaluations have demonstrated that although the affordable multi-family housing market sector may be difficult to serve, it is possible to achieve energy savings through thoughtful program design and implementation. Based on our findings, we believe the most successful programs will incorporate the following elements:

- Total-cost rebates for energy-efficient measures;
- Quality-control procedures to reduce the incidence of poor quality installations in rebate projects; these procedures might include:
 - Pre-screening participating contractors;
 - Random post-inspections of rebated projects;
 - Random satisfaction surveys of participating property managers/owners; and
 - Gaining authority to exclude noncompliant contractors from the program.
- Partnership with (and/or endorsement from) respected non-profit affordable housing organizations to lend credibility and guide participants through the program process;
- Adequate program resources so that complex institutional barriers can be understood and then mitigated through administrative assistance provided by the program;
- Subsidized technical assistance (e.g., from energy consultants);
- Goals that effectively balance equity and cost-effectiveness; and
- An adequate (lengthy) program period.

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