2003 CALIFORNIA STATEWIDE MULTIFAMILY PROGRAM EVALUATION

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1. EXECUTIVE SUMMARY

This report summarizes the results of the 2003 California Multifamily Energy Efficiency Rebate Program (MFRP) evaluation. The MFRP is a statewide program implemented by each of the four California investor-owned utilities[1] (IOUs) using a uniform set of program guidelines and incentive levels. The MFRP provides rebates for a broad list of energy efficiency measures that can be installed in apartment dwelling units and in the common areas of apartment and condominium complexes. This section provides the following summaries.

- PY2003 Evaluation Approach
- Status of PY2002 Evaluation Recommendations
- Summary of PY2003 Evaluation Findings
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1.1 PY2003 Evaluation Approach

A key priority for this evaluation was to assess the operational and marketing components of the program. Another objective was to assess the assumptions used in the program savings estimates. To meet these objectives, the evaluation research included a series of discrete tasks.

- **Process Evaluation and Summary of Accomplishments.** The evaluation team conducted a review of program literature and interviews with Program Managers and other parties affiliated with the program. A summary of program accomplishments was prepared, including an assessment of the status of recommendations made in the PY2003 program evaluation.
- **Contractor Interviews.** In-depth interviews were conducted with 22 contractor firms providing services to the MFRP.
- **Owner/Property Manager Surveys.** One hundred and fifty telephone surveys were completed with representatives from participating properties.
- **On-Site Verification and Tenant Surveys.** The team completed 102 on-site verifications of 2003 participants to verify installation ratios and to gather data to verify projected savings impacts. Tenant surveys were returned by 22 occupants.
- **Impact Savings Assessment.** The results of the measure verification were used to assess the validity of the savings estimates as reported by the program. Primary data were also used to estimate installation ratios that were used to provide adjusted *ex post* savings for the program.
- **Hard-to-Reach Assessment.** A geographic information system was built to determine where the program participants for PY2003 were located. The underlying U.S. 2000 Census and 2004 population estimates were then used to analyze salient participant characteristics.

[1] The four investor-owned utilities are Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, and Southern California Gas Company.

1.2 Status of PY2002 Evaluation Recommendations

Because the MFRP was a new program in 2002, the evaluation team felt it important to offer a wide selection of recommendations on how to strengthen the program. One of the exciting aspects of this year's evaluation is the realization that many of these issues and recommendations have been addressed. As such, it is useful to review the recommendations made in 2002 and to discuss the extent to which the issues addressed by the recommendations have been addressed. The seven recommendations made included the following.

- Work with contractors and property managers to increase lighting retention,
- Restrict lamp installation to high use applications,
- Increase program funds,
- Adjust rebate levels,
- Create an electronic application,
- Market for gas applications, and
- Develop a hard-to-reach plan.

1.2.1 Work with Contractors and Property Managers to Increase Lighting Retention

The 2002 evaluation recommended that the program work with contractors, property owners, and lighting manufacturers to improve lighting fixture and lamp quality and increase the retention rate for lighting installed. There were a number of possible reasons for the poor quality, each of which required specific action from the program.

Improving Lamp Lifetime Reliability

Issue. In the 2002 program evaluation, the most important reason for lamp removal was attributed to lamp products that were not achieving the expected lifetimes. It was recognized that the ultimate responsibility for this issue rested with the lamp manufacturers and the contractors. Furthermore, the results of the on-site inspection and property manager survey may have been the first indication to the Program Managers and to many of the contractors that lamp reliability was a serious issue.

Recommendations Made in 2002 Report. While evaluations such as this can provide feedback to the contractors and the program about lamp reliability, ultimately it should be the responsibility of the property managers to convey reliability issues to contractors, and of contractors to take these issues to their suppliers. MFRP can facilitate a more positive relationship between the property managers, contractors, and suppliers in the following ways:

- Prepare a short manual for property managers that explains the program, and
- Build awareness of product warranties and enforce product warranties.

Results in 2003-2004. The Program Managers have made lamp quality their number one issue. The evaluators have seen a number of encouraging developments taken by the Program Managers and the contractors to deal with the reliability issue.

- Several of the largest contractors contacted all of the properties they had served and agreed to replace lamps that had prematurely burned out.
- Some contractors have been giving additional lamps to property managers for use as replacements for lamps that have burned out.
- The Program Managers have met with the largest contractors to discuss the lamp retention issue.

Lamp/Fixture Quality Issues

Issue. Some landlords and tenants removed lamps because the lighting quality or the fixture aesthetics were inadequate. The MFRP cannot institute any policy that can control these types of quality issues. It must be the responsibility of the property managers to control these issues. Unfortunately, the property managers do not understand the issues involved in selecting lamps and fixtures, they are unaware of the various options available, and they are unaware that they have some choices in the types of product that can be installed in their apartments.

Recommendations Made in 2002 Evaluation.

- The manual for property managers could explain the choices that they can make in what equipment is installed.
- Contractors whose work is tied to low participant satisfaction levels should be monitored closely.

Results in 2003-2004. The Program Managers have increased the number of verification inspections and are now uncovering many of the installation and lamp quality issues themselves. Poorly performing contractors are now removed from the program. There is now a manual given to property manages that explains how to select both a contractor and the equipment to be installed.

Verification Issues in Cases of Tenant Relocation

Issue. Cases in which tenants had relocated and reported lighting measures were not verified during subsequent inspections raised issues about the causes underlying the missing measures. It is possible that tenants leaving the properties took some of the missing lamps, and other lamps may never have been installed. It is also possible that some of the lamps were installed but not found by the on-site EM&V auditors.

Recommendations Made in 2002 Evaluation.

- The best way to ensure that lamps have been installed is to increase the number of utility-conducted in-field inspections of program rebate applications.
- EM&V study should conduct telephone interviews with tenants receiving CFLs in their apartments to more accurately determine the disposition of the CFLs and assess the tenants' satisfaction with these lamps,
- EM&V study should conduct more surveys with property managers to understand better the disposition of CFLs and fixtures installed under the program.

Results in 2003-2004. As noted, inspections have been increased in 2004. The on-site protocol was modified to better establish if lamps were installed and, if removed, determine when the lamps were removed and why. In-field inspectors have interviewed property managers when lamps are not found. Mail surveys have been given to tenants by ASW when possible, as there are no records of tenant phone numbers to implement a phone survey.

1.2.2 Restrict Lamp Installation to High Use Applications

Issue. In PY2002, no restrictions were made on where or how many lamps could be installed in a unit. As a result, lamps were installed in closets and other low use applications of little benefit.

Recommendations Made in 2002 Evaluation. It is recommended that the 2004 program monitor lamp installations to make sure that lamps are being installed in appropriate applications as part of the verification process.

Results in 2003-2004. Starting in PY2004, contractors are no longer permitted to install lamps in low use areas or to install more than 8-10 lamps per unit. In addition, the 2004-05 EM&V plan calls for an emphasis on establishing run times for key measures to better determine the benefits realized by the installations made.

1.2.3 Increase Program Funds

Issue. One of the biggest issues confronting this program (during 2002) is over-demand, which forces electric funds to be subscribed within weeks of the program opening.

Recommendation Made in 2002 Evaluation. If quality control is resolved, there is significant justification for increasing program funding, particularly as a resource acquisition endeavor. Replacing inefficient lighting in tenant spaces is a large untapped potential market with almost no free ridership.

Results in 2003-2004. Funding has increased in 2003 to $7,971,720 in rebates, which represents a 106% increase over the 2002 rebate dollar total. Even so, demand for rebates still exceeds availability.

1.2.4 Adjust Rebate Levels

Issue. Because the money is so quickly committed, there is pressure to lower the level of rebate per fixture so that more units can be installed. In 2004, the program lowered the fixture rebate from $60 to $50. Not surprisingly, the existing contractors voiced objections to this rebate change, and some said the change would make it unprofitable to install the fixtures. The evaluation team's concern is that the lowered rebate will squeeze the profit margins of these contractors. This pressure may encourage contractors to use lower quality products. Unless a quality control system is implemented, the results could be worse than those results experienced in PY2002.

Recommendations Made in 2002 Evaluation. The Program Managers must closely monitor activity at the beginning of PY2004 to track both application rates and the types of lamps installed. Contractors should be encouraged to see the reduction of incentives not as a call for

lower quality equipment or less profit, but as a shift in program responsibility that requires property owners to help pay for these improvements.

Results in 2003-2004. There was no reduction in rebate commitment when the rebate level was reduced. An objective of the 2004-05 evaluation could be to examine whether lamp quality issues have resulted from the rebate reduction.

1.2.5 Create an Electronic Application

Recommendation Made in 2002 Evaluation. One frequent suggestion from participating contractors was the desire for an electronic application form. An electronic process might eliminate or reduce some of the duplicative data entry currently required for projects installing large numbers of the same measure or large numbers of measures in one location. The PG&E electronic data entry set-up is well regarded among those who have used it. Respondents felt that this electronic form offers a good model for the other utilities.

Results in 2003-2004. All of the statewide utilities have developed electronic forms, thus making it more convenient for customers to apply for funding.

1.2.6 Market for Gas Applications

Issue. The lower level of participation for qualifying gas measures continues to be a concern for the Program Managers who have stepped up marketing to potential customers and contractors. Because gas measures generally represent technologies that are incremental improvements over existing products, the utilities cannot offer rebates that cover the full installation cost. Unlike the electric lighting measures where rebates often cover the full cost of the product and installation, the lower gas rebate levels generally limit the applications to those units that need replacement.

Recommendations Made in 2002 Evaluation. To achieve full commitment of gas funds, the program will need to tap into the existing large replacement market by aggressively marketing this program to property managers, contractors, and product distributors. In so doing, it must be realized that the contractors who install gas measures have felt that, to date, the incentive levels offered by MFRP have been set too low. Outreach to contractors will need to address contractor expectations in this area and leverage other means for generating contractor interest in program participation. The program should commit to more extensive marketing of the program.

Results in 2003-2004. The broad increase in the installation of programmable thermostats appears to have eliminated the concern that gas utilities will not meet their goals. This result is a double-edged sword. However, there is now the concern that many of these thermostats will not be programmed or kept programmed in a manner that saves energy. Close scrutiny of this issue will be needed in the 2004-05 EM&V.

1.2.7 Develop a Hard-to-Reach Plan

Issues. The hard-to-reach (HTR) issues raised in the 2002 evaluation are generally applicable to CPUC-wide policy changes.

Recommendations Made in 2002 Evaluation.

- The program should concentrate on its primary HTR goal to include multifamily and mobile home customers in the list of recipients of Public Goods Charges (PGC) funds.
- The program should stop concentrating attention in rural areas.
- The program should market itself to areas with the greatest potential.
- The program needs to use Census Tract-level data for identifying HTR clusters.
- HTR achievement must be assessed at the portfolio level.
- Data on participation should be collected and assessed to design programs and redefine the exact composition of those who are HTR.

Results in 2003-2004. No changes have been made in the CPUC HTR policy, or in the MFRP HTR implementation strategy.

1.3 Summary of PY 2003 Evaluation Findings

Summary findings from this evaluation are provided for the following:

- Measure installation and adjusted savings,
- Program operational issues,
- Contractor issues, and
- Multifamily property owner/manager issues.

1.3.1 Measure Installation and Adjusted Savings

Table 1-1 shows the summary of PY2003 participation. In total, 1326 complexes were treated with nearly 626,000 measures. Rebates totaling $7,971,720 were distributed.

Table 1-1: PY 2003 Multifamily Rebate Participation Records

Utility	Number of Complexes	kWh	Therm	Quantity of Measures	Incentives
SCG	374	4,371,663	736,798	52,942	$1,139,208
SDG&E	206	3,595,507	377,330	44,261	$1,528,823
SCE	243	4,607,285	0	127,554	$1,803,970
PG&E	503	10,047,686	602,917	401,113	$3,499,719
Total	1,326	22,622,141	1,717,045	625,870	$7,971,720

The on-site inspections, coupled with property manager and tenant on-site questionnaires, indicate that almost all of the measures for which applications were filed were originally installed. For the non-lighting electric measures, nearly 100% of the measures are found to be working and in place. For SDG&E, the lighting weighted installation proportions indicate that 100% of the CFL bulbs and 98% of the indoor hard-wired fixtures were installed. The weighted installation proportion for PG&E's bulbs indicates that 16- and 32-watt CFLs were fully installed. The weighted installation proportions indicate, however, that only 57% of 27-watt CFLs and 89% of 27-watt outdoor fixtures were installed. The installation proportions for PG&E's indoor hard-wired fixtures were 100%. The weighted installation proportion for SCE's

bulbs was 73% for 20-watt CFLs and 100% for 13-, 16-, and 25-watt CFLs. The weighted installation proportions for SCE's indoor and outdoor fixtures were 98% and 100%, respectively. Instances were reported, particularly in the PG&E service territory, where contractors left measures to be installed by property managers and/or tenants; evidence from the on-site surveys shows that most of these measures were not subsequently installed.

Table 1-2 shows the net savings as reported by the program and adjusted for actual installation rate found in the EM&V on-site inspections. The adjusted net energy savings is based on weighted installation rate data.

Table 1-2: Program Reported and Installation Rate Adjusted Net Energy Savings

Measures	Utility	2002 Net Program Reported Energy Savings	2003 Net Program reported Savings	2003 Net Installation Rate Adjusted Energy Savings
Lighting	All Utilities	All Utilities	8,814,121	14,830,053
	PG&E	PG&E	2,171,050	7,827,560
	SCE	SCE	5,331,601	3,852,374
	SDG&E	SDG&E	1,311,470	3,150,119
Other Electric	All Utilities	All Utilities	413,938	3,343,728
	PG&E	PG&E	309,290	2,134,681
	SCE	SCE	92,367	754,911
	SDG&E	SDG&E	12,281	454,136
Total Electric	All Utilities	All Utilities	9,228,059	22,544,162
	PG&E	PG&E	2,480,340	9,962,240
	SCE	SCE	5,423,968	4,607,285
	SCG	SCG		4,370,381
	SDG&E	SDG&E	1,323,751	3,604,256
Total Gas	All Utilities	All Utilities	517,456	1,710,527
	PG&E	PG&E	70,250	602,917
	SCG	SCG	283,827	736,672
	SDG&E	SDG&E	163,379	370,938

The program doubled the amount of rebate incentives distributed in PY2003 as compared to the dollars distributed in PY2002. Yet in spite of that growth, demand for rebates was not close to being satisfied. By delivering energy efficiency to tenant spaces, this program is reaching out into a virtually untapped area where no energy efficiency has penetrated and virtually none will without the program incentives. California has 2.8 million multifamily households living in approximately 150,000 multifamily buildings. In 2003, this program served only 1,326, or 1%, of this market.

In the 2003 EM&V process, we cautioned against expanding the program until the quality control issues are better controlled. The first year's evaluation revealed issues with the reliability of some of the CFL lamps being installed. This lamp quality issue exposed the real Achilles' heel for the MFRP. The program itself does not have the capacity to control and monitor every piece of equipment that is installed in every unit. To be successful, the program must empower the property managers to make it their responsibility to ensure that equipment is of satisfactory quality, that it is installed as claimed, and that it operates for at least the warranty period. The program must also educate contractors on their obligation to install quality products and replace non-working equipment.

The MFRP has come a long way in building the necessary infrastructure to control the quality issue. The next section outlines some of the major accomplishments that we have seen. Program Managers have done an excellent job in addressing the recommendations made in the 2002 evaluation report. Those actions have led to fewer reported occurrences of quality issues in the feedback from property managers.

The MFRP is also an essential element of the utility portfolio of programs because it reaches into households that are classified as HTR by the California Public Utilities Commission. The program successfully reaches the multifamily sector, a HTR designation. In doing so, the MFRP also extends services to a higher proportion of non-whites, Hispanics, non-English speaking, and moderate income households than is found in the general population. The only HTR classification that MFRP does not serve well is the rural areas, where few multifamily units exist to be served.

1.3.2 Program Operational Issues

The Multifamily Rebate Program continues to be a popular program, with most utilities fully expending their rebate dollars well before the end of the year. In both 2003 and 2004, applications for lighting well exceeded the available program funds. While gas utilities had challenges attracting applications in the past, an increase in applications for programmable thermostats and water heater controls has filled the gap.

The reservation system, newly implemented in 2003, has proven to be a valuable tool for the Program Managers in managing the distribution of rebates among contractors. As SCE has demonstrated, designating some funds for applications submitted directly by property owners and managers has allowed these types of applications to rise significantly.

Program Managers have seen an increase in awareness among property managers and an increased level of scrutiny on the part of these property managers for the work performed by contractors. There are continued concerns about the quality of contractor installations, especially among some of the newer entities participating in the program. Additionally, there remain some contractors who drop-ship CFLs to the properties and ask the owners to install the lamps themselves. The Program Managers noted that the concern over CFL product quality still exists for the MFRP and the industry in general. The delisting of some lamps has raised awareness, but has not yet eliminated, this quality issue.

Program Managers indicate that, by the end of PY2003 and throughout PY2004, they have instituted a number of changes that they believe will affect the program in a positive manner.

- **Q/C Outreach with Contractors.** Program Managers have made it their responsibility to inform contractors of quality control concerns, and to make sure that contractors know that they will be called back to sites where quality issues are found. All Program Managers said that they have significantly increased the number of contacts with their contractors. The four utilities held a meeting with contractors in October 2003 in which the Program Managers informed the contractors that the utilities were going to step up interest in what they were doing. Program Managers also told the contractors that they wanted to know when there are product-related issues, and that they then will work together to address these problems. It was made clear to the contractors that they have an obligation to honor customer requests and product warranties. Contractors also provided feedback to the Program Managers on how they ensure quality control. As a result, a couple of contractors revisited sites to replace lamps from suspect manufacturers, even those that were still operating. Other contractors have made it a practice to leave additional lamps with the property manager in case any lamps fail.
- **Q/C Outreach with Property Owners/Managers.** Program Managers have increased their efforts to educate property owners and managers regarding the program and, specifically, their role in ensuring that products meet their satisfaction. Program Managers have developed a packet of materials that is sent to prospective participants at the time the reservation is made. These materials explain the program and provide information to help property managers select contractors and specific products to be installed.
- **Inspections.** Program Managers at SCE and PG&E have increased the number of inspections they complete. SCG and SDG&E already inspect 100% of the program jobs. The other utilities report that more selective inspections can uncover most of the problems. These utilities give extra scrutiny to jobs done by first-time contractors or those with a history of less-than-perfect installations.

1.3.3 Contractor Issues

Several significant findings emerged during the interviews. These key findings are highlighted here and discussed in detail in subsequent sections.

- **Funding allocation and the reservation system remain top issues for contractors.** Contractors cited funding allocation issues and problems with the reservation system as top drawbacks and/or weaknesses in the program during PY2003, and mentioned these issues throughout the interviews. Contractors voiced their dissatisfaction with the short supply of funding, which makes it difficult for them to build a sustainable business model. Several contractors who work in more than one utility territory expressed a desire for the other utilities to adopt an allocation scheme similar to SCE's where fund distribution is spread out over the year.
- **The financial incentives are seen as the top strength of the MFRP.**
- **Lamp quality was not a significant issue for contractors in PY2003.** In past years, lamp quality was observed as a major issue for contractors installing them. However, contractors indicated there were no major issues with lamp quality in 2003. Of the 10

contractors that installed lamps as a measure in PY2003, seven said they had not experienced any problems with lamp quality. The remaining three indicated there were some problems (one mentioned receiving "bad batches" from the manufacturer), but they were able to solve them immediately and replace the equipment.

- **Program satisfaction among contractors is high, although contractors did note suggested improvements.** Contractors indicated they are satisfied with the program for the most part, although they did cite improving the funding and reservation systems as two top improvements to be made with the MFRP. When asked to rate their overall experiences with the MFRP program in PY2003 (on a scale from 1 to 10, with 1 indicating "not at all satisfied" and 10 indicating "very satisfied"), 20 of the 22 contractors interviewed rated their experiences a 5 or higher, with nearly one-third of respondents giving the MFRP a score of 10. Note that half of the contractors scored the program a 9 or 10.

Some contractors expressed dissatisfaction with the paperwork requirements, while others voiced the opposite opinion that the MFRP requirements were easy to deal with.

When asked which measures they would like to see added to the program, respondents recommended several measures, including a T12 to T8 lamp retrofit (which was noted by several contractors as having been added for PY2004), halogen torchiere trade-in, duct sealing/air conditioning tune-up, and solar heating for pools and spas.

In giving feedback to the utilities regarding promotion/marketing of the program, three main themes were prominent: (1) leave marketing to the contractors, (2) provide contractors with some marketing tools, such as stickers, flyers, and (3) do not promote the program when the funds are not there to fulfill any extra work that might result from a marketing campaign.

1.3.4 Multifamily Property Owner/Manager Issues

Most PY2003 participants were taking steps to improve energy efficiency for the first time – fully 58% of these participants had not installed any energy efficiency measures in their facilities in the past. For these participants, the program was the genesis of their energy efficiency activities and, as such, is an important influence in increasing awareness and acceptance of higher efficiency alternatives in the multifamily property market. This program is penetrating historically HTR market niches that have no past record of embracing and utilizing energy efficient products.

Utility representatives were much more likely to be mentioned as a source of program information in 2003 than in the preceding year and surpassed contractors as the most frequently mentioned source of program awareness. This seems to reflect a greater proactive effort to inform property owners about program opportunities and to encourage customer-driven applications. Even so, it appears that contractor marketing efforts are a primary driver for generating participation and rebate applications. It is telling, for example, that four out of five participants did not obtain competitive bids for the program work performed at their sites.

Satisfaction indicators are reasonably positive overall. One indicator that came up negative was the feedback on tenant reactions to installed lighting measures. More tenants reported

diminished lighting function than reported improvements. In contrast, non-lighting measures in tenant spaces seem to generate favorable reactions, with increased comfort levels being widely reported.

1.4 Key Recommendations Resulting from PY2003 Evaluation

In the PY2002 evaluation, there was a long list of recommendations for the program. The main recommendation for this year is to continue the progress made in 2003-2004. Program Managers must remain proactive in managing contractors, educating property managers, and monitoring program implementation. The following recommendations can strengthen these activities.

- **Maintain close scrutiny of contractor activities.** Without ongoing vigilance on the part of the Program Managers, contractors may regress to practices that include using lower quality fixtures and dropping off lamps and fixtures rather than installing them. Both practices can potentially reduce the near- and long-term effectiveness of the program. Program Managers must continue to inform contractors of the program's expectations for warranting products, and make it known that contractors who have not rectified issues have been banned from submitting future applications.
- **Make it clear in the application that contractors who are found to not install product for which rebates are claimed will be banned from future participation.** Drop-shipment of product is not in the interest of the program. Results indicate that these products are seldom installed. Stronger wording in the application, including a signed statement by contractor that all measures claimed were installed, should also be added.
- **Continue efforts to educate property managers.** Property managers who are well educated in terms of program participation and product selection are more likely to serve as an additional checkpoint for quality control.
- **Dedicate more funds to applications directed by property managers.** The program was designed to be a property manager directed program. When property managers submit the application, they are far more likely to be an active player. Property managers cannot structure their application submission to compete with companies geared to capitalize on the short funding period, so it is important to hold funds aside. Priority should also be given to multifamily structures with less than 20 units, as this size is under-represented in the program. Program Managers may want to keep an eye on submissions because smart contractors, when they find out that these funds are available, are likely to have property managers submit the applications of jobs they generate.
- **De-emphasize non-hard-wired solutions.** The removal of CFLs from tenant spaces remains an issue. Hardwired fixtures are more likely to provide long-term savings than screw-in lamps. Given the high program demand, it makes sense to shift to technologies with longer term savings.
- **Reduce the number of lamps per unit even further.** The number of lamps that may be changed in an apartment is still too high. It is difficult to imagine how someone in a studio apartment could use eight CFLs enough to make the change-out cost-effective. Program Managers should consider cutting eligible numbers in half.
- **Monitor closely the programmable thermostat settings.** The expansion of this measure has been a boost for gas utilities. However, rebate levels are justified based on

continued implementation of setbacks in tenant spaces. The 2004-05 evaluation should make this a priority.

- **Determine run-time of lamps.** This factor remains the largest unknown in the energy savings estimates. Research to define these parameters based on empirical data will ensure the accuracy of projected program savings.
- **Expand multifamily reach into geographic areas with high potential but no current activity.** Whenever a multifamily household is provided incentives through MFRP, it satisfies one of the HTR criteria set by the CPUC. By serving this multifamily household, it also increases the odds that the PGC funds are going to a non-white, Hispanic, and/or non-English speaking household. There remain areas of the state that do not receive their share of funds. The MFRP must encourage contractors to serve these areas.
- **Consider increasing available funds.** Funding for this program has been exhausted in each year thus far, yet there remains considerable untapped potential. The multifamily market is historically underserved, free ridership appears to be minimal, and, as such, the program presents an opportunity ripe in its potential for providing energy efficiency resources to the California utilities

2. INTRODUCTION

2.1 Evaluation Objectives and Methodology Overview

This report summarizes the results of the 2003 California Multifamily Energy Efficiency Rebate Program (MFRP) evaluation. The MFRP was essentially a new effort in 2002. The main objective for this evaluation was assessing the program's operational and marketing components. A secondary objective was to assess the assumptions used in estimating savings resulting from the program.

To meet these objectives, a series of evaluation research tasks was undertaken.

- **Process evaluation.** The evaluation team reviewed program literature and conducted interviews with Program Managers and other parties.
- **Contractor interviews.** In-depth interviews were conducted with 22 firms providing services to the MFRP.
- **Owner/property manager surveys.** One hundred and fifty telephone surveys were completed with program participant properties.
- **On-site verification.** The team completed 102 on-site verifications of 2003 participants.
- **Impact savings assessment.** The results of the other research were used to assess the validity of the program savings estimates.
- **Hard-to-reach (HTR) assessment.** A geographic information system was built to determine where the PY2003 program participants were located. The underlying U.S. 2000 Census and 2004 population estimates were then used to determine their characteristics.

2.2 Program Background

The MFRP is a statewide program implemented by the four California investor-owned utilities (IOUs) using a uniform set of program guidelines and incentive levels. The MFRP provides rebates for a broad list of energy efficiency measures that can be installed in apartment dwelling units and in the common areas of apartment and condominium complexes. In this program, a multifamily complex has five or more units.

Table 2-1 lists the non-mechanical measures included in the program. Table 2-2 lists the mechanical measures.

Table 2-1: List of Non-Mechanical Measures and Rebate Amounts

Apartment and Common Area Improvements	Rebate Amount 2003	Rebate Amount 2004
ENERGY STAR Labeled Ceiling Fans with CFL	$20.00	$20.00
ENERGY STAR Labeled Screw-In CFL 5-13 watts	$5.00	$5.00
ENERGY STAR Labeled Screw-In CFL 14-20 watts	$6.50	$6.50
ENERGY STAR Labeled Screw-In CFL 21-30 watts	$7.25	$7.25
ENERGY STAR Labeled Screw-In CFL Reflector Bulbs R30	$10.00	$10.00
ENERGY STAR Labeled Screw-In CFL Reflector Bulbs R40	$12.00	$12.00
ENERGY STAR Labeled Interior Hard-Wired Fluorescent Fixture	$60.00	$50.00
ENERGY STAR Labeled Exterior Hard-Wired Fluorescent Porch Light	$30.00	$30.00
ENERGY STAR Labeled Clothes Washers – Tier 1	$75.00	$75.00
ENERGY STAR Labeled Clothes Washers – Tier 2	$75.00	$125.00
ENERGY STAR Labeled Dishwashers	$50.00	$50.00
ENERGY STAR Labeled Programmable Thermostats	$50.00	$50.00
High Performance Dual-Pane Windows	$0.50/ft^2	$1.00/ ft^2
Attic or Wall Insulation	$0.15/ft^2	$0.30/ft^2
Low-Flow Showerheads	$3.75	$5.00
Faucet Aerators	$1.25	$1.25
High Efficiency Exit Signs—Retrofit	$4.50	NO
High Efficiency Exit Signs—New	$13.50	$25.00
Occupancy Sensors	$10.00	$10.00
Photocells	$10.00	$10.00
ENERGY STAR Qualified Coin Operated Clothes Washers	NO	$150.00
T-5 OR T-8 Lamps w/Electronic Ballasts-- 1 Lamp Installation	NO	$32.00
T-5 OR T-8 Lamps w/Electronic Ballasts—2 Lamp Installation	NO	$34.00
T-5 OR T-8 Lamps w/Electronic Ballasts—3 Lamp Installation	NO	$38.00
T-5 OR T-8 Lamps w/Electronic Ballasts-- 4 Lamp Installation	NO	$45.00
T-12 Lamp Delamping	NO	$6.00/each

Table 2-2: List of Mechanical and HVAC Measures and Rebate Amounts

	Rebate Amount 2003	Rebate Amount 2004
Central System Natural Gas Boilers	$1500	$1500
Central System Natural Gas Water Heaters	$550	$550
Energy Efficiency Package Terminal Air Conditioners and Heat Pumps	$100	$100
Natural Gas Water Heater and/or Boiler Controllers-- 20 or less units	$750	$750
Natural Gas Water Heater and/or Boiler Controllers—Digital for 20 units or greater	$1500	$1500
Natural Gas Water Heater and/or Boiler Controllers—Non-digital for 20 units or greater	$750	$750
ENERGY STAR Labeled Programmable Thermostats	$50	$50
ENERGY STAR Central Natural Gas Furnace 90% AFUE	$200	$200
ENERGY STAR Central Natural Gas Furnace Variable Speed Drive 80% AFUE	$100	NO
Natural Gas Storage Water Heater	$50	$40
ENERGY STAR Labeled Room Air Conditioner	$50	$50
Energy Efficient Central Air Conditioner—Package System ≥ 12 SEER w/TXV	$100/unit	$275
Energy Efficient Central Air Conditioner—Package System ≥ 13 SEER w/TXV		$425
Energy Efficient Central Air Conditioner—Split System >13 SEER	$200/unit	$200
Energy Efficient Central Air Conditioner—Split System >13 SEER w/TXV	$325/unit	$225
Energy Efficient Central Air Conditioner—Split System >14 SEER w/TXV	$425/unit	$425
Energy Efficient Central Heat Pump—Packaged ≥ 12 SEER, 7.6 HSPF w/TXV	$175/unit	$300
Energy Efficient Central Heat Pump—Packaged ≥ 13 SEER, 7.9 HSPF w/TXV		$500
Energy Efficient Central Heat Pump—Split ≥ 13 SEER, 8.0 HSPF	$275/unit	$275
Energy Efficient Central Heat Pump—≥ Split 13 SEER, 8.0 HSPF, w/TXV	$400/unit	$300
Energy Efficient Central Heat Pump—Split ≥ 14 SEER, 8.5 HSPF, w/TXV	$500/unit	$500

Unlike the earlier Residential Contractor Program offered for this market, this program targets property managers and owners directly. The individual utilities made numerous efforts to attract the attention of property managers/owners using methods such as direct mailing, cold calling of large customers, and teaming with local building owner/manager trade associations. Although these efforts had some success, it appeared that early program jobs were primarily contractor-

generated and that contractor participation for electric measures in the first year was limited to a few large firms.

Interested parties, whether they were contractors or owner/managers, submitted program applications using the standardized forms. In 2002, these applications were processed on a first-come, first-served basis with no limitations imposed and no reservation system. In response to shortcomings of the first-year process, a reservation system was implemented for 2003. In 2003, some measures, such as lighting, were fully subscribed quickly. Each utility acted individually in deciding whether to allocate funds earmarked for other applications to cover the excess lighting measure demand. Each utility processed, paid, and tracked its own applications. SDG&E conducted post-installation inspections on every one of its applications. The other utilities reportedly performed inspections on 35% of their applications, an increase from the previous year inspection rate.

2.3 Program Changes for 2003

Reflecting experiences during the initial PY2002 program year, several changes were made for PY2003.

- **Implementation of a 45-day reservation system.** This new system was implemented to prevent contractors from locking up a disproportionate amount of program funding that might not result in actual measure installations. With the new reservation system, contractors have 45 days to file a completed rebate application seeking their reserved funds. If the amount is not claimed, it rolls back into the general fund of available monies.
- **CFL incentives increased.** CFL incentives were increased from $2 to between $5 and $7.25, depending on the lamp type.
- **Programmable thermostat incentives increased.** Incentives were increased from $20 to $50 for thermostats to offset installation costs.
- **Controller incentives modified.** A tiered rebate was implemented for controllers, resulting in three options. The first option, targeted at buildings with 20 units or less, includes a basic controller and has a $750 incentive. The second option, targeted at buildings with more than 20 units, provides a $750 incentive for a non-digital display graphing model. The third option, also targeted at buildings with more than 20 units, provides a $1,500 incentive for a controller that includes a digital display graphing model.
- **Gas water heater incentives reduced.** Incentives were reduced from $50 to $40 for 30-40 gallon-size tanks (note that central water heater incentives start with tanks 75 gallons and larger).
- **Window incentives increased.** Incentives for windows were increased from $0.50 to $1.00 per square foot, to encourage property owners to install energy efficient windows and provide the tenant with comfort and an opportunity to reduce their energy use.
- **Additional measures.** The following were added to the list of qualifying measures:
    - Reflector CFLs (interior and exterior, R-20, R-30),
    - ENERGY STAR electric water heaters, and
    - Coin-operated washing machines.

- **Reservation limits.** The CPUC established limits on the amounts that could be reserved at any one time. Specifically, a single entity could not reserve more than 5% of available funding. In part as a response to this limit, several new companies formed to provide services under the program, with some sharing physical addresses and personnel with other participating contractors.
- **Gas furnace efficiency requirements.** Beginning in 2003, furnaces must have a rating of at least 90% AFUE to qualify for a financial incentive under the program.
- **Electric water heaters added.** In 2003, electric water heaters were added as a qualifying measure.
- **ENERGY STAR coin-operated washers added.** Financial incentives were added to complement rebates already provided through a third-party local program.

2.4 2003 Program Achievement

This section summarizes the participation data for PY2003. Section 7 provides detailed information on the savings.

Table 2-3 shows the number of applications submitted in PY2003.

Table 2-3: PY2003 Multifamily Rebate Participation Records

Utility	Number of Complexes	kWh	Therm	Quantity of Measures	Incentives
SCG	374	4,371,663	736,798	52,942	$1,139,208
SDG&E	206	3,595,507	377,330	44,261	$1,528,823
SCE	243	4,607,285	0	127,554	$1,803,970
PG&E	503	10,047,686	602,917	401,113	$3,499,719
Total	1,326	22,622,141	1,717,045	625,870	$7,971,720

2.5 Changes for 2004

Some minor modifications were made for 2004, mostly centering on incentive levels and qualifying measures.

- **Adding T5 and T8 lamps.** Program Managers added T-5 and T-8 interior garage lamps for high-rise buildings.
- **Lowering the basic rebate for hard-wired fixtures.** The basic rebate level for hard-wired lamps was lowered from $60 to$50. Installing lamps in closets and storage areas is no longer permitted.
- **Increasing the rebate for exit signs.** The incentive increased from $13.50 to $25.00, to include installation costs.
- **Increasing incentives for attic insulation, wall insulation, and low flow showerheads.** The insulation market is composed of a small number of firms with an even smaller subset working in the multifamily market. To stimulate interest in these measures, Program Managers raised incentives to $0.30/ft^2 for 2004 (up from $0.15/ft^2 in 2003) for insulation. Low flow showerhead incentives rose to $5.00 from $3.75.

- **Limiting total CFLs per dwelling unit based on the number of bedrooms in unit.**
  - Studio 8 interior CFL 2 exterior CFL 3 hard-wired fixtures
  - Single Bedroom 8 interior CFL 2 exterior CFL 4 hard-wired fixtures
  - Two Bedroom 10 interior CFL 2 exterior CFL 5 hard-wired fixtures
  - Three Bedroom 12 interior CFL 2 exterior CFL 7 hard-wired fixtures
  - Single Bedroom 15 interior CFL 2 exterior CFL 9 hard-wired fixtures
  - Single Bedroom 18 interior CFL 2 exterior CFL 10 hard-wired fixtures

2.6 Report Organization

The remainder of this report is divided into the following sections:

- Section 3 discusses the process evaluation issues,
- Section 4 reports on contractor-related research,
- Section 5 discusses the owner and property manager interviews and surveys,
- Section 6 reports on the results of the on-site inspections,
- Section 7 discusses the savings assessment,
- Section 8 examines HTR issues, and
- Section 9 provides a summary and recommendations for the program and future evaluations.

3. PROCESS EVALUATION ISSUES: STAFF FEEDBACK

In-depth interviews were conducted with Program Managers at each utility. These interviews, conducted in February and March 2004 with follow-up interviews in September 2004, were intended to inform the evaluation scope and to highlight any pertinent process-related issues. Given the timing of these interviews and the fact that several changes had been made based on PY2003 experience, the discussions were focused on both PY2003 and PY2004-05 programs.

Overall, program delivery is reported to be quite smooth. The reservation system, implemented in PY2003 in response to PY2002 experiences, contributed to a smoother running program in 2003 as compared with 2002.

Program Managers were asked for feedback on the following topics:

- Program goals and goal achievement,
- Quality control,
- Program marketing,
- Hard-to-reach (HTR) customers, and
- Long-term strategic issues.

3.1 Program Goals and Goal Achievement

Program Managers were asked "What were the goals for the program in 2003, and how well did the program perform relative to these goals?" A number of goals were discussed, including (1) units installed, (2) rebate dollars committed, (3) kWh and therm impacts, and (4) penetration into HTR market segments. All Program Managers reported that they were able to meet their goals regarding number of units and rebate dollars. Activity levels for gas measures, which had been a significant challenge in 2002, were sufficient for each gas utility to make its primary goals.

Some utilities noted that they fell short on some of the specific secondary goals. SCG did not meet its kWh goal and SDG&E did not reach its HTR goals. Reaching the gas markets was an issue in 2002, but the increase in applications for programmable thermostats and water heater controls has filled the gap. One Program Manager also reported an increase in the number of applications for windows.

When asked in September how the utilities were doing with respect to their 2004 goals, all noted that they had already achieved their goals or would do so by the end of the year. For all parties, the introduction of the reservation system has been an enormous help in handling applications and distributing program dollars.

In both 2003 and 2004, applications for lighting well exceeded the available program funds. Each Program Manager has developed a unique strategy for dealing with the heavy demand for lighting rebate monies. PG&E closed the CFL rebate as soon as the allocated program dollars were used. SCE kept a portion of the program dollars aside for applications made directly by property managers.

Several Program Managers noted that they are seeing a lot more applications submitted directly by property owners/managers. This is a plus for the program and in contrast to the 2002 program experiences where contractors submitted most of the applications. First, these applicants tend to take a longer term perspective on equipment performance and consequently take a more deliberate approach to equipment selection. As a result, poor installation and equipment practices have been less apparent on these jobs. The development of a growing base of customer-generated applications is also fundamentally significant as an indicator that market changes may be starting to occur, with property owners and managers taking note of the program and initiating equipment replacement decisions, rather than taking the lead of vendors and contractors.

3.2 Program's Biggest Challenge

In February 2004, Program Managers were asked "What were the major implementation issues and/or challenges in 2003, and how were these addressed?" Three Program Managers gave the following responses.

- **SDG&E.** SDG&E feels that skillful marketing is a key requirement/accomplishment. Attaining the gas therm goals is a challenge. The utility reported having trouble attracting boiler contractors to participate in the program. In order to reach program goals, the program depends heavily on the installation of water controllers.
- **SCE.** A number of approaches were used to extend the program period so that the 2003 program did not close until November. Most importantly, SCE reserved a certain amount of the rebate monies to be available for customers who apply directly, versus those that apply through the contractors. To find customers, SCE did a mass mailing to landlords. This promotion brought in many applications; however, many were not acted upon by the applicants. The Program Manager does not know why the customers did not act, and would like to see this issue investigated.
- **SCG.** Implementing the reservation system was a bit tricky, but they are reportedly now managing it well. On the gas side, there was a slow start, but things picked up as the year went on. Qualifying central water heaters is an issue. Many of the applications do not have the required documentation, specifically the water heater model numbers and specs. The contractors are supposed to use GAMA and the CEC website (AFUE for boilers), but there are continuing challenges in getting the contractors to supply the documentation.

3.3 Quality Control

The quality of some of the lighting installed under the program was the biggest issue identified as confronting the Program Managers in PY2002. Property owners had identified a number of issues, most notably (1) high lamp failure, (2) aesthetic quality issues, (3) instances of poor installation, and (4) lamps left on site but not installed. The on-site inspections conducted during the 2002 program evaluation confirmed that a large number of lamps were not installed when the inspectors looked for them approximately 6-12 months after reported installation. Because this issue was not uncovered until mid-way through the 2003 year, it was anticipated that some of the lamp quality issues may continue in the 2003 installations.

However, the Program Managers report that they took a number of steps to address the lamp quality issue. As a result, some of these went into immediate effect as soon as the Program Managers became aware of this issue. In some instances, contractors, once alerted to the issues, went back to properties and remedied the situation. Many others changed their installation and/or buying procedures.

Program Managers indicate that by the end of PY2003 and throughout PY2004 they had instituted a number of changes that they believe will affect the program in a positive manner.

- **Q/C Outreach to Contractors.** Program Managers have made it their responsibility to inform contractors of quality control concerns and to make sure that contractors know that they will be called back to sites where quality issues are found. All Program Managers said that they have significantly increased the number of contacts with their contractors. The four utilities held a meeting with contractors in October 2003 in which the Program Managers informed the contractors that the utilities were going to step up interest in what they were doing. Program Managers also told the contractors that they wanted to know when there are product-related issues, and that they then will work together to address these problems. It was made clear to the contractors that they have an obligation to honor customer requests and product warranties. Contractors also provided feedback to the Program Managers on how they ensure quality control. As a result, a couple of contractors revisited sites to replace lamps from suspect manufacturers, even those that were still operating. Other contractors have made it a practice to leave additional lamps with the property manager in case any lamps fail.
- **Q/C Outreach to Property Owners/Managers.** Program Managers have increased their efforts to educate potential participating owner/property managers regarding the program, and their role in ensuring that products meet their satisfaction. They have developed a packet of materials that they send to prospective properties at the time the reservation is made. These materials explain the program and provide information on selecting contractors and specific products to be installed.
- **Inspections.** Program Managers at SCE and PG&E have increased the number of inspections they do. SDG&E already inspects 100% of the program jobs. The other utilities have found that more selective inspections can uncover most problems. These utilities pay special attention to jobs done by first-time contractors or those with a history of less than perfect installation.

3.4 Issues Faced in PY2004

For all of the gas utilities, generating interest on the gas side remains a challenge. The issue remains that most gas products only save enough energy to justify subsidizing a portion of the product costs rather than paying for the products outright, as has been the case for some electric products (e.g., lighting). There are some products, particularly thermostats and water heater controllers, that can be installed at low- or no-cost to the property owners, and the bulk of the gas rebate dollars include these measures.

On the electric side, Program Managers continue to confront the issue that there are not sufficient funds in the annual budget to satisfy the full demand for the program. The limited funds and the

quick manner in which they become reserved thwart the desire for the program to attract more participation from property managers and owners.

Program Managers have seen an increase in the awareness of property managers and a closer scrutiny by them of the work performed by contractors. There are continued concerns about the quality of contractors, especially among some of the new entries into the program. Some contractors still drop-ship CFLs to the properties and then ask the owners to install the lamps. The Program Managers noted that the concern over CFL product quality still exists for the MFRP and the industry in general. The delisting of some lamps has raised awareness, but has not yet eliminated the issue.

One Program Manager thinks there may eventually be a conflict between the MFRP and the upstream lighting program because that program has stores providing substantial rebates for lighting products**.** While there may be some overlap between the audiences for the MFRP and the Upstream Lighting Program, it is generally so difficult to reach the tenant sector that some duplication of services is acceptable, especially when one considers how little of each market is being covered by the programs.

3.5 Program Marketing in PY2003 and Planned Marketing for PY2004

Since the programs were generally fully subscribed, there was little need or incentive to promote the MFRP in 2003. In general, the utilities did very little marketing of this program in 2003. The following is the extent of marketing undertaken.

- SCE, in an attempt to attract direct involvement from property managers sent a mailing to property managers. They also placed monthly ads in four different apartment journals. There was no tracking of results from this activity.
- SCE and SCG staffed a booth at several apartment association trade shows, which they report worked well. They report that the MFRP is receiving better recognition overall at trade shows.
- SCG took out a full-page ad in several apartment association publications.
- SCG sent an e-mail solicitation to insulation contractors, which they report worked well.
- SDG&E called plumbers to inform them about the program.
- PG&E placed ads in publications and conducted outreach to nonprofit housing organizations.

3.6 Other Program Issues

Managers were asked how well the program was reaching its intended market of property managers. The answer given was that the market awareness for the program is growing and that Program Managers would like to see it grow even more. The Program Managers recognize that to do so involves an education process for property managers.

The managers also have seen a substantial increase in the number of contractor firms entering the program in 2004. This has become a significant issue in that at least a few of these firms have been established for the express purpose of taking advantage of the available rebates.

One Program Manager has taken the step of banning several firms with poor installation performance from participating in the program, though the Program Manager has no illusions that these people will not return in another form. This Program Manager intends to monitor closely all new contractors at least until they have established a good performance record.

4. CONTRACTOR FEEDBACK

This section summarizes interviews with participating contractors in PY2003. As with PY2002, the MFRP in PY2003 is considered a landlord/property manager-focused program. However, because contractors primarily initiate most of the applications submitted, telephone interviews were conducted with 22 participating contractors. These were conducted during June and July 2004. Participation was based on program records for PY2003. In some cases, as was evident with interviews for PY2002, contractors may not have been aware of their participation in the program, as some applications were processed directly by customers who listed the contractor's firm on the rebate forms. These contractors were included in the sample as participants. As a result, the evaluation team spoke with four contractors who were somewhat unaware of their role in the program because they had done the work on customer-sponsored applications.

The research covered the following range of topics and objectives.

- **Contractor activity in PY2003 and PY2004.** Several questions aimed to achieve a better understanding of contractor activity for PY2003. Contractors were asked under which utilities they operated, when they first participated in the program, the number of buildings and units in which measures were installed, and the types of buildings in which measures were installed. Questions were also asked about contractor participation in 2004. These questions centered on program changes, installation of new measures, incentive level changes, and volume of work associated with the MFRP.
- **Program satisfaction.** The interviews also anticipated learning about contractor satisfaction with the program in PY2003. Contractors were asked to rate the program, describe administrative experiences with the program, and describe what they thought were the program strengths and benefits.
- **Measures installed.** The evaluation team sought to understand which measures contractors were installing in 2003. Questions were asked regarding the types of measures installed and which measures contractors think should be added to the program.
- **Measure quality.** Problems with measure quality, particularly with lamps, were observed in earlier program years. In the PY2003 contractor interviews, contractors were asked questions regarding lamp and other measure qualities to gauge whether these issues had been resolved and whether other quality issues had emerged.
- **Program marketing.** Questions regarding program marketing were asked to understand the marketing efforts of both contractors and utilities.

4.1 Sample Disposition

Twenty-two interviews were conducted with contractors representing the four IOUs. Table 4-1 shows the overall sample disposition.

Table 4-1: Participating Contractor Interview Completions

Interview Completions	No.
SDG&E Complete	7
PG&E Complete	7
SoCalGas Complete	4
SCE Complete	4
Total	**22**

Many of the contractors work in multiple service territories.

4.2 Contractor Activity in PY2003

PY2003 was the second year the MFRP was offered and 77% of the contractors interviewed had participated in the program in both 2002 and 2003. Only four of the 22 contractors interviewed were new to the program in 2003. Additionally, many of the contractors who indicated that they had participated before 2003 said they had also participated in other incentive programs prior to 2002. One MFRP contractor said his company had been participating in utility-sponsored programs for 22 years.

Nearly one-third of the contractors interviewed indicated that the MFRP accounted for at least 50% of their overall business volume. However, as Table 4-2 shows, half of the contractors interviewed said the MFRP accounted for less than 25% of their overall business volume.

Table 4-2: Multifamily Rebate Program Participation – Percentage of Overall Business Volume

Multifamily Percentage of Overall Business Volume	No.
75-100%	4
50-74%	3
25-49%	3
10-24%	6
Less than 10%	5
Don't Know	1
Total	**22**

As Table 4-3 shows, when asked if the percentage of MFRP associated to overall business volume was an increase, a decrease, or about the same as the year before, eight of the 18 contractors who participated in PY2002 and PY2003 indicated their volume of MFRP work increased from PY2002, five indicated the volume decreased, and four indicated MFRP volume was static. Comments from contractors regarding MFRP volume and funding availability include:

- "Landlords are paying more attention to the program."
- "Rebate levels increased."
- "The reservation system in 2003 enabled us to capture more money and properties."
- "More flexibility in the rebates, and changes in some of the rulings."
- "Lack of funding."

- "The funding came and went so fast that we couldn't get funded."
- "[We] just didn't have as much work to do overall."
- "No reason, our work has just been steady."

Table 4-3: Participation Percentage: Increase, Decrease or About the Same?

2003 Increase/Decrease/About the Same	No.
Increase	8
Decrease	5
About the Same	4
Not Applicable (did not participate in PY2002)	4
Don't Know	1
Total	**22**

As Table 4-4 shows, 15 of the contractors interviewed said they installed measures exclusively in apartment buildings while the remaining seven indicated they installed measures in apartment buildings as well as either condominiums, townhouses, or duplexes.

Table 4-4: Multifamily Facilities Measures Installed In

Facilities Measures Installed In	No.
Apartment Buildings Only	15
Apartment Buildings & Condominiums	3
Apartment Buildings & Duplexes	3
Apartment Buildings & Townhouses	1
Total	**22**

4.3 Program Satisfaction

As shown in Table 4-5, when asked to rate their overall experiences with the MFRP program in PY2003 (on a scale from 1 to 10, with 1 indicating "not at all satisfied" and 10 indicating "very satisfied"), 20 of the 22 contractors interviewed rated their experiences a 5 or higher, with nearly one-third of respondents giving the MFRP a score of 10. Note that half of the contractors scored the program a 9 or 10.

Table 4-5: Overall Experiences with the MFRP

Overall Satisfaction with 2003 Multifamily Experiences	No.
10 – very satisfied	7
9	4
8	1
7	4
6	1
5	2
4	0
3	0
2	0
1 – Not at all satisfied	2
Don't Know	1
Total	**22**

When asked why they rated the program the way they did, contractors elaborated on their ranking with a mix of positive and negative attributes of the program.

- "[The program] was a pleasant experience; it was not the red tape I thought it was going to be."
- "The program was just smooth; one of the easier programs we work with."
- "Found it to be very useful, good benefits to us and customers, [it] helps us build relationships with customers."
- "The forms were way too time consuming to fill out, [we] had about 11,000 measures to install, [so I] had to do 11,000 line items; [this] took a ton of hours to do."
- "The program required more information on projects than the year before which was kind of a pain, they wanted to see invoices and packing slips, probably just to verify work was done, but it felt like they couldn't trust us."
- "The program itself and the paperwork worked really well, but it was very difficult to secure funds, and they go so quickly, that it is difficult to make commitments to customers."
- "2002 was more of a problem, but it still seemed like SCE always knew how things were going to run and PG&E and SDG&E didn't; the way PG&E and SDG&E allocated funds was more difficult because the funding arrives, we did the marketing, we got some properties, and then the funding is gone so fast we sometimes couldn't do the work."
- "Would like to see a process similar to SCE's—allocating funding by quarter, that way I can know ahead of time what my workload will look like."
- "Didn't do anything for us, very difficult because we didn't hardly do anything; nothing great I can say, nothing negative, nothing positive."

When asked what they considered the program's main strengths and benefits to be, many contractors referred to the incentives and rebates as primary strengths of the program, as Table 4-6 shows. Other strengths that contractors mentioned were reduced energy consumption and energy efficiency, customer satisfaction, good communication from utility Program Managers,

and better paperwork. One contractor said, "Our customers like it because they were getting something for free."

Table 4-6: Strengths and Benefits Summary

Strengths/Benefits	No.
Incentives/Rebates	6
Energy Savings and Efficiency	3
Customer Satisfaction	2
Paperwork	2
Funding	2
Don't Know	1
Other	8
Total	**24**

Multiple responses accepted.

Contractors were also asked to identify the main drawbacks or weaknesses of the MFRP. As Table 4-7 shows, contractors' comments primarily revolved around the reservation system, followed closely by program funding, paperwork, and program communications/timing. The reservation system, lack of program funding, timing and allocation of program funds, and paperwork were also salient issues discussed during the PY2002 contractor interviews. Relevant quotes from contractors regarding PY2003 include the following.

- "The only issue with the program we had was with the reservation system. It made it really difficult to plan the work, because you would make a reservation for the work you lined up, and you had to complete all that work before you could reserve any more. This made our work a little difficult, and didn't make things run very smoothly. The reservation system does not work with normal business practices."
- "The lack of stability and funding allocating [were main drawbacks and weaknesses]." The biggest drawback is they expect contractors to go to customers and offer them something; but the utility won't release funds because they say they want to diversify areas, and they don't approve of specific areas. For example, they didn't let us know that there was no funding for San Francisco, but Sacramento was okay.[2]"
- "The timing of allocation of funds and paperwork requirements [were main drawbacks and weaknesses]." Requiring original signatures and typed or handwritten application forms is a pain; the lack of consistency with the program application across all the utilities is also a pain."

[2] PG&E staff note that, although the nine Bay-area counties and Sacramento were not included in HTR targeting, applications were still accepted as long as they were from customers of PG&E.

Table 4-7: Drawbacks and Weaknesses Summary

Drawbacks/Weaknesses	No.
Reservation System	6
Funding	5
Paperwork	4
Program Communications/Timing	4
None	4
Other	6
Total	**29**

Multiple responses accepted.

There was also a mix of positive and negative reactions from contractors when asked about their experiences with the program from an administrative perspective. Main themes varied from positive to negative, but dissatisfaction with the paperwork and application process was most prominent. Some salient quotes from contractors include the following.

- "Things went very smooth." (This opinion was repeated several times.)
- "Receiving payment was good, the process has definitely improved, particularly with PG&E."
- "Quick turnaround with checks."
- "[The forms] were very tedious and cumbersome to use. Would like to see some kind of streamlining, or an electronic spreadsheet."
- "It [administrative aspects] changes from time to time, depending on who is handling the accounts; procedures change from person to person. We've had some difficulty with inconsistency."
- "The paperwork is cumbersome, but I don't know any better way to do it."
- "The report form is somewhat confusing for customers in the way that it is written; it's very wordy and difficult for customers to figure out."
- "SCG's paperwork was a hassle; they would lose things and the cycle for payment was longer than it should have been."

4.4 Measures

Contractors interviewed said they primarily installed lamp and/or fixtures under PY2003. Other measures mentioned are insulation, windows, water heater/boiler controls, and programmable thermostats. Table 4-8 shows more detailed information on the types of measures installed.

Table 4-8: Measures Installed

Measures Installed	No.
Lamps/Fixtures	10
Water Heater/Boiler Controls	5
Insulation	4
Windows	3
Programmable Thermostats	2
Total	**24**

Multiple responses accepted.

When asked which measures they would like to see added to the program, respondents recommended several measures, including a T12 to T8 lamp retrofit (which was noted by several contractors as having been added for PY2004), halogen torchiere trade-in, duct sealing/air conditioning tune-up, and solar heating for pools and spas.

4.5 Measure Quality

Of the ten contractors that installed lamps as a measure in PY2003, seven said they had not experienced any problems with lamp quality. The remaining three indicated there were some problems (one mentioned receiving "bad batches" from the manufacturer), but they were able to solve them immediately and replace the equipment. Fully 100% of the contractors that installed lamps and fixtures said they were not currently experiencing any lamp quality issues. These responses indicate that many of the lamp quality issues that occurred in prior program years are reduced.

Contractors were also asked how they manage the replacement of products that fail before their warranties were up. One hundred percent of respondents indicated they always replace any equipment that fails before their warranties are up. Many contractors said they also return to the site to replace failed products if necessary. Nine of the ten contractors who installed lamps and fixtures said they always leave lamps at the install site in case some lamps fail. Four of these nine said they typically leave about 5% of the total number of lamps installed as replacement lamps.

4.6 Marketing

When asked how they currently market the program, many contractors indicated they primarily market the program via new customers and existing customers/contacts (typically property management and investment firms) by either mentioning the rebate program when being considered for a project or by calling existing or previous customers, such as a property and investment management firms to inform them about the program. According to contractors, such

companies tend to acquire properties and thus have more eligible locations for the MFRP. Table 4-9 shows the variety of marketing methods employed by contractors.

Table 4-9: Marketing Methods

Marketing Methods	No.
Through Customers/Existing Contacts	10
Cold-Calling/Telemarketing	3
Door-to-Door Marketing	2
Advertising (TV, Radio, Yellow Pages)	2
No Marketing	1
Other	7
Total	**25**

Multiple responses accepted.

Contractors were also asked if they felt there was greater awareness of the program among multifamily property managers in PY2003, compared to PY2002. As Table 4-10 shows, responses were mixed with only six of the 22 contractors interviewed indicating they felt there was a change in awareness. Seven of the 22 felt there had not been any change in awareness from PY2002, and five of the seven said they felt there was no change in awareness from PY2002 because most of the property managers they worked with were already aware of the MFRP. However, two of these seven contractors also said they did not feel like property managers were at all aware of the program. Several comments from contractors are worth noting.

- "A lot of people know about the program."
- "Awareness [of the program by property managers] was about the same. It seemed like that they already knew about the program in advance, whether that be from other contractors of the utility, I'm not sure."
- "Even now property managers don't know about the program, and if it wasn't for contractors, they wouldn't know about it. Property managers don't want to deal with rebates…and in general there is a lack of awareness among property managers."

Table 4-10: Change in Awareness of MFRP from PY2002 to PY2003

Changes in Customer Awareness?	No.
Yes	6
No	7
Not Applicable (did not participate in PY2002/no marketing)	5
Don't Know	4
Total	**22**

In providing feedback to the utilities regarding program promotion/marketing, three main themes stood out among contractors' recommendations: (1) leave marketing to the contractors, (2) provide contractors with some marketing tools, such as stickers or flyers, and (3) do not

promote the program when the funds are not there to fulfill any extra work that might result from a marketing campaign. Salient comments include the following.

- "I don't think the program is having any problems with marketing right now, I think there are more leads than money."
- "It seems to me the utility has all of the participants they need to ensure they complete their budgets and meet their goals, so I can't think of any additional marketing efforts they need to do."
- "If you promote it too much and the funding isn't there, it doesn't look good to the customer."
- "Leave the promotion to the contractors. I would rather see the utilities save money for the installation [of measures]. The utilities don't need to do much promotion, because contractors find the jobs anyway."
- "I would like to see them send packets to contractors that would have a basic flyer explaining the program more to customers."
- "They could give me some more marketing tools, like stickers, etc."

Other suggestions that contractors gave regarding utility marketing of the program include television advertisements, packaging the MFRP with the commercial program, bill stuffers, sending a letter to property managers, and sending an information packet to property managers.

4.7 PY2003 Program Compared to PY2004

Since PY2003 interviews were conducted in June and July 2004, well into PY2004, the evaluation team asked several questions about program changes witnessed in 2004 from 2003. Contractors noted several changes, including (1) a decrease in incentive levels, (2) program funding ending early, and (3) a different reservation system and allocation of funds (some liked it, some did not). As the following comments indicate, opinions varied regarding these changes.

- "The reservation system is not really first-come, first-serve anymore. I'd like to see that reinstated."
- "2004 is better because I like the reservation system in place."
- "The rebate amount dropped for interior fixtures, but this wasn't necessarily a problem, we can still install at no cost to customers."

Six of the 22 respondents commented that they were not actively participating in 2004. While five did not elaborate on the reasons why they were not participating, one respondent did: "We went to the utilities in January, but were turned away because they said there weren't enough funds available. We haven't pursued the program since."

Ten of the 22 contractors interviewed said they expected the amount of work they do under the MFRP in 2004 to decrease, stay about the same, or were unsure, as shown in Table 4-11. This is compared to eight that said the amount of work they do would increase. Contractors primarily cited the apparent lack of program funding in 2004. Table 4-11 also compares answers given by contractors in 2003 and 2004.

Table 4-11: Expected Changes in the Amount of Work from 2003 to 2004

Increase/Decrease/About the Same	2003	2004
Increase	8	8
Decrease	5	5
About the Same	4	2
Don't Know	4	3
Not Applicable	1	4
Total	**22**	**22**

4.8 Summary and Significant Findings

Several significant findings emerged during the interviews. These key findings are highlighted here, and discussed in detail in subsequent sections.

- **Funding allocation and the reservation system remain top issues for contractors.** Contractors cited funding allocation and problems with the reservation system as top drawbacks and weaknesses in the program in PY2003, and mentioned these issues throughout the interview.
- **The financial incentive is seen as the top strength of the MFRP.**
- **Lamp quality was not a significant issue for contractors in PY2003.** In past years, lamp quality was observed as a major issue for contractors installing them. However, contractors indicated there were no major issues with lamp quality in 2003.
- **Program satisfaction among contractors is high, although contractors did note suggested improvements.** Contractors indicated they are satisfied with the program for the most part, although they did cite improving the funding and reservation systems as two top improvements to be made with the MFRP.

5. SURVEYS OF PARTICIPATING PROPERTY OWNERS AND MANAGERS

5.1 Background and Approach

Participating property managers and owners in the four service areas were surveyed to assess experiences with and opinions of the PY2003 MFRP. The evaluation surveyed 150 participants and covered the following subjects:

- How respondents first learned of the program and recall of program marketing pieces,
- Whether or not they had participated in PY2002 MFRP,
- Types and locations of measures installed,
- As applicable, whether the same measures were installed in prior year's participation,
- Whether their expectations of PY2003 MFRP were met,
- Satisfaction with the work of the contractor and with the performance of the equipment installed,
- Perceptions of tenant satisfaction,
- Factors contributing to dissatisfaction, as applicable,
- Willingness to recommend the program to others,
- Measure persistence and factors affecting persistence,
- Plans to adopt additional energy efficient measures, and
- Characteristics of respondents, their firms, and their facilities.

Most of these questions were replicated from the evaluation conducted for the PY2002 program, allowing for time-series analysis of the results. The surveys were conducted in the spring of 2004, and a copy of the questionnaire appears in Appendix A.

The analysis of survey responses examined patterns across the four utility participant populations as well as patterns in PY2002 versus PY2003. Overall, the results across utilities are very similar, with very few statistically significant differences identified. Because of the notable lack of significant variation found across utilities, this discussion does not explicitly address utility-level findings *except in those cases where significant differences were found*.

5.2 Sample Design and Weighting

The study population for the property owner and manager survey consists of participants in the PY2003 MFRP at PG&E, SCE, SCG, and SDG&E. The entire population of participants was divided into two pools. The first pool was used to select candidates for the on-site visits. The selection into the first pool was weighted towards selecting more large apartments, so the remaining pool is slightly more representative of the smaller apartments within the participant population. The remaining participants were then used as the pool for the telephone surveys. Respondents were selected randomly from this pool, though minimum quotas of 25 complete surveys for each utility were established. As a result of these sampling steps, it was necessary to weight the final sample to represent the responses of the entire population of participants. Table 5-1 shows the sample weights. It is worth noting that using the weights produces no meaningful differences from not using the weights.

Table 5-1: Survey Sample Weights

	<5900	5900-19499	19500+
Total Applications			
Southern California Edison	148	75	20
San Diego Gas & Electric	113	81	12
Southern California Gas	328	43	3
Pacific Gas & Electric	328	123	52
Survey Sample			
Southern California Edison	22	10	5
San Diego Gas & Electric	15	9	1
Southern California Gas	28	4	0
Pacific Gas & Electric	33	20	3
Survey Weights (Applications/sample)			
Southern California Edison	6.7273	7.5000	4.0000
San Diego Gas & Electric	7.5333	9.0000	12.0000
Southern California Gas	11.7143	10.7500	
Pacific Gas & Electric	9.9394	6.1500	17.3333

All of the figures quoted in this section are presented using the population weights described in Table 5-1, unless otherwise noted.

5.3 Characteristics of Participants

According to responses, the 2003 MFRP enjoyed a solid rate of re-participation from customers who had taken advantage of the program previously—an important indicator of program satisfaction. More than one-fourth of PY2003 participants surveyed were participants in the 2002 program (27%). Most PY2003 participants, however, had neither participated in the program previously (59%) nor installed any energy efficiency measures in their facilities in the past (58%). For these participants, the program was the genesis of their energy efficiency activities.

The high level of re-participation was a surprise to the evaluators and to the Program Managers, so records were examined to see if the same pattern could be found in the tracking records. The high level of re-participation reported by respondents is not corroborated by the records contained in the tracking database. When 2002 and 2003 records were cross-checked for matches on any one of the criteria—address, apartment name, or contact name—the team found only 35 matches among the SDG&E, SCE, and SCG databases, which contain more than 675 separate locations in 2002 and more than 800 locations in 2003. Few of these matched on first name only. It is likely that that the higher value reported by property managers reflects memory of participation in other utility programs and not just the MFRP.

Landlords were asked to provide the number of units in their complexes. More than 50% of responding participants (weighting applied) report that the participating facilities are more than 60 units, while complexes under 20 units represent 26% of the respondents and mid-size complexes represent 24% of the respondents. This proportion of large facilities is up from PY2002 when 37% of participants were in this segment. It is believed the data indicate that the program is having more effect in the segment of property managers with larger facilities.

Most respondents (57%) both own and manage the property where the rebated measures were installed. Very few (4%) own the property without managing it. Decision making for participation in the program most often involves the property manager (65%), followed by the property owner (59%), and someone at the property management company (36%). This decision-making pattern parallels that documented in the PY2002 evaluation.

Interestingly, decision involvement of the property owner is one of the few areas where differences are found between utilities. Property owner involvement is highest for participants in the SCG (75%) and the PGE programs (67%), and lowest in the SDG&E (25%) and the SCE programs (44%). Property management input is given in 78% of the SCE respondent properties and 70% of the PGE properties, but only 56% and 53% of the SCG and SDG&E properties, respectively.

Respondents have, on average, 15 years of experience in their field, with more than 10 years at the facility where they are currently working.

In most regards, the characteristics of participants in the PY2003 program paralleled those of participants in the PY2002 program. Table 5-2 summarizes the characteristics of the property managers surveyed in this research.

Table 5-2: Profile of PY2003 MFRP Participants

Characteristic	PY 2002 Participant Profile		PY 2003 Participant Profile	
			raw	weighted
Service area of property	PG&E	16%	37%	37%
	SCE	37%	25%	18%
	SCG	18%	21%	30%
	SDG&E	29%	17%	16%
No. of dwelling units at address (from respondents)	<20	27%	<20	29%
	20-60	33%	20-60	24%
	>60	37%	>60	47%
			mean	93 units
No. of stories at address	1	6%	1	10%
	2	73%	2	71%
	3	10%	3	12%
	4+	7%	4+	7%
			mean	2.4 stories
Ownership/management of property	Own only	3%	Own only	4%
	Manage only	36%	Manage only	39%
	Own & Manage	59%	Own & Manage	57%
No. of years in current job position	1 – 2 yr	21%	1 – 2 yr	20%
	3 – 4 yr	23%	3 – 4 yr	27%
	5 – 9 yr	19%	5 – 9 yr	16%
	10 – 19 yr	17%	10 – 19 yr	22%
	20+ yr	15%	20+ yr	11%
	Mean	9 years	Mean	10 years
No. of years in multifamily property management	1--2	11%	1--2	5%
	3 – 4		3 – 4	10%
	5 – 9	19%	5 – 9	19%
	10 – 19	29%	10 – 19	39%
	20+	26%	20+	27%
	Mean	14 years	Mean	15 years
Repeat participant in MFRP				27.5%

5.4 Measures Installed

The participants surveyed have installed the following types of measures: lighting 45%, HVAC 25%, water 21%, shell 6%, other 8%. A number of respondents have more than one type of measure installed on their site.

Self-reported data indicate that 44% of respondents had measures installed in tenant-occupied spaces but not common areas, 25% had measures installed in common areas only, and 30% had measures installed in both tenant-occupied and common areas of the buildings. This pattern resembles that found in surveys of 2002 participants, with a minimal shift toward common area installations.

Among repeat participants, over half had different types of measures installed in their second year of multifamily rebate program activity (57% had new measures installed, 32% had the same measures installed, and 10% did not know.).

5.5 Satisfaction

To assess satisfaction with the MFRP, respondents were asked the following questions.

- Are you satisfied with the overall quality of work of the contractor?
- Are you satisfied with the performance of the equipment installed?
- Are tenants satisfied with the equipment installed?
- Did the program meet your expectations?
- Would you recommend this program to other property managers?

These responses were examined in aggregate and on a question-by-question basis.

5.5.1 Overall Level of Satisfaction

More than three-fourths of participants reported that their expectations were adequately met (82%) and that they would recommend the program to another property manager (81%). Each of these satisfaction indicators was down somewhat from the prior year when they were recorded at 83% and 87%, respectively. Table 5-3 shows the summary results for each question by utility.

Table 5-3: Overview of Satisfaction Indicators

Satisfaction Indicator Variable	Percent of Participants Satisfied				Total
	PGE	SCE	SCG	SDG&E	
Q3.1 Satisfied with work of contractor	84%	76%	87%	69%	84%
Q3.3 Satisfied with equipment	79%	65%	94%	69%	75%
Q3.5 Tenant satisfaction	77%	61%	84%	60%	72%
Q3.8 Expectations for program were met	75%	83%	90%	81%	82%
Q3.10 Would recommend program	78%	71%	94%	76%	81%

Participant is counted as satisfied if for questions 3.1-3.5, they gave a rating of 4 or 5 on a 1 to 5 range, and for questions 3.8 and 3.10, they gave a yes response for yes/no question.

Table 5-4, Table 5-6, Table 5-8, Table 5-10, and Table 5-11 show the detailed responses for each of the five questions.

5.5.2 Satisfaction with Contractor

Most participating property managers report being satisfied with the work done by the contractors for the MFRP. On a five-point scale, where 5 represented "extremely satisfied," 84% rate their satisfaction with "the overall quality of the work completed by the contractors" as a 4 or 5. However, 6% rate their reaction as "not at all satisfied," the lowest possible rating.

Table 5-4: Satisfaction with Quality of Contractor Work

Satisfaction Indicator Variable	Percent of Participants Satisfied				Total
	PGE	SCE	SCG	SDG&E	
1 Not at all satisfied	4.5%	13.9%	.0%	12.6%	6.2%
2	5.0%	3.0%	3.5%	.0%	3.4%
3	.0%	7.5%	9.6%	18.0%	8.4%
4	29.1%	27.4%	13.4%	31.7%	24.6%
5 Extremely satisfied	55.2%	48.3%	73.6%	37.7%	56.5%
Refused	2.2%	.0%	.0%	.0%	.8%

Overall, nearly one out of ten respondents rated contractor performance negatively. When asked to explain why respondents gave a lower rating, the predominant factors were dissatisfaction with work quality or equipment quality. A summary of these responses appears in Table 5-5.

Table 5-5: Reasons Why Respondents Were Not Satisfied with Contractor

	Number of unweighted responses (with multiple responses)	Unweighted percentage of unsatisfied respondents (n=31)	Percentage of all respondents (n=150)
Equipment broke	7	23%	5%
Quality of equipment was not up to standards	8	26%	5%
Quality of installation was not up to standard	9	29%	6%
Installers did not meet our standards	11	35%	7%
Job took too long	3	10%	2%
Installers too disruptive/messy	6	19%	4%
Difficult to find replacements	2	6%	1%

5.5.3 Satisfaction with Rebated Equipment

Respondents were also asked to rate their satisfaction with the equipment installed on a five-point scale, with 1 being “not at all satisfied” and 5 being “extremely satisfied”. Over three-fourths of participants (79%) indicate that they are satisfied with the performance of the equipment installed, 9% are dissatisfied, and 11% give the measures a neutral rating.

Table 5-6: Satisfaction with Equipment Performance

Satisfaction Indicator Variable	Percent of Participants Satisfied				Total
	PGE	SCE	SCG	SDG&E	
1 Not at all satisfied	9.3%	5.0%	.0%	8.8%	5.6%
2	2.3%	9.0%	.0%	8.8%	3.8%
3	9.5%	17.9%	5.9%	13.8%	10.6%
4	23.9%	18.9%	29.3%	29.4%	25.4%
5 Extremely satisfied	55.0%	46.3%	64.8%	39.4%	54.0%
Refused	.0%	3.0%	.0%	.0%	.6%

As Table 5-7 indicates, most of the dissatisfaction comes from broken or substandard equipment.

Table 5-7: Reasons Why Respondents Were Not Satisfied with Equipment

	Number of unweighted responses (with multiple responses)	Unweighted percentage of unsatisfied respondents (n=34)	Percentage of all respondents (n=150)
Equipment broke	12	35%	8%
Quality of equipment was not up to standards	12	35%	8%
Quality of installation was not up to standard	5	15%	3%
Did not like the way the product looked	2	6%	1%
Lamps were too dim	2	6%	1%
Bulbs burned out too quickly/high failure rate	2	6%	1%

5.5.4 Tenant Satisfaction

For installations in tenant-occupied spaces, property managers were asked to assess tenant satisfaction on a scale of 1 to 5, with 1 being "not at all satisfied" and 5 being "extremely satisfied." Table 5-8 shows that overall, 72% of these respondents report that their tenants were satisfied, while 12% indicate that their tenants were not satisfied.

Table 5-8: Tenant Satisfaction

Satisfaction Indicator Variable	Percent Reporting Satisfied Tenants				Total
	PGE	SCE	SCG	SDG&E	
1 Not at all satisfied	1.8%	11.2%	.0%	13.6%	5.0%
2	7.0%	4.5%	5.3%	11.0%	6.8%
3	14.7%	23.1%	10.7%	15.3%	15.3%
4	29.8%	27.6%	27.8%	46.6%	31.6%
5 Extremely satisfied	46.7%	33.6%	56.1%	13.6%	41.3%

Among those whose expectations were not met, lighting measures once again contribute too many of the problems. The most frequent complaints among 2003 participants are of high failure rates in lighting measures, failure to receive the expected rebate, the time-consuming follow-up necessary to replace lighting measures, and the poor quality of the installation.

Table 5-9: Reasons Why Respondents' Tenants Were Not Satisfied

	Number of unweighted responses (with multiple responses)	Unweighted percentage of unsatisfied respondents (n=31)	Percentage of all respondents (n=102)
Equipment broke	13	42%	13%
Quality of equipment was not up to standards	4	13%	4%
Quality of installation was not up to standard	3	10%	3%
Did not like the way the product looked	1	3 %	1%
Lamps were too dim	9	29%	9%
Equipment harder to use	2	6%	2%

The aspects of the MFRP most appreciated by tenants are lower utility bills (mentioned by 23% of respondents), improved quality and/or style of equipment (mentioned by 31% of respondents), and comfort improvements (mentioned by 11% of respondents).

Respondents were questioned on feedback from tenants regarding whether they had noticed any changes in comfort levels, lighting adequacy, or energy savings. While this feedback indicates that tenants noticed improvements in comfort by a six-to-one margin, the feedback on lighting is not positive. More tenants found that lighting function has diminished rather than improved (29% vs. 20% of applicable jobs).

Respondents were also asked if any difficulties were encountered—37.3% described some sort of problem. Where difficulties were reported, one-third complained about the quality of the installation work, and roughly 28% reported unsatisfactory lighting products as the source of their troubles.

5.5.5 Meeting Customers' Expectations

In summing up their experiences with the program, respondents were asked, "Overall, were your expectations from the program adequately met?" As shown in Table 5-10, four out of five participants feel the program experience meets their expectations.

Table 5-10: Performance Relative to Customer Expectations

Satisfaction Indicator Variable	Percent Whose Expectations Were Met				Total
	PGE	SCE	SCG	SDG&E	
Yes	74.8%	83.1%	90.1%	81.0%	81.7%
No	25.2%	16.9%	9.9%	19.0%	18.3%

5.5.6 Willingness to Recommend Program to Others

Finally, customer satisfaction was also examined based on a question asking, "Would you recommend this program to the property manager at another facility?" Again, the data show roughly four out of five participants are willing to recommend the program to others.

Table 5-11: Willingness to Recommend Program to Others

Satisfaction Indicator Variable	Percent Who Would Recommend Program				Total
	PGE	SCE	SCG	SDG&E	
Yes	77.9%	71.1%	93.8%	75.9%	81.0%
No	22.1%	28.9%	6.2%	24.1%	19.0%

5.6 Complete Satisfaction

A more detailed analysis of the above findings revealed that participant responses for these elements of satisfaction were not highly correlated. For example, participants indicate that expectations were not met, yet give high satisfaction ratings on other indicators. When looking at the variable on whether they would recommend the program to others, participants are found who are dissatisfied with one or more program elements but would recommend the program to other property managers. Therefore, as the results were examined in more detail, the evaluation team decided to create a compound variable, "Completely Satisfied," that incorporates all five indicators to contrast the more thoroughly satisfied customers with the remainder. To be completely satisfied, a positive response is required to each of the five satisfaction questions. This variable serves to separate those respondents with no complaints about the program from those voicing any complaint or a lack of willingness to recommend the program to others.

Complete satisfaction is examined from two perspectives:

- Complete satisfaction by utility, and
- Complete satisfaction by type of measures installed.

5.6.1 Complete Satisfaction by Utility

Table 5-12 shows the breakdown in compound satisfaction by utility. Overall, 62% (the same percentage as in 2002) of the participant respondents are "Completely Satisfied" (a positive response to all five satisfaction questions) with the program and would recommend it to others. It is worth noting that significantly more of the participants in SCG's program were completely satisfied with their program experiences as compared to other participants.

Table 5-12: Complete Satisfaction with Program and Its Components by Utility

	Utility				
	PGE	SCE	SCG	SDG&E	Total
Percent Satisfied 2002	71%	64%	78%	45%	62%
Percent Satisfied 2003	58%	52%	82%	47%	62%

5.6.2 Complete Satisfaction by Measure Type

Table 5-13 shows the compound satisfaction by type of measures installed. The survey results indicate a distinctly greater level of dissatisfaction among property managers of facilities where lighting measures were installed. Examining the complete satisfaction indicator by type of measure installed found that participants who installed non-lighting measures were substantially more likely to report satisfaction with the program than participants who installed lighting.

Table 5-13: Complete Satisfaction by Measure Type

	Percent Completely Satisfied
Lighting	47%
HVAC	72%
Water heaters, water controllers, or water saving measures	65%
Windows or insulation	88%
Clothes washers and dishwashers	78%
Total	68%

5.7 Measure Persistence and Replacement

Nearly one out of five participants (19%) reports the removal of at least one of the MFRP measures from their premises. Lighting measures account for most of the reported removals. Seven percent of all participants (16% of all with lighting measures) report the removal of at least one screw-in CFLs. Four percent of the total participants (10% of all participants with lighting) removed at least one hard-wired fluorescent fixture, and 5% of the total participants removed at least one programmable thermostat (19% of all respondents with HVAC measures). Three other measures—windows, water heaters, and air conditioners—were reportedly removed by only one respondent apiece.

The most common reason for removing program measures was, by far, that the equipment broke or failed (71% of removals). Other reasons for removals include unsatisfactory quality,

appearance, or performance (15% of removals), product quality not up to the respondent's standards (6% of removals), preferred old equipment (15% of removals), and tenants requested removal of the installed equipment (11% of removals).

Roughly one in five of the participants who had lighting measures installed reported difficulty finding replacement measures of the same type (18%). Nearly half report being able to obtain appropriate replacements (49%) and 24% report that they have not yet tried to find replacement lighting equipment.

5.8 Role of the Participating Contractor

The data in Table 5-14 suggest that, once again, much of the program activity is contractor-generated rather than customer-generated. A large proportion of participants did not solicit bids for the MFRP work performed (67%). These participants were presumably influenced by a single contractor who assertively promoted the program. Together with the other 14% of owners or managers who reported receiving bids from one contractor, it is clear that most MFRP participants work with a single contractor when enrolling in the program. In total, less than one in five participants obtained competing bids for the program work completed in PY2003.

Table 5-14: Number of Bids Sought

	Percentage of Respondents
No Bids Sought or No Response	66.8%
1 Bid	14.0%
2 Bids	8.3%
3 Bids	10.9%

One issue of interest to Program Managers in PY2003 centered on the communication between contractor and customer about steps to be taken in the event of equipment failure. As Table 5-15 shows, a number of participants indicate that the contractor did not discuss the subject of equipment failure (37%) with them. When this issue was addressed, more than one-third of participating customers (36%) were told to contact the contractor in the event of equipment failure, while another 29% were told that there was a warranty. One-fourth were simply told the equipment was reliable.

Table 5-15: Contractor Contact Regarding Potential Equipment Failures

	Percentage of Respondents
Told us to contact them if it failed	36%
Told us there was a warranty	29%
Told us the equipment was reliable	26%
Did not discuss it/said nothing	37%

5.9 Energy Savings

Overall, 22% of participants report seeing a decrease in their energy bills since the program measures were installed, and 9% report no reductions, The remainder do not know if any bill savings had been realized. One in five respondents (18%) indicate that their tenants have reported reductions in their bills. Fifty-five percent of respondents report that they have not heard from tenants that the tenants' bills have been reduced. Another 25% indicate that the measures taken have no effect on tenants' bills.

5.10 Program Marketing

Respondents were asked how they first learned about the MFRP. Responses are shown in Table 5-16. In a significant change from the prior year, the top source of initial program information is reported to be utility representatives (25%). This is up dramatically from 5% in 2003. In fact, the utility, through its web page, brochures, and bill stuffers, in addition to its representatives, is responsible for 37% of the leads. Contractors, internal management, and equipment suppliers follow in importance (18%, 14%, and 10%, respectively).

Table 5-16: Sources of Information on MFRP

	Percent Responding (weighted)	Cumulative Percent (%)
Utility brochure	2.9	2.9
Bill stuffer	5.9	8.9
Utility company web page	3.5	12.3
Utility representative	25.0	37.4
Utility application package	1.1	38.5
Contacted by a contractor offering services	20.2	58.7
Equipment distributor/supplier	11.8	70.4
Your management	15.3	85.7
Newspaper/magazine/newsletter article	3.9	89.7
Trade association/other property manager	1.9	91.5
Participated last year (already knew about the program)	2.3	93.9
Property owner	3.6	97.4
Other	2.6	100.0

Respondents were asked directly whether they recall seeing utility brochures, bill stuffers, or internet information about MFRP. Recall of the program brochure is higher than recall of bill stuffers or website information (34% vs. 15% and 14%, respectively). Interestingly, the websites have nearly the same reach as the bill inserts, presumably at a lower cost. It is also worth noting that awareness generated from the utility websites has changed little from the year before (14% vs. 13%).

Table 5-17: Recollection of Utility Marketing Material

	Yes	No	Don't Recall or Missing
Recall seeing bill stuffer	15%	78%	7%
Recall seeing brochures	34%	60%	6%
Recall seeing website	14%	82%	4%

5.11 Measure Adoption

Respondents are fairly evenly split as to whether they expect to install additional efficiency measures at their properties in the future (43% yes, 41% no, and 16% undecided). Among the most anticipated additions in tenant-occupied areas are hard-wired fluorescents, ENERGY STAR refrigerators, and high efficiency room air conditioners. The most commonly planned additions for common areas are hard-wired indoor fluorescent lighting and outdoor lighting upgrades.

Overall, 38% of participants in the 2003 program indicate that they had previously installed energy efficiency measures on their premises. This was up somewhat from the findings in 2002 EM&V.

Measures most commonly installed in facilities prior to participation in the 2003 program are hard-wired fluorescent fixtures and porch lights and screw-in CFLs. These same measure categories are the ones most frequently attributed to 2002 program participation. Of respondents indicating past installation of measures, five of ten attribute their hard-wired fluorescent fixtures to the MFR program, three of 18 credit the program for their hard-wired fluorescent porch or outdoor lighting, and two out of seven credit the program for their CFLs.

5.12 Program Changes Suggested by Property Managers

Among the array of recommendations offered for improving the MFRP, the following were most common:

- Improved marketing (12%) to property owners and managers (11), to tenants (3), or generally (5),
- Provision of information on where to find replacement measures/products (7%),
- Offer/install better quality products (7%),
- Provide increased rebate opportunities (either more products or for longer periods of time) (5%), and
- Make the process easier or with less paperwork (5%).

One-half of the respondents had no recommendations for improving the program.

5.13 Summary and Significant Findings

Several significant findings emerged during the interviews. These key findings are highlighted below:

Most PY2003 participants (58%) had not previously installed any energy efficiency measures in their facilities in the past. For these participants, the program was the genesis of their energy efficiency activities and, as such, is an important influence in increasing awareness and acceptance of higher efficiency alternatives in the multifamily property market. The data from the surveys indicate that this program is penetrating historically HTR market niches that have no past record of embracing and utilizing energy efficient products.

Utility representatives were much more likely to be mentioned as a source of program information in PY2003 than in the preceding year and surpassed contractors as the most frequently mentioned source of program awareness. This seems to reflect a greater proactive effort to inform property owners about program opportunities and to encourage customer-driven applications. Even so, it appears that contractor marketing efforts are a primary driver for generating participation and rebate applications. It is telling, for example, that four out of five participants did not obtain competitive bids for the program work performed at their sites.

Satisfaction indicators are reasonably positive overall. One indicator that came up negative was the feedback on tenant reactions to installed lighting measures. More tenants reported diminished lighting function than reported improvements. In contrast, non-lighting measures in tenant spaces seem to generate favorable reactions, with increased comfort levels being widely reported.

6. ON-SITE ASSESSMENT

The purpose of the on-site assessment is as follows:

- Quantify the proportion of measures installed under the program,
- Quantify the proportion of measures still in place and operational after the first year, and
- Observe any installation or operational issues with the measures in place.

It is important to recognize that this is neither a persistence study nor a retention study. A persistence study assesses changes in net program load impacts over time. A retention study is an assessment of (a) the length of time the measure(s) installed during the program year are maintained in operating condition; and (b) the extent to which there has been a significant reduction in the effectiveness of the measures(s).[3].

Perhaps the largest area of uncertainty with respect to measures rebated is their disposition and utilization. Therefore, the evaluation plan included 100 on-site surveys of complexes to determine how the rebated measures are being used. In this task, Itron, with the on-site assistance of ASW Engineering, verified measures installed through the program using on-site surveys.

6.1 Methodology

The on-site assessment methodology has three elements: sample design, data collection, and analysis.

6.1.1 Sample Design

The sample design process involved two tasks: review of the program implementation databases and a sample design for conducting the on-site surveys.

California Multifamily Energy Efficiency Rebates Program Databases

The four California utilities provided MFRP participant databases. The structure of the databases varied significantly. The project team identified sufficiently common elements in each database to facilitate a sample design for the on-site verifications of measures installed through the program.

The project team decided that a proportional stratified random sampling approach would be used for the sample design. The sample is stratified based on total incentive dollars and the number of sample complexes are drawn proportionate to the number of complexes per utility in each stratum. Incentive dollars is a common characteristic of all program rebate applications across the state and a good combined proxy of the quantity of measures rebated and their associated energy savings. A description of the database is presented in Table 6-1. The sample design was developed using the steps described below.

[3] Appendix A M&E Protocols and Procedures

A count of the unique application or site codes by utility was used to determine the total number of complexes. A complex is defined as a single location with one or more multifamily buildings.

Table 6-1: California Multifamily Rebate ProgramDatabase

Utility	Number of Complexes	kWh	Therm	Quantity of Measures	Incentives
SCG	374	4,371,663	736,798	52,942	$1,139,208
SDG&E	206	3,595,507	377,330	44,261	$1,528,823
SCE	243	4,607,285	0	127,554	$1,803,970
PG&E	503	10,047,686	602,917	401,113	$3,499,719
Total	**1,326**	**22,622,141**	**1,717,045**	**625,870**	**$7,971,720**

A sample size of 100 complexes was allocated to this project for the onsite survey. If the 100 complexes were chosen such that the number of sampled complexes was proportionate to the number of applications, the distribution would be as described in Table 6-2.

Table 6-2: Number of Applications by Utility

Utility	Number of Applications	Proportion of Applications
SCG	374	0.28
SDG&E	206	0.16
SCE	243	0.18
PG&E	503	0.38
Total	**1326**	**1.00**

However, simple proportional sampling by utility did not ensure that the on-site team would inspect a sufficient number of large installations. Results from the 2002 EM&V found a substantially lower verification rate in complexes with a larger number of initial installations. Stratified sampling based on total measure incentive will enable the on-site survey team to inspect a larger number of large dollar installations.

Table 6-3 through Table 6-6 show the breakdown of incentive dollars by utility. Examination of these data shows that while SCG has 28% of the total number of applications, they have only 14.4% of the total incentive dollars. PG&E has only 38% of the total number of applications, and 44.3% of the total incentive dollars. Much of the difference in the distribution results from a relatively large number of high-value incentive applications at PG&E as compared with SCG. Fifty-two of 503 applications at PG&E exceed $20,000; only three of the 374 applications at SCG exceed $20,000 in incentives;

Table 6-3: SCG 2003 Multifamily Rebate Program Incentives

Range of Incentives ($)	Total Incentives	Number of Applications	Minimum Incentive	Maximum Incentive
0-1000	$35,096	91	$40	$950
1001-2000	$129,012	89	$1,050	$1,900
2001-3000	$323,100	118	$2,050	$3,000
3001-4000	$32,600	9	$3,200	$3,900
4001-5000	$40,250	9	$4,050	$4,900
5001-6000	$66,900	12	$5,050	$6,000
6001-7000	$25,500	4	$6,050	$6,600
7001-8000	$89,100	12	$7,050	$8,000
8001-10000	$97,650	11	$8,050	$9,600
10001-12000	$66,850	6	$10,050	$12,000
12001-14000	$37,650	3	$12,050	$12,800
14001-20000	$112,250	7	$15,000	$18,000
20001-30000	$48,750	2	$23,250	$25,500
30001-40000	$34,500	1	$34,500	$34,500
40001+	$0	0	$0	$0
Total	**$1,139,208**	**374**	**$131,440**	**$147,650**

Table 6-4: SDG&E 2003 Multifamily Rebate Program Incentives

Range of Incentives ($)	Total Incentives	Number of Applications	Minimum Incentive	Maximum Incentive
0-1000	$8,338	17	$40	$1,000
1001-2000	$68,964	45	$1,093	$2,000
2001-3000	$47,560	17	$2,100	$3,000
3001-4000	$35,815	10	$3,086	$3,900
4001-5000	$57,680	13	$4,080	$4,980
5001-6000	$63,311	11	$5,100	$6,000
6001-7000	$59,039	9	$6,086	$7,000
7001-8000	$59,760	8	$7,200	$8,000
8001-10000	$170,274	19	$8,100	$9,900
10001-12000	$121,289	11	$10,075	$12,000
12001-14000	$117,417	9	$12,260	$13,500
14001-20000	$407,547	25	$14,020	$19,500
20001-30000	$268,329	11	$20,060	$29,900
30001-40000	$0	0	$0	$0
40001+	$43,500	1	$43,500	$43,500
Total	**$1,528,823**	**206**	**$136,800**	**$164,180**

Table 6-5: SCE 2003 Multifamily Rebate Program Incentives

Range of Incentives ($)	Total Incentives	Number of Applications	Minimum Incentive	Maximum Incentive
0-1000	$17,228	34	$10	$902
1001-2000	$43,727	30	$1,027	$1,980
2001-3000	$68,994	27	$2,100	$3,000
3001-4000	$72,602	20	$3,120	$4,000
4001-5000	$85,321	19	$4,050	$4,888
5001-6000	$96,558	18	$5,029	$5,900
6001-7000	$57,967	9	$6,017	$6,780
7001-8000	$97,456	13	$7,065	$7,802
8001-10000	$167,694	19	$8,040	$9,700
10001-12000	$128,663	12	$10,097	$11,700
12001-14000	$65,316	5	$12,240	$13,680
14001-20000	$288,222	17	$14,018	$19,997
20001-30000	$367,940	16	$20,550	$29,354
30001-40000	$62,048	2	$30,060	$31,988
40001+	$109,707	2	$42,560	$67,147
Total	**$1,729,442**	**243**	**$165,983**	**$218,818**

Table 6-6: PG&E 2003 Multifamily Rebate Program Incentives

Range of Incentives ($)	Total Incentives	Number of Applications	Minimum Incentive	Maximum Incentive
0-1000	$58,566	157	$38	$1,000
1001-2000	$84,020	59	$1,011	$1,989
2001-3000	$89,702	36	$2,011	$3,000
3001-4000	$101,645	29	$3,028	$4,000
4001-5000	$130,096	29	$4,001	$5,000
5001-6000	$98,228	18	$5,016	$5,950
6001-7000	$192,270	30	$6,050	$6,925
7001-8000	$144,317	19	$7,020	$8,000
8001-10000	$216,640	24	$8,119	$10,000
10001-12000	$236,298	22	$10,067	$12,000
12001-14000	$129,149	10	$12,047	$13,985
14001-20000	$300,315	18	$14,250	$19,953
20001-30000	$822,681	32	$20,073	$29,340
30001-40000	$348,792	10	$30,454	$38,618
40001+	$547,000	10	$40,246	$91,018
Total	**$3,499,719**	**503**	**$163,431**	**$250,778**

Sample Design

This section describes the method used to design the sample. First, to ensure that a wide range of incentive levels were selected, the team decided that it was necessary to stratify the sample design based on total incentive levels. This process will ensure that an adequate number of large sized installations are sampled. The team decided to combine all of the applications into one large database to determine strata boundaries and the total number of observations per strata. The combined database was divided into three groups: a low, medium, and high incentive breakdown. The Dalenius-Hodges[4] procedure was used on the database to determine the two strata boundaries. The ranges of the strata are less than $5,900, $5,900 to $19,500, and above $19,500, respectively. The 100 on-site sample points were allocated to the three strata using the Neyman Allocation[5] method. Thirty-eight sites were chosen for the low incentive strata, 32 for the medium strata, and 30 for the high strata. The number of sites for each utility within the strata is proportional to the number of applications for the utility within the strata. Table 6-7 lists the number of sites by utility and strata.

[4] AEIC (Association of Edison Illuminating Companies) 2001. Load Research Manual. Birmingham, Alabama

[5] Ibid.

Table 6-7: California Multifamily Targeted Sample Design

Utility	Incentives up to $5,900	Incentives $5,901 to $19,500	Incentives over $19,500	Total Sample Size
SCG	14	5	1	20
SDG&E	4	8	4	16
SCE	6	7	8	21
PG&E	14	12	17	43
Total	38	32	30	100

Within these guidelines, a random sample of participating multifamily facilities was drawn. To ensure that the on-site survey team was able to find the designated number of complexes, they were supplied with a randomly drawn list of complexes that was two times as large as the targeted number of completions.

6.1.2 Data Collection

The on-site data collection involved designing a survey instrument, recruiting the sample, scheduling appointments with property owners or representatives, and conducting the on-site surveys. Itron designed the on-site survey instrument. ASW Engineering performed the recruiting, scheduling, and surveying tasks.

Design Survey Instrument

The primary data collection instrument was designed to gather the following information:

- Lighting, hard-wired fluorescent fixtures, HVAC, water heating, and clothes washer counts of still functioning measures,
- Comments on measures that were not verified and,
- Windows and insulation still in place and their surface area or square footage.

The primary on-site data collection instrument is provided in Appendix B.

Itron entered the results of the on-site verifications into a database and applied expansion weights to estimate the universe of installed measures under the multifamily program.

Sample Recruitment

A recruiting protocol was developed. The protocol included a recruiting letter sent to the apartment manager on utility letterhead and a procedure for making phone calls. The recruiting letter is provided in Appendix C.

Appointment Scheduling

When the ASW surveyor called to schedule an appointment after the participant had been recruited, additional information was obtained about the measures installed and the managers' and the tenants' satisfaction with lighting measures. The manager's telephone questionnaire is included as Appendix D.

Conducting On-Site Surveys

Itron provided ASW with a list of building addresses, contact names, and telephone numbers. Itron also provided information, including types and quantities, of all measures to be verified at each location.

Verifications were performed at sampled multifamily locations throughout the SDG&E, SCG, SCE, and PG&E territories.

Once on site, the surveyor verified the types and quantities of measures installed based on the program participant information provided by the corresponding utility. Differences between what was recorded in the program tracking databases and what was observed during the on-site surveys were reported and an attempt was made to obtain information on original installation of the missing measures.

Sub-Sampling Strategy

The number of treated apartments can vary significantly within the sample of complexes. To make the process manageable and limit the number of treated apartments inspected, a within-complex sampling strategy was developed.

- For common areas, the general rule was to verify all measures. The exception was for high-rises with common areas on each floor and the same measure(s) installed on each floor. In this instance, every other floor was inspected. The same applied for complexes with multiple buildings where each building had its own common area.
- For complexes with five or less treated apartments, all apartment units were inspected.
- For complexes with more than five apartments, a sub-sample of a minimum of five treated units was inspected.

Once the number of units to be inspected was determined, the units were randomly selected. The objective was to verify a representative distribution of all the measures installed. If the apartments were distributed throughout multiple buildings, at least one apartment from each building was inspected. If this was not possible given the sub-sampling strategy described above, then at least one unit from every other building was inspected. This same approach applied to apartments on multiple floors of a high-rise building.

ASW visited each site for no more than four hours. During that time, ASW briefly interviewed the property owner or manager and attempted to locate each product rebated.

Verification included the following steps.

- First, inspectors attempted to verify the installation of equipment based on discussions with the property owner. Then, for individual units, inspectors attempted to examine each measure in use, verified that they still functioned, and examined the installation of hard-wired fluorescent fixtures. In common areas, inspectors closely inspected at least

one unit of each type to verify the manufacturer and model number as compared to the program tracking information.

- Second, if inspectors were unable to locate the measure, they attempted to determine if the measure was initially installed. If the measure was initially installed, inspectors attempted to determine why the measure was removed.

6.1.3 Analysis of On-Site Data

On-site verifications can be designed to examine two quantities that directly affect program energy savings. These are installation ratios and verification rates. In all cases, the timing of these verification efforts is important. Installation ratios need to be verified shortly after the measures are installed. Measure verification rates, a mixture of premature removal rates and first year retention rates, need to be determined shortly after the conclusion of the program year. These quantities or savings adjustment factors all contribute to the calculation of first year ex post savings.

Premature removals are typically a result of some form of customer dissatisfaction and usually occur shortly after the initial installation. First year retention rates are typically a result of technical failure or accidents causing failure. However, retention rates can also include removals due to remodeling and migration from the service territory. Measure verification rates included all of these factors.

The on-site verifications for this program occurred approximately six months after the end of the program year. This timing has an impact on how accurately all of these factors can be quantified. The six-month lag makes the initial installation rate difficult to determine with a simple count of measures in place and working. To more accurately obtain information on initial installation, surveyors were instructed to obtain information on why measures were not found. They were instructed to determine if the measures were or were not initially installed, or if the measure had been removed due to remodeling, tenant migration, or replaced with a non-program measure. As a result, it was possible to determine both the percent of measures initially installed and the percent of measures found during the on-site survey. The resulting analysis of the on-site verifications should be used to provide insight and guidance to program modifications that will improve first year savings and measure retention.

On-Site Installation Ratio

For the analysis of on-site measure installation of specific sites, the team calculated simple measure-specific counts of measures listed on program tracking databases, measures installed, and measures found during the inspection process. Using these data, weighted verification ratios of the percentage installed and the percentage verified were calculated.

A utility-specific installation ratio was calculated as the weighted mean of the site-specific installation ratios. The site-specific ratio was the sum of the measures verified as installed divided by the sum of the quantity of measures sampled from the program-tracking database. A measure was verified as installed if the measure was verified as in place and working, or if the property manager or tenant reported that the missing measure was initially installed. The site-specific installation ratio was calculated:

$$Installation\ Ratio_i = \frac{\sum Quantity Verified\ as\ Installed}{\sum Quantity Sampled}$$

The utility specific installation ratio is the weighed mean of the site-specific ratios:

$$Weighted\ Utility\ Installation\ Ratio = \frac{\sum W_i\ Installation\ Ratio_i}{\sum W_i}$$

where W_i is the site-specific weight determined by the same design.

The site-specific installation ratio is the simple percentage of measures installed to the number of measures rebated in the tracking database for the sampled site. The utility installation ratio is the best measure of the percentage of all installed measures.

On-Site Verification Ratio

A utility-specific verification ratio was calculated as the weighted mean of the site-specific verification ratios. The site-specific ratio was the sum of the measures verified as in place and working divided by the sum of the quantity of measures sampled from the program tracking database. The site-specific verification ratio is:

$$Verification\ Ratio = \frac{\sum Quantity Verified\ as\ in\ Place}{\sum Quantity\ Sampled}$$

The utility-specific verification ratio is the weighed mean of the site-specific ratios:

$$Weighted\ Utility\ Verification\ Ratio = \frac{\sum W_i\ Verification\ Ratio_i}{\sum W_i}$$

The site-specific verification ratio is the simple percentage of measures verified as in place and working to the number of measures rebated in the tracking database for the sampled site. The utility verification ratio is the best measure of the percentage of measures in place and working.

6.2 Results

The original sample design called for 100 surveys distributed across three incentive strata: low, medium, and high. The incentive strata breakpoints were determined by using the Dalenius-Hodges procedure. The 100 on-site sample points were allocated to the three strata using the Neyman Allocation method. Thirty-eight sites were chosen for the low incentive strata, 32 for the medium, and 30 for the high strata. The number of sites for each utility within the strata is proportional to the number of applications for the utility within the strata. The sites at each utility were randomly selected. During the on-site process, ASW surveyed a sub-sample of measures at selected sites.

6.2.1 Final On-Site Survey Distribution

ASW completed 102 on-site surveys. Table 6-8 lists the final distribution of the sites. The distribution among the utilities was consistent with the original sample design. The final incentive distribution includes 31 medium and 41 low incentive sites, the original sample design called for 32 medium and 38 low incentive sites. The final distribution of sites was incorporated into the site-specific weights.

Table 6-8: Completed On-Site Verifications

Utility	Incentive Levels			Total Sample Size
	High Incentive Levels	Medium Incentive Levels	Low Incentive Levels	
PG&E	17	11	16	44
SCE	8	7	7	22
SCG	1	5	14	20
SDG&E	4	8	4	16
Total	30	31	41	102

6.2.2 Measure Counts

Table 6-9 through Table 6-12 list the measure counts from the program tracking data, the on-site sub-sample program tracking data, and the installation and verification counts. The tables also list the utility installation and verification ratios for measures included in each utility's on-site analysis.

The program count data show that for non-lighting measures, the quantity listed, installed, and verified track each other closely. For most lighting measures, the quantity listed and the quantity installed are approximately equal. These data confirm that most lighting measures were installed as rebated. For lighting measures, the quantity verified is often less than the quantity listed for the on-site sub-sample. These data may indicate that tenants or management removed the bulbs from the apartment due to technical failure, remodeling, or tenant migration. A discussion of this issue will be presented below.

Table 6-9: PG&E Program Tracking, Installation, and Verification

Measure Name	On-Site Sub-Sample Quantity Listed	On-Site Quantity Installed	On-Site Quantity Verified	Weighted Installation Ratio	Weighted Verification Ratio	Program Tracking Quantity
CFL 13 watt	5	4	4	0.80	0.80	1539
CFL 16 watt	43	43	37	1.00	0.88	42393
CFL 20 watt	86	82	73	0.84	0.72	28996
CFL 25 watt	85	69	65	0.72	0.59	4033
CFL 32 watt	18	18	8	1.00	0.50	5188
Indoor Hard-Wired Fixture - 16 watt	5	5	5	1.00	1.00	1324
Indoor Hard-Wired Fixture - 27 watt	101	101	89	1.00	0.96	15766
Indoor Hard-Wired Fixture - 30 watt	312	296	272	0.92	0.89	29136
Outdoor Hard-Wired Fixture - 13 watt	16	10	10	0.57	0.57	1546
Outdoor Hard-Wired Fixture - 27 watt	13	12	12	0.89	0.89	510
Apartment Programmable Thermostat	35	35	35	1.00	1.00	10608
ENERGY STAR Dishwasher	5	5	5	1.00	1.00	90
High Performance Dual Pane Windows (per sq. ft.)	1257	1243	1243	0.99	0.99	37885
Attic Insulation (per sq. ft.)	8338	8338	8338	1.00	1.00	171516
Wall Insulation (per sq. ft.)	234	234	234	1.00	1.00	39688
ENERGY STAR Clothes Washer - Coin Operated	20	20	20	1.00	1.00	96
High Efficiency Exit Signs - New Sign Installation - LED	2	2	2	1.00	1.00	87
Central System Natural Gas Water Heaters	3	3	3	1.00	1.00	11
Common Area Programmable Thermostat	5	4	4	0.80	0.80	1161
Natural Gas Storage Water Heater (energy factor .6 or greater)	6	6	6	1.00	1.00	63

Table 6-10: SCE Program Tracking, Installation, and Verification

Measure name	On-Site Sub-Sample Quantity Listed	On-Site Quantity Installed	On-Site Quantity Verified	Weighted Installation Ratio	Weighted Verification Ratio	Program Tracking Quantity
14-watt Screw-In CFL Interior	60	60	28	1.00	0.42	12775
15-watt Screw-In CFL Interior	20	20	20	1.00	1.00	12481
20-watt Screw-In CFL Interior	35	29	28	0.73	0.63	3378
27-watt Screw-In CFL Interior	23	23	9	1.00	0.13	3327
13-18-watt Exterior Hard-Wired Fixture	78	77	77	1.00	1.00	8095
26-30-watt Interior Hard-Wired Fixture	153	145	143	0.98	0.98	17279
AC Tier I Package Unit	6	6	6	1.00	1.00	7
AC Tier I Package Unit + TXV	7	7	7	1.00	1.00	59
ES Thermostat	29	27	27	0.94	0.94	2457
High Performance Dual Pane Windows	723.59	637.25	637.25	0.91	0.91	58292.47

Table 6-11: SCG Program Tracking, Installation, and Verification

Measure name	On-Site Sub-Sample Quantity Listed	On-Site Quantity Installed	On-Site Quantity Verified	Weighted Installation Ratio	Weighted Verification Ratio	Program Tracking Quantity
Central System Natural Gas Boilers - Hot Water	13	13	13	1.00	1.00	279
Commercial Clothes Washer - Horizontal Axis	3	3	3	1.00	1.00	40
Digital Gas Water Heater/Boiler Control (>=20 units)	3	3	3	1.00	1.00	72
Natural Gas Boiler Controllers	1	1	1	1.00	1.00	20
Thermostat - ENERGY STAR	49	47	47	0.94	0.94	10088

Table 6-12: SDG&E Program Tracking, Installation, and Verification

Measure name	On-Site Sub-Sample Quantity Listed	On-Site Quantity Installed	On-Site Quantity Verified	Weighted Installation Ratio	Weighted Verification Ratio	Program Tracking Quantity
Screw-In 14-20-watt CFL	51	51	5	1.00	0.05	16481
Screw-In 21-30-watt CFL	18	18	7	1.00	0.85	3783
Screw-In 15-watt CFL with Reflector	4	4	4	1.00	1.00	579
Screw-In 23-watt CFL with Reflector	22	22	14	1.00	0.20	4500
ENERGY STAR Labeled Interior Hard-Wired Fluorescent Fixture	74	73	69	0.98	0.61	12624
Thermostat - ENERGY STAR	5	5	5	1.00	1.00	2234
Gas Water Heater and/or Boiler Controller (<20 units)	5	5	5	1.00	1.00	161
Digital Gas Water Heater/Boiler Control (>=20 units)	17	17	17	1.00	1.00	171
Water Heating - Common Area - Natural Gas Boiler Control	10	10	9	1.00	0.90	35

6.2.3 Weighted Installation and Verification Ratios

PG&E's weighted installation and verification ratios are listed in Table 6-9. The weighted installation and verification ratios for non-lighting measures, with the exception of common area thermostats, indicate that 100% of the surveyed measures were installed and verified as in place and still working.

The weighted installation ratios for PG&E lighting measures range from 0.57 to 1.00. Four of the ten lighting measures included in the on-site survey were found to be 100% installed. Of the six lighting measures with less than 100% installation ratios, only 13-watt exterior hard-wired fixtures and 25-watt CFL bulbs have an installation rate of less than 80%.

The weighted verification ratios for PG&E lighting measures range from 0.50 to 1.00. Nine of the ten lighting measures included in the on-site survey were less than 100% verified. A 100% verification rate was found for 16-watt indoor hard-wired fixtures. The weighted verification ratios for CFL bulbs range from 0.50 to 0.88 while 27- and 30-watt indoor hard-wired fixtures had weighted verification ratios of 0.96 and 0.89, respectively.

SCE's weighted installation ratios exceed 0.90 for all surveyed measures other than 20-watt CFL bulbs. The 91% installation rate for windows was due to window measurement. For windows, the difference between a 100% and a 91% installation rate may be due to measurements on the inside and the outside of the frame. All of the listed windows were installed.

Four out of ten surveyed measures for SCE were 100% verified as in place and working. Three wattages of CFL bulbs have a low weighted verification ratio: 0.13 for 27-watt bulbs, 0.63 for 20-watt bulbs, and 0.42 for 14-watt bulbs.

SCG's installation and verification ratios are 100% for all surveyed measures other than programmable thermostats.

SDG&E's installation rates are 100% for all surveyed measures other than interior hard-wired fixtures. As with the other electric utilities, their weighted verification ratio for CFL bulbs drops dramatically below their installation ratio. Fourteen-watt CFL bulbs had a weighted verification ratio of only 0.05.

6.2.4 Lighting Issues

The 2002 on-site data analysis of the MFRP uncovered potential quality control issues with lighting measures. Specifically, the initial installation of lighting measures was found to be an issue during the analysis. The analysis of the 2003 MFRP therefore explored these issues further by adding additional lighting-related questions to the on-site form and to the 2002 phone survey questionnaire used with property managers. The telephone questionnaire of property managers inquired about lighting complaints received from tenants. The additional questions on the on-site survey enabled the analysis team to determine if a measure had been initially installed. Additionally, a leave-behind mail-in survey was developed to explore issues related to the replacement of lighting measures, tenant satisfaction with the measures, and tenant satisfaction with the quality of the installation contractor's work.

Prior to the on-site visit, telephone questionnaires of property managers asked about their tenants' satisfaction with the lighting measures. During the on-site visit, property managers were also asked if they had experienced problems with hard-wired fixtures or lamps, if the fixtures or bulbs that were currently missing had been installed, and, if the missing fixtures and bulbs were initially installed, why they were currently missing. As the installation ratios listed in Table 6-9 through Table 6-12 indicate, the answers to these questions revealed that most lighting measures were installed in the quantities listed in the utility databases.

During the on-site visits in SCE's territory, no significant problems with hard-wired fixtures were reported. Five property managers in SCE's service territory reported that some bulbs shown as installed were actually not installed in the quantities listed. Four of the managers in SDG&E's service territory reported that the missing CFL bulbs were taken by the previous tenant when the tenant vacated the apartment. Unfortunately, many managers only let surveyors into vacated apartments. This practice has the potential to reduce the reported verification rate, while having no effect on the installation rate.

During the telephone questionnaire of property managers and during the on-site visits, lighting quality control issues were found in PG&E's service territory. During the on-site visits, six of 21 property managers with indoor or outdoor hard-wired fixtures reported problems with the fixtures. These managers reported that the fixtures were poorly installed, they had a high failure rate, and a high maintenance and bulb replacement cost. During the on-site visit, two property

managers in PG&E's service territory reported that the CFL bulbs were not installed; the bulbs were left for the managers and the tenants to install.

The findings from the property manager's telephone questionnaires are listed in Table 6-13. In PG&E's service territory, the managers of 13 complexes report that tenants have raised complaints about the lighting measures. Ten of the 13 managers notified the contractor about the problems and eight managers have requested replacements. Unfortunately, the questionnaire did not inquire about the contractor's willingness to provide better replacements.

Table 6-13: Findings from the Telephone Questionnaire with Managers

Utility	PG&E	SCE	SCG	SDG&E
Number of complexes with major renovations since the MFRP	2	1	0	1
Number of complexes with tenant complaints about lighting	13	1	N/A	1
If a tenant complaint, number of managers who notified the contractor	10	0	N/A	0
If a manager notified the contractor, number who asked for a better replacement	8	0	N/A	0

Two different questionnaires were developed for tenants with lighting measures, one for tenants whose lighting measures were verified as in place and working during the on-site visit and one for tenants with missing lighting measures. Unfortunately, only two surveys were returned from tenants with missing lighting measures. Table 6-14 lists the results from the verified surveys. Only 22 surveys were received from tenants with verified lighting measures: nine in PG&E's service territory, eight in SCE's service territory, and five from SDG&E's service territory.

Table 6-14: Tenant Survey, Lighting Measures Verified

Question	PG&E	SCE	SDG&E
Number of surveys returned	9	8	5
Number of tenants who have replaced the measures in-kind	3	2	2
If the measure was replaced, why?			
Too dim	1	1	1
Undesirable color	0	1	1
Burned out	2	2	1
Number of tenants who did not replace the measures	6	6	3
Lamp was bright enough	4	5	3
Liked the color	5	6	3
Satisfied with contractor	4	6	3
Satisfied with the look of the measure	6	6	3

7. SAVINGS ASSESSMENT

7.1 Overview

In this task, the final fourth quarter workbook and filed savings by each utility are validated. The ex post savings are then also presented, adjusted for the proportion of measures installed (installation ratio). To facilitate comparison, both the savings from the workbook and adjusted ex post savings using the weighted installation ratio are presented. The remainder of this section defines study methods, summarizes results of the evaluation, and discusses a set of evaluation issues.

7.2 Methodology

This part of the MFRP evaluation involves the following.

- **Validation of first year utility reported savings.** To validate the first year utility reported savings filed by each utility, the team matched the utilities' program databases to their filings. During this validation process, the team accepted the utilities' specified net-to-gross ratios, per-unit annual energy savings, net-to-gross ratios, and the treatment in their database and filings of committed, paid, and cancelled rebate applications.
- **Measuring the installation ratio for reported measures.** The installation rate was inferred from the combination of measure verification and the answers to question directed to managers and tenants. The observed installation rate is an estimate of the true installation rate.
- **Assessment of first year savings using validation and installation ratio results.** First year savings were calculated as a product of the validated savings and the installation ratios calculated using primary research data.

The methodology used is further discussed below.

7.3 Results

This section discusses the results of the validation of first year filed savings with utility savings calculated from utility databases, lists the number of gas and electric measures the utilities claim to have installed, and makes adjustments to first year ex post savings for measure installation ratios estimated in this study.

7.3.1 Validation of Savings Calculation Results

The team compared the first year filed energy savings with the savings listed in utility databases. A utility's total net energy savings from the database is the sum of the utility measure's net energy savings. The database numbers were compared with the filed numbers for each utility. The filed net energy savings for PG&E and SCE include committed and paid applications while the net energy savings for SDG&E and SCG included only paid applications.

Table 7-1 presents the numbers calculated using the program databases provided to Itron. In all cases, the numbers closely match those filed with the CPUC. SCE's program database exactly

matches their filed numbers. PG&E's net kWh fillings with the CPUC are 10,047,783 kWh. Their CPUC filings are slightly higher than the database first year savings of 9,962,240 kWh. SDG&E's net kWh and therm fillings with the CPUC are 3,595,507 kWh and 377,330 therms, respectively. SDG&E's database savings are 3,604,256 kWh and 370,938 therms, respectively. SCG's net kWh and therm fillings with the CPUC are 4,371,663 kWh and 736,798 therms, respectively. SCG's database savings are 4,370,381 kWh and 736,672 therms, respectively. The differences in the program databases and the CPUC filing are due to slight data entry problems.

Table 7-1: Validated Gross and Net Energy Savings

Measures	Utility	Database Energy Savings		CPUC Utility Energy Savings	
		Gross	Net	Gross	Net
Lighting	All Utilities	17,146,249	14,830,053	17,230,591	14,905,117
	PG&E	8,795,011	7,827,560	8,891,081	7,913,062
	SCE	4,811,778	3,852,374	4,811,778	3,852,374
	SDG&E	3,539,460	3,150,119	3,527,732	3,139,681
Other Electric	All Utilities	3,758,648	3,343,728	3,760,692	3,345,457
	PG&E	2,398,518	2,134,681	2,398,563	2,134,721
	SCE	849,961	754,911	849,961	754,911
	SDG&E	510,271	454,136	512,168	455,825
Total Electric	All Utilities	25,815,540	22,544,162	25,903,263	22,622,236
	PG&E	11,193,519	9,962,240	11,289,644	10,047,783
	SCE	5,661,739	4,607,285	5,661,739	4,607,285
	SCG	4,910,541	4,370,381	4,911,980	4,371,662
	SDG&E	4,049,731	3,604,256	4,039,900	3,595,506
Total Gas	All Utilities	1,922,156	1,710,527	1,929,389	1,717,044
	PG&E	677,435	602,917	677,435	602,917
	SCG	827,935	736,672	827,987	736,798
	SDG&E	416,786	370,938	423,967	377,329

PG&E = Pacific Gas & Electric
SCE = Southern California Edison
SCG = Southern California Gas Company
SDG&E = San Diego Gas & Electric

7.3.2 Assessment of Installation Ratios

Table 7-2 and Table 7-3 show the proportion of measures installed for electric and gas measures, respectively. Table 7-2 shows that a high percentage of lighting measures are no longer in place. For the non-lighting electric measures, nearly 100% of the measures are found to be working and in place.

For SDG&E, the lighting weighted installation proportions indicate that 100% of the CFL bulbs and 98% of the indoor hard-wired fixtures were installed.

The weighted installation proportion for PG&E's bulbs indicates that only 16 and 32 watt CFLs were fully installed. Comments from property managers in PG&E's service territory indicated that some bulbs were not installed in the quantities listed in the program tracking data and that

some bulbs were left with managers and tenants to install. The bulbs left with property managers and tenants were uniformly not installed. The weighted installation proportions also indicate that only 57% of 27 watt and 89% of 27-watt outdoor fixtures were installed. The installation proportions for PG&E's indoor hard-wired fixtures were 100%.

The weighted installation proportion for SCE's bulbs was 73% for 20-watt CFLs and 100% for 13-, 16-, and 25-watt CFLs. The weighted installation proportions for SCE's indoor and outdoor fixtures were 98% and 100%, respectively.

Table 7-2: 2003 Weighted Installation Ratios of Electric Measures

Measure Description	PG&E	SCE	SCG	SDG&E
CFL – 13 watt	80%			
CFL – 14 watt		100%		
CFL – 15 watt		100%		
CFL – 16 watt	100%			100%
CFL – 20 watt	84%	73%		
CFL – 25 watt	72%			100%
CFL – 27 watt		100%		
CFL – 32 watt	100%			
Screw-In 15-watt CF Lamp with Reflector				100%
Screw-In 23-watt CF Lamp with Reflector				100%
Outdoor Hard-Wired Fixture – 13-watt CFL	57%	100%		
Outdoor Hard-Wired Fixture – 27-watt CFL	89%			
Indoor Hard-Wired Fixture – 16-watt CFL	100%			
Indoor Hard-Wired Fixture – 27-watt CFL	100%			98%
Indoor Hard-Wired Fixture – 30-watt CFL	92%	98%		
LED Exit Sign	100%			
Apartment Programmable Thermostat	100%	94%	94%	100%
Common Area Programmable Thermostat	80%			
High Performance Window	99%	91%		
Attic Insulation	100%			
Wall Insulation	100%			
ENERGY STAR Room Air Conditioner	100%			
Packaged System AC – Tier 1		100%		
Air Conditioner Tier I Package Unit + TXV		100%		
ENERGY STAR Clothes Washer – Coin Operated	100%			
Commercial Clothes Washer – Horizontal Axis			100%	
ENERGY STAR Dishwasher	100%			

Table 7-3 shows the proportion of gas measures in place. In general, these ratios indicate that nearly all gas measures are 100% installed.

Table 7-3: 2003 Weighted Installation Ratios of Gas Measures

Measure Description	PG&E	SCE	SCG	SDG&E
Central System Natural Gas Boiler			100%	
Central System Natural Gas Water Heater	100%			
Natural Gas Storage Water Heater	100%			
Natural Gas Boiler Controller				100%
Natural Gas Boiler/Water Controller (>20 units)			100%	100%
Natural Gas Boiler/Water Controller			100%	100%
Programmable Thermostat	100%	94%	94%	100%
Common Area Programmable Thermostat	80%			
High Performance Window	99%			
Attic Insulation	100%			
Wall Insulation	100%			
ENERGY STAR Clothes Washer – Coin Operated	100%			
Commercial Clothes Washer – Horizontal Axis			100%	
ENERGY STAR Dishwasher	100%			

7.3.3 Adjusted Annual Energy Savings

Table 7-4 lists the 2002 net energy savings and the 2003 net energy savings from the utility tracking databases and the 2003 ex post savings when adjusted for the weighted installation ratio. The data from 2002 are presented to enable comparison to the 2003 results.

First, the electric energy savings from the 2003 MFRP are more than twice as large as the electric energy savings from the 2002 program. The measure with the largest increase in the number of units installed was programmable thermostats. In 2002, 214 programmable thermostats were installed. The data listed in Table 7-2 shows that 25,388 programmable thermostats were installed in 2003. The increase in energy saving is evidenced by the eight-fold increase in non-lighting electric savings and 3.3-fold increase in gas savings. Programmable thermostats contribute to a reduction in both electric and natural gas consumption, helping to explain the dramatic increase in savings.

The data in Table 7-4 indicate that annual installation ratio-adjusted ex post electric energy savings for all utilities is 20,839,434 kWh, or 92.44% of the database energy savings. Annual adjusted ex post gas energy savings for all utilities is 1,672,420 or 97.90% of the database energy savings. The installation ratio adjusted lighting ex post energy savings in 14,172,378 kWh, or 95.56% of the utility reported and EM&V validated energy savings. This finding indicates that Program Managers have addressed many of the lighting problems encountered in the 2002 MFRP. The installation ratio adjusted non-lighting *ex post* energy savings is 2,544,592 kWh or 76.10% of the utility reported and EM&V validated energy savings. This finding helps to

illustrate the new importance of programmable thermostats. Both SCE and SCG had a 94% installation rate for programmable thermostats and only 80% of PG&E's common area thermostats were reported as initially installed.

Table 7-4: Utility Reported and Weighted Installation Ratio Adjusted Ex post Net Energy Savings

Measures	Utility	2002 Net	2003 Net		
		Database Energy Savings	Utility-Filed Energy Savings	Tracking Database Energy Savings	Weighted Installation Ratio Adjusted Energy Savings of Tracking Database
Lighting	All Utilities	8,814,121	14,905,117	14,830,053	14,172,378
	PG&E	2,171,050	7,913,062	7,827,560	7,247,182
	SCE	5,331,601	3,852,374	3,852,374	3,793,919
	SDG&E	1,311,470	3,139,681	3,150,119	3,131,276
Other Electric	All Utilities	413,938	3,345,457	3,343,728	3,252,607
	PG&E	309,290	2,134,721	2,134,681	2,090,456
	SCE	92,367	754,911	754,911	708,015
	SDG&E	12,281	455,825	454,136	454,136
Total Electric	All Utilities	9,228,059	22,622,236	22,544,162	20,839,434
	PG&E	2,480,340	10,047,783	9,962,240	9,337,638
	SCE	5,423,968	4,607,285	4,607,285	4,501,934
	SCG		4,371,662	4,370,381	4,122,465
	SDG&E	1,323,751	3,595,506	3,604,256	3,585,412
Total Gas	All Utilities	517,456	1,717,044	1,710,527	1,672,420
	PG&E	70,250	602,917	602,917	590,962
	SCG	283,827	736,798	736,672	712,397
	SDG&E	163,379	377,329	370,938	370,938

Comparison of Number of Measures Installed

This section discusses and compares each parameter used by each utility in calculating estimates of savings.

Table 7-5 and Table 7-6 list the number of electric and gas measures installed. The listed measures contribute both gas and electricity savings. PG&E has the widest range of measures listed and SCG has more water heaters and boilers than the other utilities. Comparing 2002 findings with 2003 gas findings shows that all utilities had a substantial increase in the number of programmable thermostats installed.

PG&E had more than twice as many screw-in CFL bulbs as SCE, and more than three times as many as SDG&E. PG&E installed 86,750 CFL bulbs and 48,282 fixtures. SCE installed 38,941 CFL bulbs and 25,374 fixtures while SDG&E installed 25,346 CFL bulbs and 12,810 fixtures.

Table 7-5: 2003 Quantity of Electric Measures Installed

Measure Description	PG&E	SCE	SCG	SDG&E
CFL – 11 watt	4,322			
CFL – 13 watt	1,539	144		
CFL – 14 watt		12,849		
CFL – 15 watt		12,508		
CFL – 16 watt	42,393			16,481
CFL – 18 watt		3		
CFL – 19 watt		132		
CFL – 20 watt	28,996	3,404		
CFL – 23 watt		3,770		
CFL – 24 watt		40		
CFL – 25 watt	4,033	1,175		3,783
CFL – 27 watt		3,375		
CFL – 32 watt	5,188			
CFL – 13 watt Common Area	30			
CFL – 25 watt Common Area	25			
Reflector CFL – 15 watt	194			579
Reflector CFL – 23 watt	30			4,500
Reflector CFL – 30 watt		1,201		
Reflector CFL – 40 watt		340		
Ceiling Fan with CFLs	6			
Outdoor Hard-Wired Fixture–13-watt CFL	1,546	8,095		361
Outdoor Hard-Wired Fixture–27-watt CFL	510			
Indoor Hard-Wired Fixture–16-watt CFL	1,324			
Indoor Hard-Wired Fixture–27-watt CFL	15,766	17,279		12,624
Indoor Hard-Wired Fixture–30-watt CFL	29,136			
LED Exit Sign	87	88		
Apartment Programmable Thermostat	10,608	2,457	10,088	2,235
Common Area Programmable Thermostat	1,161			
Occupancy Sensors	21	54		
Photocells	30			
Low-Flow Showerhead	10			
Faucet Aerator	4,283			2,056
High Performance Window	38,299 ft^2	58,292 ft^2		
Attic Insulation	171,516 ft^2		34,280 ft^2	
Wall Insulation	39,688 ft^2		7,970 ft^2	1,122 ft^2
ENERGY STAR Room Air Conditioner	19	136		
Packaged System AC – Tier 1	29	7		
Packaged System AC – Tier 1 with TXV	6	59		
ENERGY STAR Dishwasher	90		37	2
ENERGY STAR Clothes Washer – Coin Operated	96			
ENERGY STAR Clothes Washer	1			

Table 7-6: 2003 Quantity of Gas Measures Installed

Measure Description	PG&E	SCE	SCG	SDG&E
Furnace – 80 AFUE			10	
Furnace – 90 AFUE	26			
Space Heating Boiler				2
Central System Natural Gas Boiler	6			
Central System Natural Gas Boiler & Water			279	28
Central System Natural Gas Water Heater	11		49	3
Storage System Natural Gas Water Heater	63		8	9
Natural Gas Boiler/Water Controller (<20 units)	20		55	171
Natural Gas Boiler/Water Controller	3		72	161
Natural Gas Boiler Controller	2		27	1
Natural Gas Water Heater Controller			4	35
Programmable Thermostat	11,769	2,457	10,088	2,235
Low-Flow Showerhead	10			
Faucet Aerator	4,283			2,048
High Performance Window	38,299 ft^2	58,292 ft^2		1,122 ft^2
Attic Insulation	171,516 ft^2		34,280 ft^2	
Wall Insulation	39,688 ft^2		7,970 ft^2	
ENERGY STAR Dishwasher	90		37	2
Commercial Clothes Washer	96		40	
ENERGY STAR Clothes Washer	1		20	

8. HARD-TO-REACH (HTR) ANALYSIS

This section is divided into three subsections.

- The first discusses background information on HTR populations for energy efficiency programs in California, interpretation of the CPUC directive for the multifamily rebate program by various utilities, goals developed by each utility for meeting the CPUC HTR directive, and overall performance against these goals during PY2003.
- The second section assesses how successful each utility has been in the PY2003 multifamily rebate program in penetrating their target multifamily sector. This section uses a geographic information system (GIS) to determine who is and is not participating. It also explores the extent to which program policy and other factors have affected the distribution of rebates across the utilities.
- The third section identifies geographic areas where good HTR prospects are likely to be found within the multifamily sector.

8.1 HTR Background and Utility HTR Goals for the Multifamily Program

In 2002, the CPUC encouraged the utilities to attract participants from classes of customers who had not traditionally participated in utility-sponsored energy efficiency initiatives. The CPUC established the following categories of residential customers as being HTR.

- **Language.** Primary language spoken is other than English, and/or
- **Income.** Customers who fall into the moderate income level (income levels less than 400% but greater than 175% of Federal poverty guidelines), and/or
- **Housing Type.** Multifamily and mobile home tenants, and/or
- **Geographic.** Residents of areas other than San Francisco Bay, San Diego, Los Angeles Basin, or Sacramento, and/or
- **Homeownership.** Renters

8.1.1 What Are Each Utility's HTR Goals?

Because the MFRP is targeted exclusively at the multifamily and mobile home market, nearly all participants at least meet the "Housing Type" category within the CPUC definition of HTR. The only MFRP participants who could not be classified as HTR are the few participants living in multifamily condominiums who own those units and rebates paid to property owners for work performed in common areas.

The utilities emphasize in planning documents that the MFRP is attracting one of the heretofore-underserved markets. However, since the CPUC required each energy efficiency program to set a HTR target for 2003, each utility went further in establishing specific additional goals to market to areas where multifamily buildings were likely to contain occupants within CPUC-defined moderate income and geographic HTR categories. The utilities did not want a situation where a disproportionate amount of the multifamily program benefits was flowing to the most

affluent multifamily dwellers. Hence, each utility, except SDG&E, established secondary goals to attract a percentage of multifamily participants from these other HTR categories.

To implement their HTR goals, each utility used a list of ZIP codes within its service territory that were categorized as rural/non-urban and/or having a higher than average percentage of households in the moderate income bracket (between 175% and 400% of the Federal poverty guidelines). The Statewide Residential Customer Needs Assessment Study provided the background ZIP code data for these designations.[6] Since a similar level of information was not available at the time of goal setting and program implementation for non-English speaking multifamily dwellers, this segment was not targeted specifically.

Much of the identification of HTR segmentation relied on a ZIP code mapping created in the Statewide Residential Needs Assessment Study, which classified California's ZIP codes by a variety of demographic and available Census data features. This study produced segment maps identifying the location of HTR population densities by ZIP code and utility service maps.

The following HTR segments are targeted by the 2003 MFRP.

- **Rural.** PG&E designated rural as every city not located in the San Francisco Bay Area or Sacramento, while SCE and SCG used the Statewide Residential Needs study rural ZIP codes and those with high percentages of moderate income households. SDG&E did not include a rural population segment.
- **Moderate income.** SCE and SCG also included moderate income customers in their HTR segments (PG&E and SDG&E did not).[7] Customers in ZIP codes with a large percentage of moderate income residents were classified as being of moderate income.
- **Multifamily and mobile homes.** SDG&E included all rebates that went to renters in multifamily (that is within the tenants' space as opposed to placed in common areas) or mobile homes as HTR irrespective of income classification or geographic location.

As Table 8-1 indicates, each utility has its own criteria and 2003 goal for HTR within their territory.

[6] TecMrkt Works, CALMAC # 3533, 2000.
[7] Note that low income programs are also available to multifamily customers.

Table 8-1: Utility Hard-to-Reach Definitions and 2002 Goals

	2003 HTR Performance Goals	2003 HTR Performance Result	Criteria Used to Determine Which ZIP Codes Are HTR
PG&E	305	43%	ZIP codes outside Bay area - nine counties and Sacramento
SCE	36%	55.9%	Rural[8] and those ZIP codes with 43% or more of households with household incomes between 175% and 400% of poverty level.
SCG	29%	34%	Rural[9] and those ZIP codes with 43% or more of households with household incomes between 175% and 400% of poverty level
SDG&E	92%	85%	All renters in multifamily units and mobile homes.

8.1.2 Did Each Utility Meet Their HTR Goals?

Most of the attention given to HTR customers in the quarterly reports focuses on the additional goals of reaching non-urban and moderate income multifamily households. As Table 8-1 shows, the utilities all met their secondary goals. As is discussed in more detail in the next two subsections, the achievement of these secondary goals, while laudable, certainly has less significance than the overall achievement of delivering services to the multifamily sector.

By measure of the very broadest and clearly the most important criteria, i.e., multifamily dwellings, the 2003 MFRP is an unqualified success with respect to meeting CPUC HTR policy directives. With the new program design, the MFRP has been transformed from the RCP model, which largely could not address the needs of the multifamily landlords and tenants, to a viable program effectively delivering services to this previously underserved market, which had long resisted prior conservation initiatives due to fundamental split incentive barriers.

8.2 A Geographic Analysis of HTR

8.2.1 HTR Methodology Using a Geographic Information System

A detailed analysis was made of the distribution of rebates across the four service territories. To accomplish this analysis, a geographic information system (GIS) was constructed that can merge data on the location of each participant multifamily complex with the 2000 U.S. Census data and 2004 population projections.

The GIS software, ArcView 8.3, can locate the exact coordinates of more than 95% of the program participants by matching street addresses to the underlying street data contained in the

[8] Rural zip codes include several parts of large metropolitan counties considered rural. A good example is the eastern desert part of San Bernardino County. See Goldsmith, H. Puskin, D., and Stiles, D., "Improving the Operational Definition of Rural Areas for Federal Programs," http://www.nal.usda.gov/orhp/Goldsmith.htm.

[9] ibid

year 2000 TIGER data set.[10] As an enhancement to the method used in the 2002 MFRP evaluation, the utilities were asked to provide the known latitudes and longitudes of addressees and/or the ZIP+4 addresses. These additional data increased the accuracy of the geo-location, such that, as shown in Table 8-2, 99% of all addresses were located for the 2003 multifamily participants.

Table 8-2: Success Rate for Geo-Locating 2003 MFRP Participants

	Total Dollars of 2003 Rebates from Database	Total Dollars of 2003 Rebates with Successful Geo-Location	Percent of Rebate Dollars Geo-Located	Total Dollars after Clipping Service Territory	Percent of Rebate Dollars Remaining after Clipping
PGE	$3,428,754.05	$3,416,314.05	99.64%	$3,416,314.05	99.64%
SCE	$1,659,893.49	$1,630,555.99	98.23%	$1,630,555.99	98.23%
SCG	$1,209,242.50	$1,166,121.25	96.43%	$1,166,121.25	96.43%
SDGE	$2,198,784.25	$2,195,784.25	99.86%	$2,194,684.25	99.81%
Total	$8,496,674.29	$8,408,775.54	98.97%	$8,407,675.54	98.95%

Once the exact location of each site is determined, the GIS assigns to that location the underlying census information on the housing type as well as other demographic variables that may be of interest, including the population's racial composition, median income, and housing type. Another improvement made to the 2003 analysis is the use of the Census Block Group instead of the Census Tract as the geographic unit of study. The block group represents a smaller unit of study so that households within block groups are more homogenous than they are within each within a census tract

The first step in the development of the GIS analysis is to combine the census block group features with each utility service territory boundary. The boundary of each utility service territory is overlaid onto the census block group boundary map. At the boundaries of the utility service territories, there will be bisection of census block groups. All population statistics are automatically proportioned to the bisected pieces based on their area relative to the original land area. Because this process can produce tiny clips of census block groups, all partial block groups are dropped that contain less than 5% of the original block group area.[11] As Table 8-2 indicates, there are virtually no losses with the clipping of street addresses.

[10] The Topologically Integrated Geographic Encoding and Referencing (TIGER) files define the location and relationship of streets, rivers, railroads, and other features to each other, and to the numerous geographic entities for which the Census Bureau tabulates data from its censuses and sample surveys. It is designed to ensure there is no duplication of these features or areas. See http://www.census.gov/geo/www/tiger/overview.html for more information.

[11] The overlay of two sets of polygonal data will result in some small clipping because of slight inaccuracies in the line segments used to outline the polygons. For example, if both sets of data have the same road as a boundary, but one set has a more accurate representation of that road, then what should be treated as the same line will appear to be two separate lines closely associated with each other, but crisscrossing each other and creating minute areas that show differences in the representation of that road. For permanent GIS systems, it would be important to redefine that road in one set to be exactly like the other so that no little polygons are created in the intersection. For the purposes of this work, dropping these small polygons does not affect the analysis and is much simpler to implement.

For each of the four utility service territories, an analysis of the rebates received is compared to the median income of the census block group, the percentage of population that is non-white, Hispanic, non-English speaking, and the percentage living in areas defined as rural (note that in this comparison, "rural" is defined by the Athens Research using RuralBG, the rural definition for the specific block group). In each case, correlation statistics are used to measure the strength of the relationship between the rebate amount per household and each of the other variables of interest.

To express rebate coverage across the service territory, the total rebate dollars are summed for each census block group and divided by the total number of households in the block group as projected in the 2004 population projections. The total number of households in each block group was used because it provides a more reliable statistic than the number of multifamily units.

The purpose of this analysis is to assess the effectiveness of the coverage of the MFRP rebates with respect to total number of household units. This issue is addressed on three levels.

- **Where did the rebates go?** The team first looked at the actual locations where the rebates were given and used the GIS to describe the block groups based on the 2000 U.S. Census data. The most important finding was the low degree of coverage across each utility. Most block groups in each service territory had no activity in 2003.
- **Are there patterns with respect to race, language, income, and population density that account for the differences in the coverage?** The team compared the characteristics of each active block group to the characteristics of block groups with no activity. The team also looked for trends in the distribution of activity across racial composition and income and performed a correlation analysis to determine which factors were most associated with the distribution of funds across block groups. In general, no obvious signs of discrimination were found. In fact, the distribution of multifamily rebate dollars favors census block groups with higher percentages of non-white, Hispanic, non-English speaking households.
- **What effects have the HTR goals had on the distribution of rebates?** One factor that may affect the distribution of rebates is the utility efforts to direct activity to certain designated HTR areas. The team looked at the relationship between the distribution of rebates per household and the distribution of multifamily households to see if more activity could be detected than would normally be expected in areas that the utilities designated as target areas. The MFRP rebates have tended to flow to locations with higher percentage of HTR designated characteristics. What cannot be definitively said is whether this trend is due to the targeting by the utility program or the fact that the HTR criteria are more readily found in multifamily apartments.

8.2.2 Where Did the Rebates Go?

The first question addressed with respect to the analysis is what does the distribution of MFRP rebates look like across the four utilities? Figure 8-1 through Table 8-5 show the distribution of rebate dollars geographically. These maps show that only a small percentage of the area within the utility service territories have program activity. This is further illustrated in Table 8-3, where only 1.7% to 9.1% of the census block groups show any activity.

Figure 8-1: Statewide Map of Multifamily Rebate Dollars by Census Block Group ($/household)

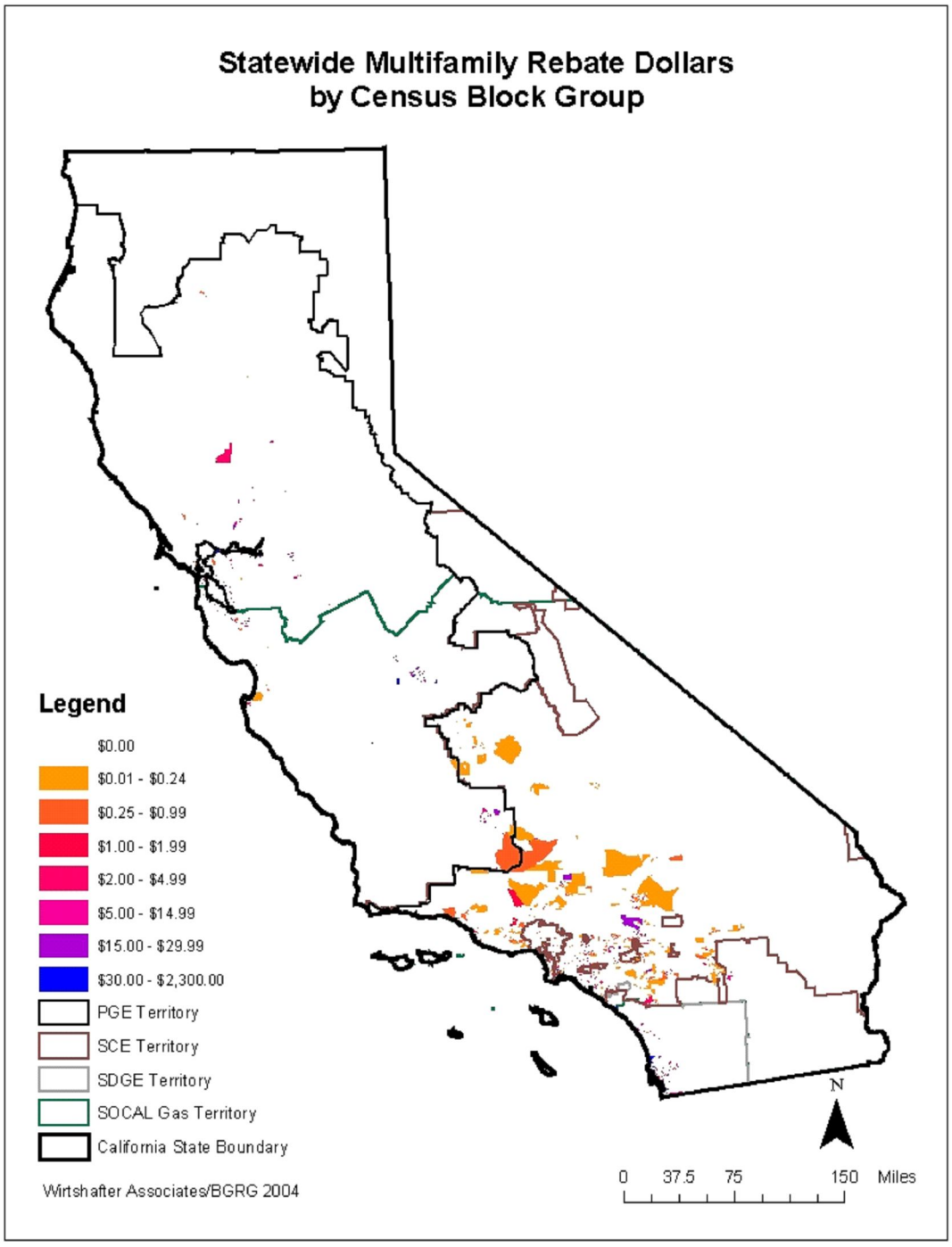


Figure 8-2: PG&E Map of Multifamily Rebate Dollars by Census Block Group ($/household)

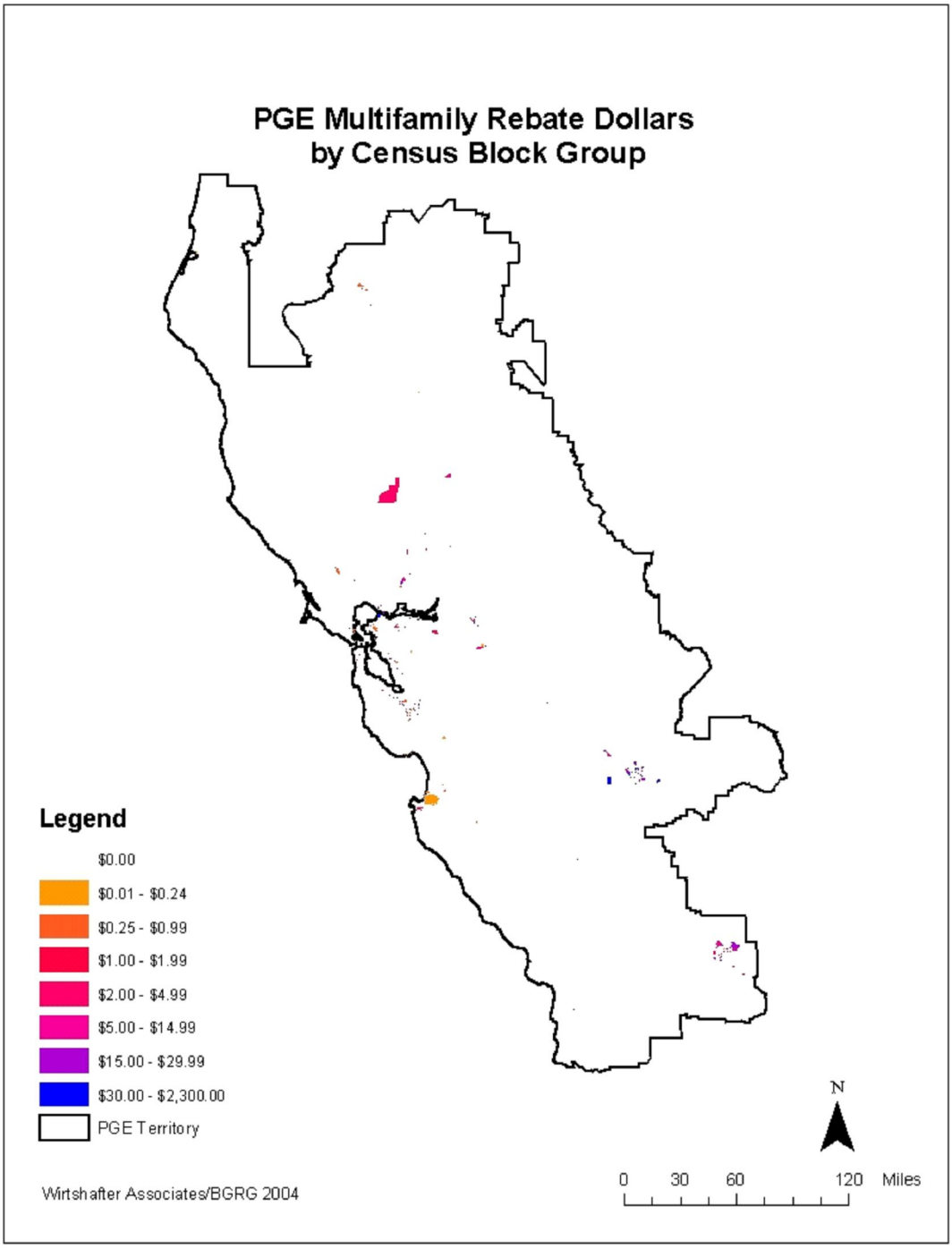


Figure 8-3: SCE Map of Multifamily Rebate Dollars by Census Block Group ($/household)

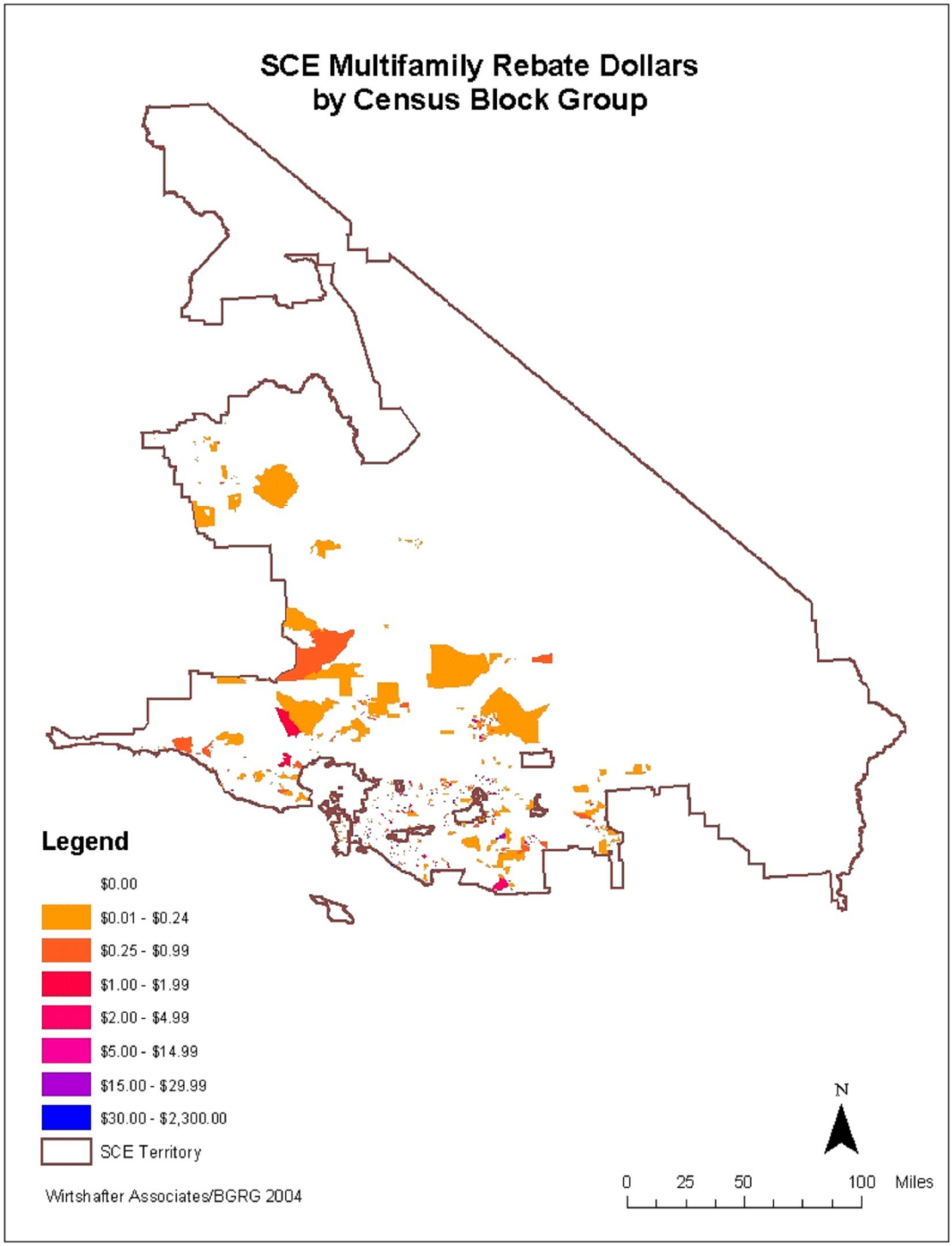


Figure 8-4: SCG Map of Multifamily Rebate Dollars by Census Block Group ($/household)

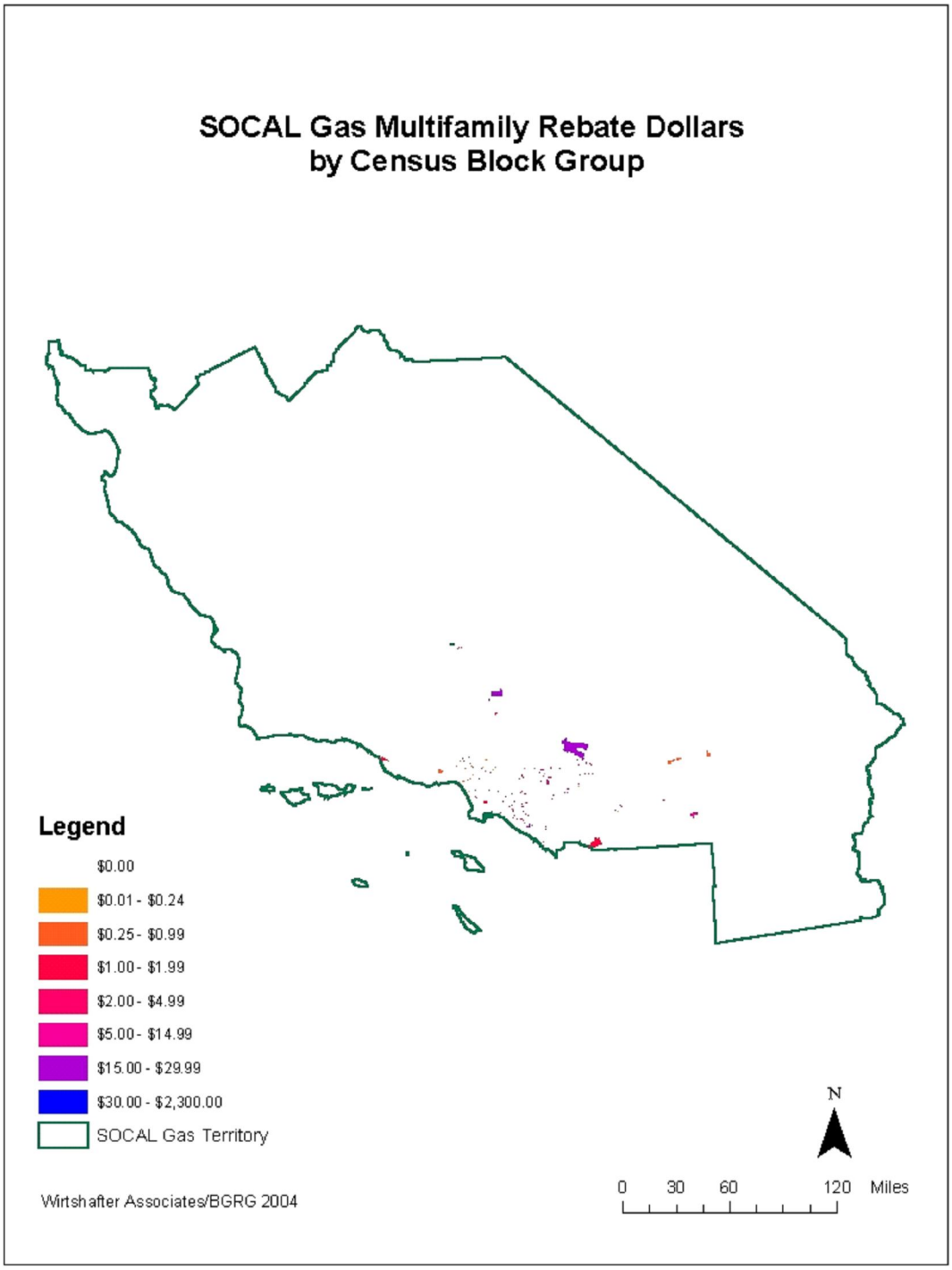


Figure 8-5: SDG&E Map of Multifamily Rebate Dollars by Census Block Group ($/household)

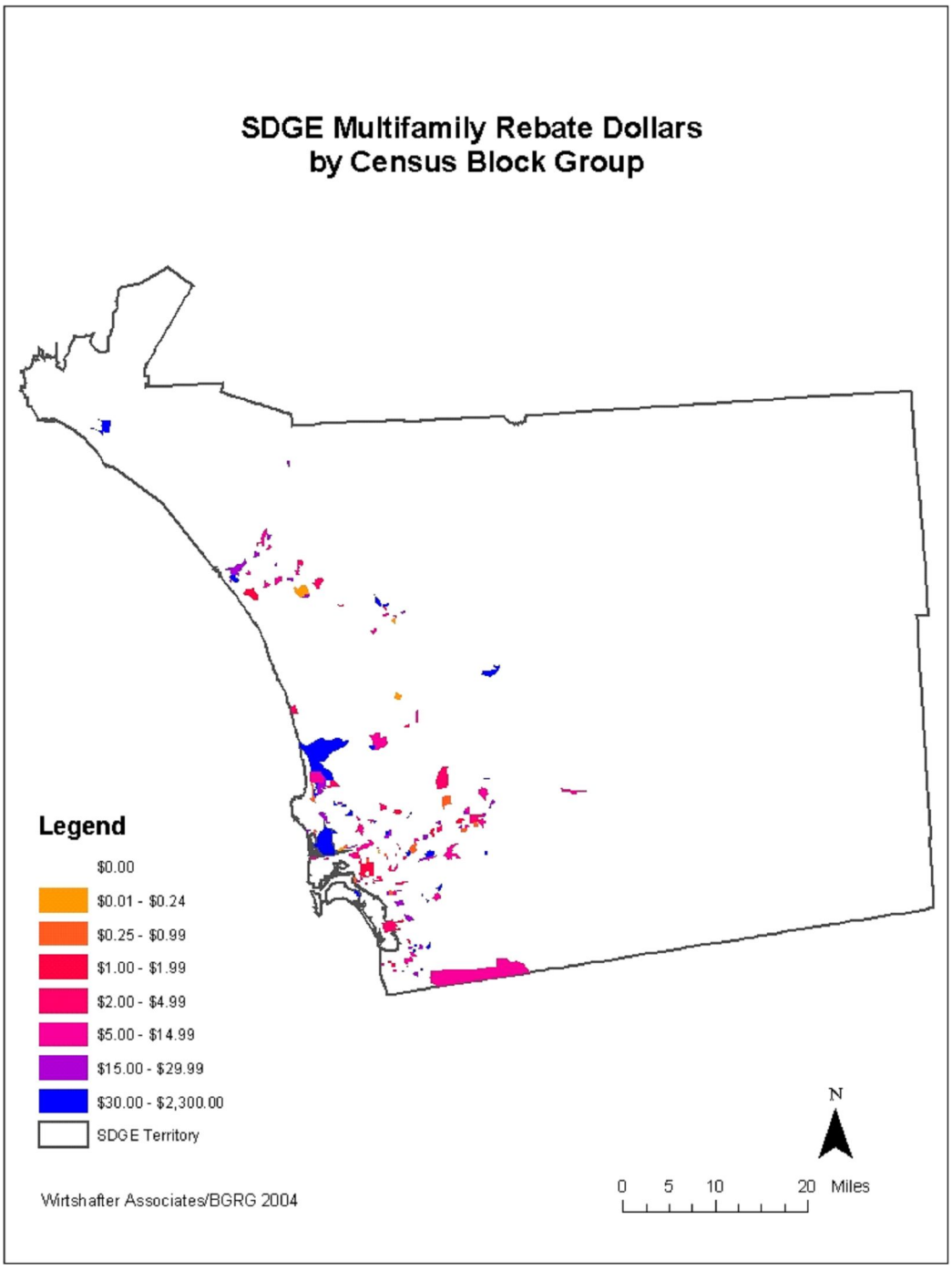


Table 8-3: Coverage of MFRP across Census Block Groups

	Number of Census Block Groups	Number of Census Block Groups with MFRP Activity	Percentage of Block Groups with MFRP Activity
PGE	9,101	333	3.66%
SCE	8,423	638	7.57%
SCG	16,255	283	1.74%
SDG&E	1,917	174	9.08%
All Utilities	35,696	1,428	4.00%

One possible explanation for this high concentration of activity in a few areas is that many block groups do not contain sufficient numbers of multifamily units to warrant marketing by contractors. Census data were used to calculate the number of multifamily units (not structures) in each census block group. The team then examined block groups with activity to identify patterns of distribution. As shown in Table 8-4, there is a significant range in the number of multifamily units in the active block groups. Program activity spans the range of block groups with respect to number of multifamily units. In general, activity is happening more often in block groups that are below the average size for each territory.

Based on the 2000 U.S. Census, a number of block groups have little or no multifamily structures with five or more units. Unfortunately, it does not appear that the Census count is consistent with the program activity records. There is program activity in areas where the Census says there are few or no multifamily units. No obvious explanation for this discrepancy is available. Some program activity is for mobile home parks, but this is not enough to explain the entire issue. Some of the difference may be in the counting of units within a complex or the structure. The Census only counts buildings with five or more units within a structure, while the program may include low-rise complexes with fewer units in each structure as long as the entire complex contains more than five units. It is also possible that some are units built since 2000. These data are presented here with the knowledge that the program contractors have found some areas where multifamily units exist, even though the Census reports little potential there.

Table 8-4: Distribution of Number of Multifamily Units in Active Block Groups

	Average Number of Multifamily Units in Block Groups with Activity	Minimum Number of Multifamily Units in Block Groups with Activity	Maximum Number of Multifamily Units in Block Groups with Activity	Average Number of Multifamily Units in Block Groups without Activity
PGE	365	0	2,593	96
SCE	638	0	3,040	105
SCG	283	0	4,061	128
SDG&E	174	0	4,267	134
All Utilities	312	0	4,267	115

Next, the team wanted to determine the extent to which areas with large multifamily potential within each utility service territory were not participating. Table 8-5 shows that even if all of the block groups with less than 250 multifamily units were removed, there remain many block groups with large numbers of multifamily units that are not active. On average, three-fourths of the block groups with more than 250 multifamily units had no activity in 2003. SCE, which had activity in 54% of the block groups with more than 250 multifamily units, is the most successful in matching activity to their block groups with the most multifamily units. In general, however, there are large portions of these service territories where no activity is taking place even though there appear to be large numbers of multifamily units available. The next section looks to identify some characteristics of these block groups that differentiate them from those receiving attention from contractors.

Table 8-5: Coverage Percentages Using only Block Groups with Large Numbers of Multifamily Units

	Number of Census Block Groups with MFRP Activity	Number of Census Block Groups with More than 100 Multifamily Units	Percentage of Multifamily >100-unit Block Groups with Activity	Number of Census Block Groups with More than 250 Multifamily Units	Percentage of Multifamily >250-unit Block Groups with Activity
PGE	333	2,540	13.11%	1,200	27.75%
SCE	638	2,539	25.13%	1,180	54.07%
SCG	283	5,505	5.14%	2,841	9.96%
SDG&E	174	813	21.40%	453	38.41%
All Utilities	1,428	11,397	12.53%	5,674	25.17%

The next step was to search for a pattern of distribution that would suggest that some groups are being less served by the program. Specifically, the team examined how well the program performed across the various HTR criteria established by the CPUC.

8.2.3 Are Characteristics of the Active Block Groups Different from the Non-Active Block Groups?

The team examined the characteristics of the active block groups compared to the non-active block groups to determine if any distinguishing characteristics could be found that inform as to who is participating. Table 8-6 compares block groups that have had program activity and block groups with no activity for the average values of key characteristics. As can be seen, the average values are generally very similar between participant and nonparticipant households, however, even these slight differences are statistically significant. The statistical significance finding indicates that there is a differentiation in the characteristics of the participant and nonparticipant households, albeit that such an influence is small.

Table 8-6: Comparison of Characteristics between Active and Non-Active Census Block Groups

	PGE		SCE		SCG		SDG&E	
	Active	Non-Active	Active	Non-Active	Active	Non-Active	Active	Non-Active
Number of Block Groups	333	8,768	638	7,785	283	15,972	174	1,743
Average Number Total Housing Units	**895**	**584**	**862**	**553**	**904**	**574**	**849**	**611**
Average Number of Multifamily Units	**365**	**96**	**187**	**105**	**481**	**128**	**394**	**134**
Average Percentage of Multifamily Units	**39.9%**	**14.1%**	**21.8%**	**16.6%**	**50.0%**	**19.2%**	**46.6%**	**20.6%**
Average Percent Multifamily or Mobile Homes	**42.9%**	**19.0%**	**27.8%**	**20.8%**	**52.8%**	**23.0%**	**51.6%**	**24.2%**
Average Percent Rural Households	**1.2%**	**13.3%**	**6.6%**	**4.8%**	**1.5%**	**5.4%**	**0.4%**	**4.4%**
Average Percent Non-White	**40.2%**	**33.1%**	**38.5%**	**39.8%**	**42.3%**	**39.0%**	**34.7%**	**27.8%**
Average Percent Hispanic	**22.2%**	**18.0%**	**27.8%**	**31.7%**	28.4%	29.2%	**26.3%**	**20.1%**
Average Percent Non-English	**39.1%**	**31.9%**	**38.3%**	**43.4%**	45.1%	43.2%	**39.5%**	**32.9%**
Average Percent Non-English—Isolated Households	**11.0%**	**7.4%**	**9.6%**	**10.7%**	**14.4%**	**11.2%**	**10.2%**	**6.6%**
Average Percent in Moderate Income Range	31.9%	32.4%	**33.6%**	**34.8%**	**32.9%**	**34.4%**	**34.5%**	**36.4%**

Bold values are significant using an independent samples test—t-test for equality, at 95% level. This indicates that the difference between the two means is unlikely (less than 1 in 20) to be just the result of random occurrence.

Three factors complicate the statistics displayed above.

- The Census data are only available in aggregate statistics. It is not possible to identify households within a block group that are low income, non-white, and living in a multifamily unit. It can also not be determined if one factor, such as income level, is disproportionately distributed across another factor such as housing type.
- Because there are separate low income-specific programs, the MFRP is designed to serve households above 175% of the poverty level. There is a very strong relationship between the percentage of non-white and Hispanics and the percentage of households living below 175% of poverty level. This means that, proportionally speaking, more non-whites and Hispanics are covered by the low-income initiatives. The MFRP, if it is operating

principally in housing units above 175% of poverty, will likely attract a lower portion of Hispanics and non-whites than are found in the general population.

- One cannot simply look at distribution of activity without considering how CPUC directives to push the program into HTR areas have affected coverage. The policy to encourage contractors to market to non-urban areas, and to target property owners and managers in these areas, also affects the values for income and racial/ethnic composition.

Distribution of various factors can be reviewed in more detail to determine if average values are misleading. One way is to look at the distribution of funds, measured in rebates per household across various characteristics.

Looking at the distribution of rebates will reveal what factors are most associated with higher rebate levels per household. Pearson Correlation was used to measure the relationship between the rebate totals per household and various demographic factors. If the test results are significant, this implies a relationship between rebates per household and the factor that is likely not a random event. If the relationship is positive, then as that factor increases so does the amount of rebates per household. If it is negative, then as one factor increases, the other factor decreases. The measure of the strength of the relationship is the correlation coefficient. At 1.0, the two values are perfectly matched and changes in one results in proportional changes in the other. As the correlation coefficient drops, the strength of the relationship drops. If sample sizes are large enough, coefficients as low as 0.01 may detect a significant but weak relationship.

The results in Table 8-7 show the overall set of correlations between rebate totals per household and various measures of each block group's demographic characteristics. Many of the relationships produce significant, yet weak correlations. Table 8-7 shows that the strongest positively correlated ties are between $rebated/household and the percentage of the households that are multifamily and the percentage of households that do not speak English at home and have no one in the home that does (isolated).

Table 8-7: Pearson Correlation to Rebate Amount per Household

	All Utilities	PGE	SCE	SCG	SDG&E
Percent Rural	-0.008	**-0.034**	-0.005	-0.004	-0.037
Percent Non-White	**0.019**	**0.066**	0.026	0.005	**0.063**
Percent Hispanic	0.000	**0.040**	-0.007	0.010	**0.049**
Percent Multifamily	**0.022**	**0.090**	0.006	0.026	**0.149**
Percent Mobile Home and Multifamily	**0.019**	**0.077**	0.003	**0.024**	**0.145**
Percent Non-English Speaking	**0.014**	**0.039**	0.027	-0.012	**0.067**
Percent Non-English Speaking Isolated	**0.043**	**0.041**	**0.087**	-0.006	**0.066**
Percent of Households with Moderate Incomes	**0.017**	0.005	0.014	0.007	**0.073**

Bold are significant at the 1% level

Table 8-8 through Table 8-11 show the distribution of fund dollars across racial, housing type, language, and income categories. The block groups are divided into groups based on the

percentage of households in that category. For example, in Table 8-8, the chart shows the comparison between the average rebate per household for the 10% of block groups with the least concentration of non-whites as compared with the 10% of block groups with the highest concentration of non-whites.

The tables indicate that the MFRP tends to distribute more funds to those block groups that have higher percentages of the HTR characteristics. Activity in each of the utilities increases as the percent of non-whites, Hispanics, non-English speakers increases. This trend does not hold for rural households. As the block groups become more rural, the $rebated/household drops. As has been pointed out, this drop off is the direct consequence of the fact that there are few multifamily units in rural areas.

Table 8-8: Rebates per Household by Block Group Racial Composition

Percentiles by Percent of Households that Are Non-White ***(range of values)***	**PGE**	**SCE**	**SCG**	**SDG&E**
Average all Block Groups	$0.50	$0.58	$0.13	$1.68
10% of Block Groups with Least Percentage of Non-White	$0.04 *(<11%)*	$0.03 *(<13.2%)f*	$0.00 *(<12.8%)*	$0.33 *(<10%)*
10 to 25%	$0.03 *(11 to 16.3%)*	$0.10 *(13.2 to 19.5%)*	$0.04 *(12.8 to 19.5%)*	$0.24 *(10 to 12.8%)*
25 to 50%	$0.22 *(16.3 to 27.8%)*	$0.16 *(19.5 to 34.2%)*	$0.15 *(19.5 to 35.5%)*	$1.26 *(12.8 to 22.4%)*
50 to 75%	$0.78 *(27.8 to 46.1%)*	$0.48 *(34.2 to 50.8%)*	$0.25 *(35.5 to 55.1%)*	$2.75 *(22.4 to 39.7%)*
75 to 90%	$0.99 *(46.1 to 66.0%)*	$0.42 *(50.8 to 61.7%)*	$0.15 *(55.1 to 71.6%)*	$3.16 *(39.7 to 58.7%)*
10% of Block Groups with Highest Percentage of Non-White	$0.92 *(>66%)*	$2.10 *(>61.7%)*	$0.03 *(>71.6%)*	$1.35 *(>58.7%)*

Table 8-9: Rebates per Household by Block Group Hispanic Composition

Percentiles by Percent of Households that Are Hispanic *(range of values)*	**PGE**	**SCE**	**SCG**	**SDG&E**
Average all Block Groups	$0.50	$0.58	$0.13	$1.68
10% of Block Groups with Least Percentage of Hispanic.	$0.06 *(<3.3%)*	$0.02 *(<6.8%)*	$0.06 *(<6.1%)*	$0.41 *(<5.6%)*
10 to 25%	$0.13 *(3.3 to 5.7%)*	$1.90 *(6.8 to 11.3%)*	$0.12 *(6.1 to 10.2%)*	$0.88 *(5.6 to 7.8%)*
25 to 50%	$0.15 *(5.7 to 11.7%)*	$0.45 *(11.3 to 23.1%)*	$0.11 *(10.2 to 21.3%)*	$1.81 *(7.8 to 12.8%)*
50 to 75%	$0.78 *(11.7 to 23.9%)*	$0.41 *(23.1 to 45.4%)*	$0.17 *(21.3 to 43.9%)*	$2.16 *(12.8 to 26.2%)*
75 to 90%	$1.13 *(23.9 to 42.9%)*	$0.32 *(45.4 to 71.6%)*	$0.05 *(43.9 to 69.7%)*	$1.49 *(26.2 to 49.4%)*
10% of Block Groups with Highest Percentage of Hispanic	$0.71 *(>42.9%)*	$0.36 *(>71.6%)*	$0.30 (>69.7)	$2.94 (>49.4%)

Table 8-10: Rebates per Household by Block Group Non-English Speaking Households (Non-Isolated) Composition

Percentiles by Percent of Households that Speak Language Other Than English in the Home *(range of values)*	**PGE**	**SCE**	**SCG**	**SDG&E**
Average all Block Groups	$0.50	$0.58	$0.13	$1.68
10% of Block Groups with Least Percentage of Non-English households.	$0.04 *(<10.2%)*	$0.38 *(<14.4%)*	$0.31 *(<14.7%)*	$0.33 (<12.9%)
10 to 25%	$0.04 *(10.2 to 16.7%)*	$0.20 *(14.4 to 22.7%)*	$0.07 *(14.7 to 23.1%)*	$1.34 *(12.9 to 18%)*
25 to 50%	$0.36 *(16.7 to 26.8%)*	$0.34 *(22.7 to 37.3%)*	$0.15 *(23.1 to 37.9%)*	$0.51 *(18% to 26.6%)*
50 to 75%	$0.90 *(26.8 to 43.5%)*	$0.29 *(37.3 to 60.1%)*	$0.15 *(37.9 to 60.7%)*	$2.85 *(26.6 to 43.9%)*
75 to 90%	$0.79 *(43.5 to 62.5%)*	$0.26 *(60.1 to 81%)*	$0.11 *(60.7 to 81.1%)*	$1.94 *(43.9 to 66.7%)*
10% of Block Groups with Highest Percentage of Non-English Speaking Households	$0.54 *(>62.5%)*	$3.26 *(>81%)*	$0.03 *(>81.1%)*	$3.18 *(>66.7%)*

Table 8-11: Rebates per Household by Block Group Rural Composition

Percentiles by Percent of Households that Are Rural ***(% of total block groups)***	**PGE**	**SCE**	**SCG**	**SDG&E**
Average all Block Groups	$0.50	$0.58	$0.13	$1.78
Block-Groups Less Than 1% Rural	$0.61 (82%)	$0.63 (91%)	$0.14 (91%)	$1.83 (93%)
Block Groups Between 1% And 9.99% Rural	$0.55 (2%)	$0.21 (1%)	$0.01 (1%)	$1.55 (1%)
Block Groups Between 10 And 49.99% Rural	$0.11 (4%)	$0.06 (3%)	$0.06 (2%)	$0.00 (1%)
Block Groups Between 50 And 94.99% Rural	$0.01 (4%)	$0.02 (1%)	$0.24 (1%)	$0.29 (1%)
Block Groups Between 95 And 100% Rural	$0.01 (9%)	$0.01 (3%)	$0.02 (4%)	$0.00 (3%)

Table 8-12 uses a definition provided by the CPUC to estimate the approximate number of participating households that fall between 175% and 400% of the poverty level, a group targeted by this program. This is a difficult statistic to operationalize within a program design because individual households within a given geographic area can be either over or under the threshold and, therefore, it is likely that some of the wealthiest areas and some of the poorest are grouped together in the percentile categories. It does appear that a large portion of the MFRP dollars are being distributed to block groups with the highest percentages of moderate income households.

Table 8-12: Rebates per Household by Block Group Percentage of Block Group that is Moderate Income

Percentiles by Percent of Households With Moderate Incomes (150 to 400% of Poverty Level)	PGE	SCE	SCG	SDG&E
Average all Block Groups	$0.50	$0.58	$0.13	$1.68
10% of Block Groups with Least Percentage of Moderate Income Households	$0.18 *(<22%)*	$0.06 *(<26%)*	$0.11 *(<25%)*	$0.71 *(<28%)*
10 to 24.99%	$0.33 *(22 to 28%)*	$0.15 *(26 to 30%)*	$0.09 *(25 to 30%)*	$0.84 *(28 to 31%)*
25 to 49.99%	$0.89 *(28 to 33%)*	$0.25 *(30 to 34%)*	$0.19 *(30 to 34%)*	$1.00 *(31 to 35%)*
50 to 74.99%	$0.49 *(33 to 37%)*	$0.35 *(34 to 37%)*	$0.08 *(34 to 37%)*	$2.14 *(35 to 38%)*
75.01 to 90%	$0.30 *(37 to 40%)*	$0.44 *(37 to 40%)*	$0.15 *(37 to 40%)*	$1.70 *(38 to 40%)*
10% of Block Groups with Highest Percentage of Moderate Income Households	$0.38 *(>40%)*	$3.40 *(>40%)*	$0.19 *(>40%)*	$4.45 *(>40%)*

Having looked at the distribution of activity, the biggest concern lies not with the exclusion of particular types of households, but with the limited reach of the current effort to all parts of the utility service territories. The program must concern itself with reaching more than the few block groups it now does. The reader is reminded again that the activity illustrated in Figure 8-1 leaves most of the state untouched.

8.2.4 What Effects Have the HTR Goals Had on the Distribution of Rebates?

The results in Table 8-7 are made without an appreciation for the underlying relationship between market potential and program accomplishment. If the program was more active in areas that were rural, was this because the program worked hard to enlist apartments in rural areas, or is the natural distribution of apartments such that one would expect to see more activity there? Table 8-13 shows the underlying relationship between the characteristics of the block groups and the percent of the block group that is multifamily.

Table 8-14 combines the multifamily and the mobile home counts to capture the full extent of the program's reach. Table 8-13 reveals very large and significant correlations between the percent multifamily and the key demographic characteristics related to the HTR analysis. As the table illustrates, there are strong positive correlations between the percentage of multifamily households in a block group and the percent of the block group that is non-white, Hispanic, and non-English speaking. In short, the likelihood of the MFRP delivering program benefits to non-white, Hispanic, and non-English household is increased when the rebates are given to block groups with high percentages of multifamily households. The only strong negative relationship found is between the percentages of multifamily units and the percentage of rural households.

Rural block groups are less likely to have multifamily households. Even when adding mobile homes into the mix in Table 8-14, there remains a very strong negative correlation between percent rural and percent of housing that is either multifamily or mobile. This says that the more rural the area, the less likely it will have larger number of households eligible for this program.

This means that the program achievement of obtaining a positive correlation between rebates and the percent rural found in Table 8-7 is even stronger than the explicit results suggest. The program has been extremely successful in targeting this program to the more rural areas, even though there are proportionally less eligible multifamily and mobile homes households in these areas.

Table 8-13: Pearson Correlation to Percent of Block Group that Is Multifamily

	All Utilities	PGE	SCE	SCG	SDG&E
Percent Rural	**-.200**	**-.259**	**-.153**	**-.179**	**-.180**
Percent Non-White	**.187**	**.208**	**.154**	**.187**	**.246**
Percent Hispanic	**.073**	.006	**.054**	**.078**	**.178**
Percent Non-English Speaking	**.155**	**.152**	**.110**	**.167**	**.144**
Percent of Households with Moderate Incomes	.007	**-.105**	**.029**	**.024**	**.243**

Bold significant at the 1% level

Table 8-14: Pearson Correlation to Percent of Block Group that Is Multifamily or Mobile Home

	All Utilities	PGE	SCE	SCG	SDG&E
Percent Rural	**-.039**	**-.060**	.020	**-.031**	**-.087**
Percent Non-White	**.146**	**.143**	**.114**	**.156**	**.220**
Percent Hispanic	**.051**	-.003	.017	**.062**	**.175**
Percent Non-English Speaking	**.093**	**.071**	**.038**	**.117**	**.116**
Percent of Households with Moderate Incomes	**0.80**	.014	**.095**	**.084**	**.286**

Bold significant at the 1% level

Looking further into the relationship between Table 8-7 and Table 8-13 shows that the emphasis on rural areas comes at a cost of reaching other HTR sub-categories. Table 8-13 indicates that there is a very strong relationship between percent of multifamily and percentage of non-white or Hispanic families. A similar set of relationships exists when using the percentage of both multifamily and mobile homes as shown in Table 8-14. This indicates that the achievement of reaching non-white/Hispanic families shown in Table 8-7 is weaker than the table values suggest.

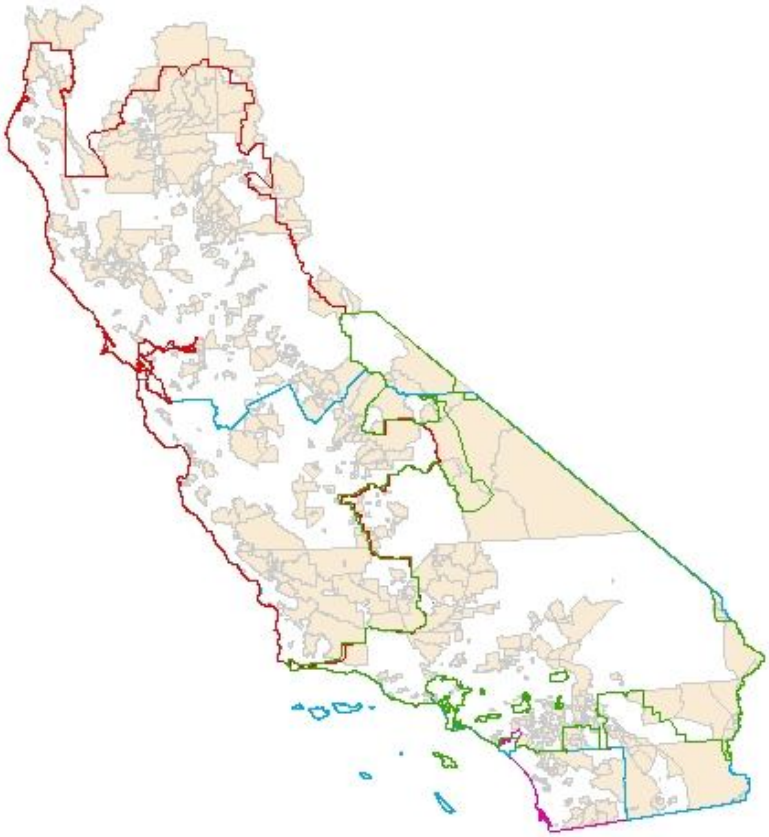
Rural locations are not a good place to market this program. Figure 8-6 shows all of the 2000 Census block groups in California where greater than 10% of the block group's households are classified as being rural. Figure 8-7 shows the subset of these rural Census block groups with 25 or more multifamily units. Only a few isolated rural areas have a critical mass of multifamily

units. Only a small portion of the entire state population is represented. The darkened area in Figure 8-7 represents only 57,400 multifamily units—just 2% of the state's total. Only when the mobile home count is added, as seen in Figure 8-8, do these rural areas have much program potential. Even so, the shaded areas only have 330,000 multifamily and mobile units combined. This is less than 8% of the total number of multifamily and mobile units found in California.

Figure 8-6: California Census Block Groups with More than 10% of Households Classified as Rural

Figure 8-7: California Census Block Groups with More than 10% of Households Classified as Rural and with More than 25 Multifamily Housing Units

Figure 8-8: California Census Block Groups with More than 10% of Households Classified as Rural and with More than 100 Multifamily Housing or Mobile Home Units



8.3 Recommended Changes to HTR Activities and Priorities

The results of the GIS analysis identify issues and suggest how the implementation of the HTR efforts can be improved. Some issues derive from the specific methods chosen to set the goals, implement the efforts, and measure the results. While addressing some of these program-specific issues, it is important to tie the individual program effort to the overall CPUC goal of reaching HTR customers. The discussion below builds from program-specific issues to issues needing modifications in the overall CPUC policy.

First to be discussed are the goals as set by the utilities, and approved by the CPUC, and whether they are appropriate. The discussion then centers on issues related to how the utilities have implemented the HTR efforts and tracked progress. Finally, broader issues for the CPUC are discussed. Of particular concern is the CPUC directive to design, implement, and measure HTR success at the program level.

8.3.1 Assessment of the MFRP HTR Goals

Each utility has its own basis for setting HTR goals. One issue confusing the evaluation of these secondary HTR goal achievements is the manner in which each utility has set its goal. Each utility has used a very different set of standards, which the CPUC approved, for deciding which applications qualify as HTR. These individual approaches have created a broad variation in goals ranging from 10% to 90% of total participants that must be from the ZIP codes defined as HTR. This is no common framework across the four utilities upon which to assess the appropriateness of these individual goals, the goal values in relationship to overall markets, or the level of difficulty each utility has in reaching these sub-markets. The goal of 90% as defined by SDG&E may be easier to achieve than the 10% goal set by SCG.

The goal of promoting emphasis in rural areas is counter-productive. The analysis above shows the problems a single program encounters when it individually tries to address all HTR issues simultaneously. While it would be ideal with respect to meeting HTR goals to target the energy efficiency programs to customers who are simultaneously rural and non-English-speaking, non-white, and of moderate income, the fact remains that there are few such individuals possessing all four of these characteristics. In setting the HTR goals for a specific program, it is necessary to match the sub-set of HTR criteria to be addressed by the program with the characteristics of the customers for whom the program is designed to address.

The MFRP cannot deliver effectively and efficiently a multifamily program targeted to multifamily customers while at the same time focusing on rural areas because this is not where the bulk of multifamily households exist. As the program continues, it will be increasingly more difficult to find nonparticipant multifamily complexes in these areas. Of course, the program could continue to focus on rural areas by pushing the program to mobile home parks. This is certainly a possible option, and indeed the program already allows participation for common areas in mobile home parks, but such a move should be accompanied by program enhancements favorable to the mobile home market. It may make more sense to design a specific program for mobile homes.[12]

The emphasis on secondary goals such as rural or moderate income targets detract from the all-important goal of reaching multifamily units. Reaching the multifamily market is a worthy goal in itself. The entire multifamily segment has long been underserved because of recalcitrant, embedded market barriers that are fundamental to this market segment. The MFRP is one of the first programs to succeed in bringing any type of program benefits to the tenants in these complexes, and the goal should be to reach the broadest possible market of multifamily customers. There are areas of each service territory with large concentrations of multifamily households receiving no benefits from the MFRP. Many of these areas have low involvement because they are farther away from the existing group of contractors who are driving program interest. While targeting moderate income areas is acceptable (targeting rural is less appropriate as noted above), this should not be the exclusive concern. The program more importantly needs to build coverage across these other underserved areas.

[12] Note that the Low Income Program includes mobile home parks.

Note that there are upwards of 2.8 million multifamily units in California contained in approximately 125,000 to 150,000 multifamily buildings. At the current level of funding, the program will never run out of potential markets or serve everyone in this market segment. Therefore, it is important to reach the broadest range of multifamily households while monitoring that no groups are receiving unjustified shares of the funds.

In developing a marketing and program-delivery strategy to reach multifamily households, it is most efficient to try to build a program that reaches the broadest possible niche first, and then refine the message and delivery options to reach the sub-markets not responding to the broader approach. When there is determined to be a need to reach a sub-market that does not respond to the broad market message, it is best to define that sub-market in the most precise manner possible. For example, if language is a barrier to participation, messages need to be developed in the specific languages to effectively reach that sub-market. With the information collected in this analysis, the MFRP can offer a broadly targeted program and pinpoint underserved areas and the characteristics of the households in those areas.

8.3.2 HTR Implementation Issues

When targeting the multifamily program to specific HTR criteria, using zip codes is too broad in many cases: As noted above, the program should strive to reach the broad market, but when narrowing in on specific sub-markets, it should do so as precisely as possible. The utilities set original target priorities by selecting a set of ZIP codes to include as HTR areas. While the ZIP codes were selected using Census information, in most cases the ZIP code level is too aggregated a spatial measure to distinguish HTR households from non-HTR households accurately.

The program should market itself to areas with the greatest potential. The program's goal should be to push into areas where there has been little program activity yet great potential for finding applicable multifamily units. The GIS system helps identify specific census block groups where large numbers of potential candidates are located. This is summarized in Table 8-15 and is defined as areas with more than 250 multifamily households and larger than average numbers of families in the moderate income range (<32%).

To assist in identifying these areas, the team generated a table of ZIP+4 numbers that are within the large market potential areas. This list of ZIP+4 numbers is being distributed to the MFRP managers via CD ROM.

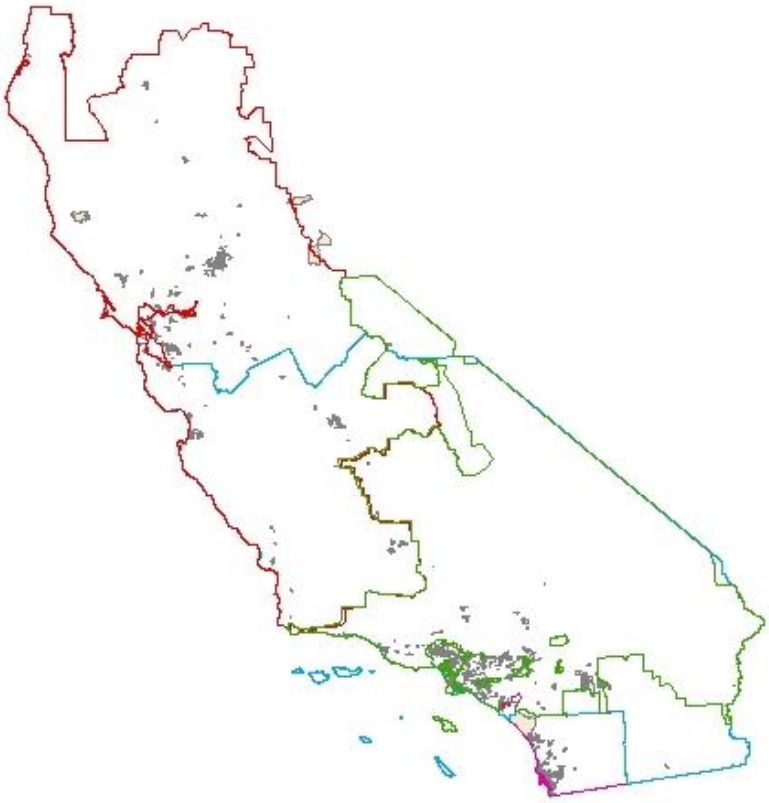
Table 8-15: Selection of Block Groups with Large Market Potential

Utility	Total Number of Block-Groups with Activity in 2003	Number of Prime Marketing Block Groups with Activity in 2003	Percent of Block Groups with Activity 2003 that Are Prime Marketing Areas	Number of Prime Marketing Block Groups	Percentage of Prime Marketing Block Groups that Had Activity in 2003
PGE	333	76	23%	511	15%
SCE	638	139	22%	838	17%
SCG	283	121	43%	1,810	7%
SDG&E	174	78	45%	371	21%

(Prime Marketing Block Groups have >250 Multifamily units and >.32% Moderate Income)

Figure 8-9: Block Groups in California with More than 32% of Households in 175 to 400% of Poverty Level Category

Figure 8-10: Block Groups with Areas with Large Market Potential



9. SUMMARY AND RECOMMENDATIONS

The results of the 2003 MFRP evaluation are pleasantly surprising. The PY2002 evaluation, which assessed the first year of this new program, uncovered some significant quality control issues associated with the lamps and fixtures being installed by the contractors, as well as a high degree of dissatisfaction by the property managers in whose buildings these measures were installed. Because most of the 2003 units were treated before the PY2002 evaluation results were uncovered (the first indications of problems did not emerge until July 2003, by which time most of the 2003 sites had been treated), it was expected that the quality issues would continue to be a significant factor in the 2003 assessment. While some quality issues remain, they are not overwhelmingly significant. More importantly, the Program Managers have seriously and effectively addressed the issues raised in the 2002 report. They have pressed upon the contractors that it is the contractors' responsibility to ensure that products perform as expected. They have also taken measures to educate the property managers to empower them to be good advocates for their interests. These measures, though principally implemented for the 2004 program year, have had the desired effect of having contractors fix quality issues identified by the property managers in 2003 installations, and thus reducing the number of quality issues seen by the on-site assessors and property manager interviews for this year's evaluation.

The results are summarized below, followed by a set of recommendations for consideration.

9.1 Summary of PY 2003 Evaluation Findings

Summary findings from this evaluation are provided for the following:

- Measure installation and adjusted savings,
- Program operational issues,
- Contractor issues, and
- Multifamily property owner/manager issues.

9.1.1 Measure Installation and Adjusted Ex Post Savings

Table 9-1 shows the summary of PY2003 participation. In total, 1,326 complexes were treated with nearly 626,000 measures. Rebates totaling $7,971,720 were distributed.

Table 9-1: PY 2003 Multifamily Rebate Participation Records

Utility	Number of Complexes	kWh	Therm	Quantity of Measures	Incentives
SCG	374	4,371,663	736,798	52,942	$1,139,208
SDG&E	206	3,595,507	377,330	44,261	$1,528,823
SCE	243	4,607,285	0	127,554	$1,803,970
PG&E	503	10,047,686	602,917	401,113	$3,499,719
Total	1,326	22,622,141	1,717,045	625,870	$7,971,720

The on-site inspections, coupled with property manager and tenant on-site questionnaires, indicate that almost all of the measures for which applications were filed were originally installed. For the non-lighting electric measures, nearly 100% of the measures are found to be working and in place. For SDG&E, the lighting weighted installation proportions indicate that 100% of the CFL bulbs and 98% of the indoor hard-wired fixtures were installed. The weighted installation proportion for PG&E's bulbs indicates that only 16- and 32-watt CFLs were fully installed. The weighted installation proportions also indicate that only 57% of 27-watt indoor and 89% of 27-watt outdoor fixtures were installed. The installation proportions for PG&E's indoor hard-wired fixtures were 100%. The weighted installation proportion for SCE's bulbs was 73% for 20-watt CFLs and 100% for 13-, 16-, and 25-watt CFLs. The weighted installation proportions for SCE's indoor and outdoor fixtures were 98% and 100%, respectively. Instances were reported, particularly in the PG&E service territory, where contractors left measures to be installed by property managers and/or tenants; evidence from the on-site surveys shows that most of these measures were not subsequently installed.

Table 9-2 shows the adjusted ex post net savings.

Table 9-2: Net and Weighted Installation Adjusted Energy Savings

Measures	Utility	2002 Net	2003 Net		
		Database Energy Savings	Utility-Filed Energy Savings	Tracking Database Energy Savings	Weighted Installation Ratio Adjusted Energy Savings of Tracking Database
Lighting	All Utilities	8,814,121	14,905,117	14,830,053	14,172,378
	PG&E	2,171,050	7,913,062	7,827,560	7,247,182
	SCE	5,331,601	3,852,374	3,852,374	3,793,919
	SDG&E	1,311,470	3,139,681	3,150,119	3,131,276
Other Electric	All Utilities	413,938	3,345,457	3,343,728	3,252,607
	PG&E	309,290	2,134,721	2,134,681	2,090,456
	SCE	92,367	754,911	754,911	708,015
	SDG&E	12,281	455,825	454,136	454,136
Total Electric	All Utilities	9,228,059	22,622,236	22,544,162	20,839,434
	PG&E	2,480,340	10,047,783	9,962,240	9,337,638
	SCE	5,423,968	4,607,285	4,607,285	4,501,934
	SCG		4,371,662	4,370,381	4,122,465
	SDG&E	1,323,751	3,595,506	3,604,256	3,585,412
Total Gas	All Utilities	517,456	1,717,044	1,710,527	1,672,420
	PG&E	70,250	602,917	602,917	590,962
	SCG	283,827	736,798	736,672	712,397
	SDG&E	163,379	377,329	370,938	370,938

The program doubled the amount of rebate incentives distributed in PY2003 as compared to the dollars distributed in PY2002. Yet in spite of that growth, demand for rebates was not close to being satisfied. By delivering energy efficiency to tenant spaces, this program is reaching out into a virtually untapped area, where no energy efficiency has penetrated and virtually none will without the program incentives. California has 2.8 million multifamily households living in approximately 150,000 multifamily buildings. In 2003, this program served only 1,326, or 1%, of this market.

The 2003 EM&V cautioned against expanding the size of the program until the quality control issues are better controlled. The first year's evaluation revealed issues with the reliability of some of the CFL lamps installed. This lamp quality issue exposed the real weakness of the MFRP. The program itself does not have the capacity to control and monitor every piece of equipment that is installed in every unit. To be successful, the program must empower the property managers to make it their responsibility to ensure that equipment is of satisfactory quality, that it is installed as claimed, and that it operates for at least the warranty period. The program must also educate contractors on their obligation to install quality products and replace non-working equipment.

The MFRP has come a long way in building the necessary infrastructure to control the quality issue. The next section outlines some of the major accomplishments that have been seen. Program Managers have done an excellent job in addressing the recommendations made in the 2002 evaluation report. Those actions have led to a diminishing of the reported occurrences of quality issues in the feedback from property managers.

The MFRP is also an essential element of the utility portfolio of programs because it reaches into households classified as hard-to-reach (HTR) by the California Public Utilities Commission. The program successfully reaches the multifamily sector, a HTR designation. In doing so, the MFRP also extends services to a higher proportion of non-whites, Hispanics, non-English speaking, and moderate income households than is found in the general population. The only HTR classification that the MFRP does not serve well is the rural areas, where few multifamily units exist to be served.

9.1.2 Program Operational Issues

The Multifamily Rebate Program continues to be a popular program, with most utilities fully expending their rebate dollars well before the end of the year. In both 2003 and 2004, applications for lighting well exceeded the available program funds. While gas utilities had challenges attracting applications in the past, an increase in applications for programmable thermostats and water heater controls has filled the gap.

The reservation system, newly implemented in 2003, has proven to be a valuable tool for the Program Managers in managing the distribution of rebates among contractors. As SCE has demonstrated, designating some funds for applications submitted directly by property owners and managers has allowed these types of applications to rise significantly.

Program Managers have seen an increase in awareness among property managers and an increased level of scrutiny on the part of these property managers for the work performed by

contractors. There are continued concerns about the quality of contractor installations, especially among some of the newer entities participating in the program. There are still some contractors who drop-ship CFLs to the properties and ask the owners to install the lamps themselves. The Program Managers noted that the concern over CFL product quality still exists for the MFRP and the industry in general; the delisting of some lamps has raised awareness, but has not yet eliminated this quality issue.

Program Managers indicate that by the end of PY2003 and throughout PY2004, they have instituted a number of changes that they believe will affect the program in a positive manner.

- **Q/C Outreach with Contractors.** Program Managers have made it their responsibility to inform contractors of quality control concerns, and to make sure that contractors know that they will be called back to sites where quality issues are found. All Program Managers said that they have significantly increased the number of contacts with their contractors. The four utilities held a meeting with contractors in October 2003 in which the Program Managers informed the contractors that the utilities were going to step up interest in what they were doing. Program Managers also told the contractors that they wanted to be informed when there are product-related issues, and that they then will work together to address these problems. It was made clear to the contractors that they have an obligation to honor customer requests and product warranties. Contractors also provided feedback to the Program Managers on how they ensure quality control. As a result, a couple of contractors revisited sites to replace lamps from suspect manufacturers, even those that were still operating. Other contractors have made it a practice to leave additional lamps with the property manager in case any lamps fail.
- **Q/C Outreach with Property Owners/Managers.** Program Managers have increased their efforts to educate property owners and managers regarding the program and, specifically, their role in ensuring that products meet their satisfaction. Program Managers developed a packet of materials that is sent to prospective participants at the time the reservation is made. These materials explain the program and provide information to how to select contractors and specific products to be installed.
- **Inspections.** Program Managers at SCE and PG&E have increased the number of inspections they complete. SCG and SDG&E already inspect 100% of the program jobs. The other utilities report that more selective inspections uncover most problems. These utilities give extra scrutiny to jobs done by first-time contractors or those with a history of less than perfect installations.

9.1.3 Contractor Issues

Several significant findings emerged during the interviews. These key findings are highlighted below and discussed in detail in subsequent sections.

- **Funding allocation and the reservation system remain top issues for contractors.** Contractors cited funding allocation issues and problems with the reservation system as top drawbacks and/or weaknesses in the program during PY2003, and mentioned these issues throughout the interviews. Contractors voiced their dissatisfaction with the short supply of funding, which makes it difficult for them to build a sustainable business model. Several contractors who work in more than one utility territory expressed a desire

for the other utilities to adopt an allocation scheme similar to SCE's, where fund distribution is spread out over the year.

- **The financial incentives are seen as the top strength of the MFRP.**
- **Lamp quality was not a significant issue for contractors in PY2003.** In past years, lamp quality was observed as a major issue for contractors installing lamps. However, contractors indicated there were no major issues with lamp quality in 2003. Of the 10 contractors that installed lamps as a measure in PY2003, seven said they had not experienced any problems with lamp quality. The remaining three indicated there were some problems (one mentioned receiving "bad batches" from the manufacturer), but they were able to solve them immediately and replace the equipment.
- **Program satisfaction among contractors is high, although contractors did note suggested improvements.** Contractors indicated they are satisfied with the program for the most part, although improving the funding and reservation systems were cited as two top improvements to be made to the MFRP. When asked to rate their overall experiences with the MFRP program in PY2003 (on a scale from 1 to 10, with 1 indicating "not at all satisfied" and 10 indicating "very satisfied"), 20 of the 22 contractors interviewed rated their experiences a 5 or higher, with nearly one-third of respondents giving the MFRP a score of 10. Note that half of the contractors scored the program a 9 or 10.

Some contractors expressed dissatisfaction with the paperwork requirements, while others voiced the opposite opinion that the MFRP requirements were easy to deal with.

When asked which measures they would like to see added to the program, respondents recommended several measures, including a T12 to T8 lamp retrofit (which was noted by several contractors as having been added for PY2004), halogen torchiere trade-in, duct sealing/air conditioning tune-up, and solar heating for pools and spas.

In giving feedback to the utilities regarding promotion/marketing of the program, comments from contractors fell into one of three main themes: (1) leave marketing to the contractors, (2) provide contractors with some marketing tools, such as stickers, flyers, and (3) don't promote the program when the funds are not there to fulfill extra work that might result from a marketing campaign.

9.1.4 Multifamily Property Owner/Manager Issues

Most PY2003 participants were taking steps to improve energy efficiency for the first time—fully 58% of these participants had not installed any energy efficiency measures in their facilities in the past. For these participants, the program was the genesis of their energy efficiency activities and, as such, is an important influence in increasing awareness of and acceptance of higher efficiency alternatives in the multifamily property market. This program is penetrating historically HTR market niches that have no past record of embracing and utilizing energy efficient products.

Utility representatives were much more likely to be mentioned as a source of program information in 2003 than in the preceding year and surpassed contractors as the most frequently mentioned source of program awareness. This seems to reflect a greater proactive effort to inform property owners about program opportunities and to encourage customer-driven

applications. Even so, it appears that contractor marketing efforts are a primary driver for generating participation and rebate applications. It is telling, for example, that four of five participants did not obtain competitive bids for the program work performed at their sites.

Satisfaction indicators are reasonably positive overall. One indicator that came up negative was the feedback on tenant reactions to installed lighting measures. More tenants reported diminished lighting function than reported improvements. In contrast, non-lighting measures in tenant spaces seem to generate favorable reactions, with increased comfort levels being widely reported.

9.2 Status of PY2002 Evaluation Recommendations

Because the MFRP was a new program in 2002, the evaluation team felt it important to offer a wide selection of recommendations on how to strengthen the program. One of the exciting aspects of this year's evaluation is the realization that many of these issues and recommendation have been addressed. As such, it is useful to review the recommendations made in 2002 and to discuss the extent to which the issues addressed by the recommendation have been addressed. The seven recommendations made included the following:

- Work with contractors and property managers to increase lighting retention,
- Restrict lamp installation to high use applications,
- Increase program funds,
- Adjust rebate levels,
- Create an electronic application,
- Market for gas applications, and
- Develop a HTR plan.

9.2.1 Work with Contractors and Property Managers to Increase Lighting Retention

The 2002 evaluation recommended that the program work with contractors, property owners, and lighting manufacturers to increase lighting fixture and lamp quality and increase the retention rate for lighting installed. There were a number of possible reasons for the poor quality, each of which required specific action from the program.

Improving Lamp Lifetime Reliability

Issue. The most important reason for lamp removal was attributed to lamp products that were not achieving the expected lifetimes. It was recognized that the ultimate responsibility for this issue rested with the lamp manufacturers and the contractors. Furthermore, the results of the on-site inspection and property manager survey may have been the first indication to the Program Managers, and many of the contractors, that lamp reliability was a serious issue.

Recommendations Made in 2002 Report. While evaluations like this can provide feedback to the contractors and the program about lamp reliability, it should ultimately be the responsibility of the property managers to convey reliability issues to contractors, and of contractors to take these issues to their suppliers. The MFRP can facilitate a more positive relationship between the property managers, contractors, and suppliers in the following ways:

- Prepare a short manual for property managers that explains the program, and
- Build awareness of product warranties and enforce those warranties.

Result in 2003-2004. The Program Managers have made lamp quality their number one issue. The evaluators have seen a number of encouraging developments taken by the Program Managers and the contractors to deal with the reliability issue.

- Several of the largest contractors contacted all of the properties they had served and agreed to replace lamps that had burned out prematurely.
- Some contractors have been giving additional lamps to property managers for use as replacements for lamps that have burned out.
- The Program Managers have met with the largest contractors to discuss the lamp retention issue.

Lamp/Fixture Quality Issues

Issue. Some landlords and tenants removed lamps because the lighting quality or the fixture aesthetics were inadequate. The MFRP cannot institute any policy that can control these types of quality issues. It must be the responsibility of the property managers to control these issues. Unfortunately, the property managers do not understand the issues involved in selecting lamps and fixtures, they are unaware of the various options available, and they are unaware that they have some choices in the types of products that can be installed in their apartments.

Recommendations Made in 2002 Evaluation.

- The manual for property managers should explain the choices that they can make regarding the types of equipment to be installed.
- Contractors whose work is tied to low participant satisfaction levels should be monitored closely.

Results in 2003-2004. The Program Managers have increased the number of verification inspections and are now uncovering many of the installation and lamp quality issues themselves. Poorly performing contractors are now removed from the program. Property managers now receive a manual that explains how to select both a contractor and the equipment to be installed.

Verification Issues in Cases of Tenant Relocation

Issue. There were cases in which tenants had relocated and the reported lighting measures were not verified during subsequent inspections. This raised issues about the causes underlying the missing measures. It is possible that tenants leaving the properties took some of the missing lamps, and that other lamps were never installed. It is also possible that some of the lamps were installed but not found by the on-site inspectors.

Recommendations Made in 2002 Evaluation.

- The best way to ensure that lamps have been installed is to increase the number of utility-conducted in-field inspections of program rebate applications.

- Conduct telephone interviews with tenants receiving CFLs in their apartments to more accurately determine the disposition of the CFLs and assess the tenants' satisfaction with these lamps.
- Conduct more surveys with property managers to understand better the disposition of CFLs and fixtures installed under the program.

Result in 2003-2004. As noted, inspections have been increased in 2004. The on-site protocol was modified to better establish if lamps were installed and if removed, determine when the lamps were removed and why. On-site inspectors have interviewed property managers when lamps were not found. Mail surveys have been given to tenants, as there are no records of tenant phone numbers to implement a phone survey.

9.2.2 Restrict Lamp Installation to High Use Applications

Issue. In PY2002, no restrictions were made on where or how many lamps could be installed in a unit. As a result, lamps were installed in closets and other low use applications of little benefit.

Recommendations Made in 2002 Evaluation. It is recommended that the 2004 program monitor lamp installations to ensure that lamps are being installed in appropriate applications as part of the verification process.

Results in 2003-2004. Starting in PY2004, contractors can no longer install lamps in low use areas or install more than 8-10 lamps per unit. In addition, the 2004 evaluation plan calls for an emphasis on establishing run times for key measures to better determine the benefits realized by the installations made.

9.2.3 Increase Program Funds

Issue. One of the biggest issues confronting this program (during 2002) is over-demand, which forces electric funds to be subscribed within weeks of the program opening.

Recommendation Made in 2002 Evaluation. If quality control is resolved, there is significant justification for increasing program funding, particularly as a resource acquisition endeavor. Replacing inefficient lighting in tenant spaces is a large untapped potential market with almost no free ridership.

Results in 2003-2004. Funding has increased in 2003 to $7,971,720 in rebates, which represents a 106% increase over the 2002 rebate dollar total. Even so, demand for rebates is still far from being satisfied.

9.2.4 Adjust Rebate Levels

Issue. Because money is so quickly committed, there is pressure to lower the level of rebate per fixture so that more units can be installed. The PY2004 program lowers the fixture rebate from $60 to $50. Not surprisingly, the existing contractors voiced objections to this rebate change, and some said the change would make it unprofitable to install the fixtures. The evaluation team's concern is that the lowered rebate will squeeze the profit margins of these contractors.

This pressure may encourage contractors to use lower quality products. Unless a quality control system is implemented, the results could be worse than those experienced in PY2002.

Recommendations Made in 2002 Evaluation. The Program Managers must closely monitor activity at the beginning of PY2004 to track both application rates and the types of lamps installed. Contractors should be encouraged to see the reduction of incentives not as a call for lower quality equipment or less profit, but as a shift in program responsibility that requires property owners to help pay for these improvements.

Results in 2003-2004. There was no reduction in rebate commitment when the rebate level was reduced. An objective of the 2004 evaluation will be to examine whether lamp quality issues have resulted from the rebate reduction.

9.2.5 Create an Electronic Application

Recommendation Made in 2002 Evaluation. One frequent suggestion from participating contractors was the desire for an electronic application form. An electronic process might eliminate or reduce some of the duplicative data entry currently required for projects installing large numbers of the same measure or large numbers of measures in one location. The PG&E electronic data entry set up is well regarded among those who have used it. Respondents felt that this electronic form offers a good model for the other utilities.

Results in 2003-2004. The evaluation team is unaware of any movement towards electronic applications.

9.2.6 Market for Gas Applications

Issue. The lower level of participation for qualifying gas measures continues to be a concern for the Program Managers who have stepped up marketing to potential customers and contractors. Because gas measures generally represent technologies that are incremental improvements over existing products, the utilities cannot offer rebates that cover the full installation cost. Unlike the electric lighting measures where rebates often cover the full cost of the product and installation, the lower gas rebate levels generally limit the applications to those units that need replacement.

Recommendations Made in 2002 Evaluation. To achieve full commitment of gas funds, the program will need to tap into the existing large replacement market by aggressively marketing this program to property managers, contractors, and product distributors. In so doing, it must be realized that the contractors who install gas measures have felt that, to date, the incentives offered by MFRP have been set at levels that are too low. Outreach to contractors will need to address contractor expectations in this area and leverage other means for generating contractor interest in program participation. The program should commit to more extensive program marketing.

Results in 2003-2004. The broad increase in the installation of programmable thermostats appears to have eliminated the concern that gas utilities will not meet their goals. This result is a double-edged sword. The concern now is that many of these thermostats will not be programmed or kept programmed in a manner that saves energy. Close scrutiny of this issue will be needed in the 2004 evaluation.

9.2.7 Develop a Hard-to-Reach Plan

Issues. The HTR issues raised in the 2002 evaluation are generally applicable to CPUC-wide policy changes. A separate report is being prepared to address these issues.

Recommendations Made in 2002 Evaluation.

- The program should concentrate on its primary HTR goal to include multifamily and mobile home customers in the list of recipients of Public Goods Charges (PGC) funds.
- The program should stop concentrating attention in rural areas.
- The program should market itself to areas with the greatest potential.
- The program needs to use Census tract-level data for identifying HTR clusters.
- HTR achievement must be assessed at the portfolio level.
- Data on participation should be collected and assessed to design programs and redefine the exact composition of those who are HTR.

Results in 2003-2004. No changes have been made in the CPUC HTR policy or in the MFRP HTR implementation strategy.

9.3 Key Recommendations Resulting from PY2003 Evaluation

The PY2002 evaluation offered a long list of program recommendations. The main recommendation for this year is to continue the progress made in 2003-2004. Program Managers must remain proactive in managing contractors, educating property managers, and monitoring program implementation. The following are recommended steps that can be taken to strengthen these activities.

- **Maintain close scrutiny of contractor activities.** Without ongoing vigilance on the part of the Program Managers, contractors may regress to practices that include using lower quality fixtures and dropping off lamps and fixtures rather than installing them. Both practices can reduce the near- and long-term effectiveness of the MFRP. Project Managers should continue to let contractors know of the program's expectations for warranting products, and make it known that contractors who have not rectified issues have been banned from submitting future applications.
- **Make it clear in the application that contractors who are found to not install products for which rebates are claimed will be banned from future participation.** Drop shipment of products is not in the interest of the program. Results indicate that these products are seldom installed. Stronger wording in the application, including a signed statement by the contractor that all measures claimed were installed, should also be added. The IOUs are aware of this situation and are informing property owners and managers of their responsibilities since they sign the submitted application.
- **Continue efforts to educate property managers.** Property managers who are well educated in terms of program participation and product selection are more likely to serve as an additional checkpoint for quality control.
- **Dedicate more funds to applications directed by property managers.** The program was designed to be a property manager-directed program. The evaluation research

indicates that when property managers submit the application, they are far more likely to be an active player. Property managers cannot structure their application submission to compete with companies geared to capitalize on the short funding period, so it is important to hold funds aside. Priority should also be given to multifamily structures with less than 20 units, as this size is under-represented in the MFRP. Program Managers may want to keep an eye on submissions, because when smart contractors discover that these funds are available, they are likely to have the property managers submit the applications of jobs they generate.

- **De-emphasize non-hard-wired solutions.** The removal of CFLs from tenant spaces remains an issue. Hard-wired fixtures are more likely to provide long-term savings than screw-in lamps. Given the high demand for the MFRP, it makes sense to shift to technologies with longer term savings.
- **Reduce the number of lamps per unit even further.** The number of lamps allowed to be changed in an apartment is still too high. It is hard to imagine how someone in a studio apartment could use eight CFLs enough to make the change-out cost-effective. The eligible numbers of CFLs should be reduced to half of what they now are.
- **Monitor the programmable thermostat settings closely.** The expansion of this measure has been a boost for gas utilities. However, rebate levels are justified based on continued implementation of setbacks in the tenant spaces. The 2004 evaluation should set this as one of their measurement priorities.
- **Determine run-time of lamps.** This factor remains the largest unknown in the energy savings estimates. Research to define these parameters based on empirical data will ensure the accuracy of projected program savings.
- **Expand multifamily reach into geographic areas with high potential but no current activity.** Whenever a multifamily household is provided incentives through the MFRP, it satisfies one of the HTR criteria set by the CPUC. By serving this multifamily household, it also increases the odds that PCG funds are going to a non-white, Hispanic, and/or non-English-speaking household. There remain areas of the state that do not receive their share of funds. The MFRP must encourage contractors to serve these areas.
- **Consider increasing available funds.** Funding for this program has been exhausted in each year thus far, yet there remains considerable untapped potential. The multifamily market is historically underserved, free ridership appears to be minimal, and, as such, the program presents an opportunity ripe in its potential for providing energy efficiency resources to the California utilities

10. APPENDIX A: PROPERTY MANAGERS SURVEY

ICR
53 West Baltimore Pike
Media, Pennsylvania 19063-5698

Job #D1199
May 14, 2004

INTERNATIONAL COMMUNICATIONS RESEARCH

Multifamily Rebate Program
Participating Property Manager Survey

(ASK TO SPEAK TO NAME ON SAMPLE, OR PROPERTY OWNER OR MANAGER)

Introduction

Hello I am _____ from International Communication Research, and I am interviewing property owners and managers as part of an evaluation of the Multifamily Rebate Program offered by (UTILITY NAME) and other utilities in 2003. Your input will help (UTILITY NAME) assess how well the program has been performing and find ways to improve the program, if needed, in the future.

This program offered rebates for energy efficient items such as outdoor lighting, indoor lighting, appliances, heating and cooling equipment, insulation, etc. installed in apartment complexes and condominiums as well as mobile home parks.

(UTILITY NAME) is required by the Public Utilities Commission to hire an independent evaluator to make sure the programs are working as intended.

Screening

S1. Our records show that you participated in the Multifamily Rebate Program and installed:

(IF LIGHT = TRUE – Lighting measures,
IF HVAC = TRUE – Heating, Ventilation and/or Air Conditioning Measures,
IF WATER = TRUE – Water heaters, water controllers and/or water saving measures,
IF SHELL = TRUE – Windows and/or insulation,
IF OTHER = TRUE – Clothes washers and/or dish washers)

at your property at (ADDRESS FOR SAMPLED PROPERTY). Are you familiar with those improvements?

1 Yes
2 No (ASK TO SPEAK TO SOMEONE WHO WOULD BE FAMILIAR)
R Refused (TERMINATE)

1. Initial Interest in Program

1.1 Had you participated in the Multifamily Rebate program in 2002?

1 Yes
2 No
D Don't know
R Refused

When answering the following questions, we will only be referring to the
s

(IF LIGHT = TRUE – Lighting measures,
IF HVAC = TRUE – Heating, Ventilation and/or Air Conditioning Measures,
IF WATER = TRUE – Water heaters, water controllers and/or water saving measures,
IF SHELL = TRUE – Windows and/or insulation,
IF OTHER = TRUE – Clothes washers and/or dish washers)

installed at (ADDRESS FOR SAMPLED PROPERTY) last year.

1.2. Do you recall how you first learned about the Multifamily Rebate program?
(DO NOT READ LIST. ACCEPT ONE ANSWER)

01 Utility brochure
02 Bill stuffer
03 Utility Company Web page
04 Utility representative
05 Utility application package
06 Contacted by a contractor offering services
07 Equipment distributor/supplier
08 Your management
09 Newspaper/magazine/newsletter article
10 Trade association/other property manager
11 Participated last year (already knew about the program)
12 Property owner
97 Other (PLEASE SPECIFY) _____
DD Don't Know
RR Refused

1.3 Do you recall seeing any of the following information about the program?

1 Yes
2 No
D Don't Know
R Refused

(ONLY ASK FOR THOSE NOT MENTIONED IN Q.1.2)
a. Brochures
b Bill stuffers
c. Web pages

2. Measures Installed and Decision-making

2.1 Thinking about the …

(IF LIGHT = TRUE – Lighting measures,
IF HVAC = TRUE – Heating, Ventilation and/or Air Conditioning Measures,
IF WATER = TRUE – Water heaters, water controllers and/or water saving measures,
IF SHELL = TRUE – Windows and/or insulation,
IF OTHER = TRUE – Clothes washers and/or dish washers)

Were those measures installed in the common areas only, tenant-occupied spaces only, or both? By common areas, we mean the public spaces in and around your buildings, such as the laundry rooms, hallways, and the like.

1 Common areas only
2 Tenant-occupied spaces only
3 Both
D Don't know
R Refused

(IF Q.1.1 = 1, ASK Q.2.2; OTHERWISE SKIP TO 2.3)

2.2 Are the measures that you had installed in 2003 of the same type as those you had installed previously through the multifamily rebate program?

1 Yes, same types of measures
2 No, new measures
3 Both new and same type as previously
D Don't know
R Refused

(ASK EVERYONE)

2.3. Now, thinking of all the measures taken, including yourself, who was involved in this decision?
(READ LIST, ENTER ALL THAT APPLY)

1 Property owner
2 Property manager
3 Someone at the property management company
5 The Board
7 Other (PLEASE SPECIFY) _____
D Don't Know
R Refused

2.4. How many bids did you seek for this work?
(SELECT ONE)

1 One bid
2 2 bids
3 3 bids
4 4 or more bids
7 Other (PLEASE SPECIFY) _____
N None/no bids sought
D Don't Know
R Refused

2.5. (OMIT)

2.6 (OMIT)

2.7 What difficulties, if any, were encountered with the work done as part of the Multifamily Rebate program? (PROBE FOR SPECIFIC ANSWERS)

1 Answer given
N None, no difficulties
D Don't know
R Refused

2.8 Have any of the measures that were installed through this program last year been removed?

(INTERVIEWER NOTE: REMOVAL COULD BE BY ANYONE, INCLUDING TENANTS)

1 Yes
2 No
D Don't know
R Refused

(IF Q.2.8 = 1, ASK; OTHERWISE SKIP TO Q.2.12)

2.9 Which measures were removed? What others?

01 Hardwired Fluorescent Fixtures
02 Hardwired Fluorescent porch/outdoor lights
03 Screw in Compact Fluorescent Lamps (CFLs)
04 Energy Star ceiling fans
05 Energy Star clothes washers
06 Energy Star Dishwashers
07 Energy Star programmable thermostats
08 High performance dual-paned windows
09 Attic or wall insulation
10 High efficiency exit signs
11 Occupancy Sensors
12 Photocell controls for exterior lighting
13 High efficiency boilers
14 High efficiency water heaters
15 High efficiency air conditioners or heat pumps
16 Natural gas water heater or boiler controllers
17 Solar water heating
18 Solar photovoltaic (PV) panels
19 Cool roofs
20 Shower heads/aerators
97 Other (SPECIFY) _____
DD Don't know
RR Refused

2.10 Why were these removed?

01 Equipment broke/failed
02 Quality/appearance/performance was unsatisfactory
03 Quality of installation was not up to our standard
04 Preferred old equipment
05 Tenant requested removal
06 Remodeling/rehab work led to removal
97 Other (SPECIFY)
DD Don't know
RR Refused

(IF Q.2.10 = 06, ASK Q.2.10A)

2.10A When the remodeling is complete, will the energy efficient equipment that was removed be put back or replaced?

1 Put back
2 Replaced with other energy efficient equipment
3 Replaced with standard equipment
4 Some of each – some put back/some replaced
D Don't know
R Refused

2.11 When was this equipment removed?

_____ (ENTER MONTH AND YEAR – MM/YY)
DD Don't know
RR Refused

2.12. (IF LIGHT = TRUE, ASK; OTHERWISE SKIP TO Q.3.1) Have you been able to find or obtain replacement bulbs of the same type as those installed?

1 Yes
2 No, unable to find replacement
3 Have not yet tried to find replacement
4 Do not intend to replace with similar bulbs
5 Contractor left behind extra bulbs and information about where to purchase
N No lighting installed
D Don't know
R Refused

3. Satisfaction and Experiences

3.1. On a scale of 1 to 5, with 1 being "not at all satisfied" and 5 being "extremely satisfied," how satisfied are you with the overall quality of the work completed by the contractor?

5	Extremely satisfied	(SKIP TO Q.3.3)
4		(SKIP TO Q.3.3)
3		(CONTINUE TO Q. 3.2)
2		(CONTINUE TO Q. 3.2)
1	Not at all satisfied	(CONTINUE TO Q. 3.2)
D	Don't know	(SKIP TO Q.3.3)
R	Refused	(SKIP TO Q.3.3)

(IF RATING IS 3 OR LESS, ASK:)

3.2. Why did you select that rating? (DO NOT READ LIST. ENTER ALL THAT APPLY.)

01 Equipment broke
02 Quality of equipment was not up to our standards
03 Quality of installation was not up to our standard
04 Did not like the way the product looked
05 Installers did not meet our standards
06 Job took too long
07 Installers too disruptive/messy
99 Other (SPECIFY)
DD Don't know
RR Refused

3.3. On a scale of 1 to 5, with 1 being "not at all satisfied" and 5 being "extremely satisfied," how satisfied are you with the Performance of the equipment installed by the contractor?

5	Extremely satisfied	(SKIP TO Q.3.5)
4		(SKIP TO Q.3.5)
3		(CONTINUE TO Q.3.4)
2		(CONTINUE TO Q.3.4)
1	Not at all satisfied	(CONTINUE TO Q.3.4)
D	Don't know	(SKIP TO Q.3.5)
R	Refused	(SKIP TO Q.3.5)

(IF RATING IS 3 OR LESS, ASK:)

3.4. Why did you select that rating? (DO NOT READ LIST. ENTER ALL THAT APPLY.)

01 Equipment broke
02 Quality of equipment not up to our standards
03 Quality of installation not up to our standard
04 Did not like the way the product looked
05 Lamps were too dim
06 Equipment makes too much noise
99 Other (SPECIFY)
DD Don't know
RR Refused

(IF TENANT MEASURES, Q. 2.1 = 2 OR 3, ASK; OTHERWISE SKIP TO Q.3.8)

3.5. For installations in tenant units, on a scale of 1 to 5, with 1 being "not at all satisfied" and 5 being "extremely satisfied," how satisfied are <u>your tenants</u> with the equipment that was installed?

5	Extremely satisfied	(SKIP TO Q.3.7)
4		(SKIP TO Q.3.7)
3		(CONTINUE TO Q.3.6)
2		(CONTINUE TO Q.3.6)
1	Not at all satisfied	(CONTINUE TO Q.3.6)
D	Don't Know	(SKIP TO Q.3.8)
R	Refused	(SKIP TO Q.3.8)

(IF RATING IS 3 OR LESS:)

3.6. Why did you select that rating? (DO NOT READ LIST. ENTER ALL THAT APPLY.)

01 Equipment broke/failed
02 Quality of equipment was not up to our standards
03 Quality of installation was not up to our standard
04 Did not like the way the product looked
05 The lamps were too dim
06 Unsatisfactory color
07 Equipment makes too much noise
97 Other (SPECIFY)
DD Don't know
RR Refused

(IF RATING IN Q.3.5 IS 4 OR 5:)

3.7. What do tenants like most about the work that was completed?

01 Reduced/lower energy bills
02 More comfortable/better cooling/heating
03 Style
04 Better quality
97 Other (SPECIFY)
DD Don't know
RR Refused

3.8. Overall, were your expectations from the program adequately met?

1	Yes	(SKIP TO Q.3.10)
2	No	
D	Don't Know	(SKIP TO Q.3.10)
R	Refused	(SKIP TO Q.3.10)

(IF NO, ASK:)
3.9. Please explain why not.

1 Answer given
D Don't know
R Refused

3.10. Would you recommend this program to the property manager at another facility?

1	Yes	(SKIP TO Q.3.12)
2	No	(CONTINUE TO Q. 3.11)
D	Don't Know	(SKIP TO Q.3.12)
R	Refused	(SKIP TO Q.3.12)

(IF NO, ASK:)
3.11. Please explain why not.

1 Answer given
D Don't know
R Refused

3.12 What, if anything, did the contractor or equipment supplier say to you with respect to equipment failure? (READ LIST IF NECESSARY)

1 Told us to contact them if it failed
2 Told us there was a warranty
3 Told us the equipment was reliable
4 Did not discuss it/said nothing
5 Other (SPECIFY)
D Don't know
R Refused

5. Impacts and Recommendations for Improvement

5.1. Are you in a position to see the energy savings from the equipment installed through the Multifamily Rebate Program?

1	Yes	(CONTINUE TO Q.5.2)
2	No	(SKIP TO Q.5.4)
D	Don't Know	(SKIP TO Q.5.4)
R	Refused	(SKIP TO Q.5.4)

(IF YES ASK; OTHERWISE SKIP TO 5.4)

5.2. Have you seen decreases in your energy bills for the property at (SAMPLE ADDRESS) from the measures installed last year?

1	Yes	(CONTINUE TO Q.5.3)
2	No	(SKIP TO Q.5.4)
D	Don't Know	(SKIP TO Q.5.4)
R	Refused	(SKIP TO Q.5.4)

(IF YES ASK; OTHERWISE SKIP TO 5.4)

5.3. On average, what are the monthly savings as a result of the new equipment?

_____ (ENTER $ AMOUNT) (5 DIGIT, RANGE 0-10000)
DD Don't know
RR Refused

5.4. Have any tenants told you that they have seen decreases in their energy bills?

1 Yes
2 No
3 Tenants were not affected
D Don't Know
R Refused

(IF HVAC OR SHELL = "TRUE", ASK; OTHERWISE SKIP TO 5.6)

5.5. Have any tenants commented on being more or less comfortable since the HVAC or insulation measures were installed?
(ACCEPT ONE ANSWER)

1 More comfortable
2 Less Comfortable
3 About the same
4 Tenants have not commented
5 No HVAC/Insulation measures installed
D Don't Know
R Refused

(IF LIGHT = "TRUE", ASK; OTHERWISE SKIP TO 5.7)

5.6 Have any tenants commented on being able to see better or less well since the lighting measures were installed?
(ACCEPT ONE ANSWER)

1 Better
2 Less
3 About the same
4 Tenants have not commented
5 No lighting measures installed
D Don't Know
R Refused

5.7. Had you installed any energy efficiency improvements prior to participating in this program?

1 Yes
2 No (SKIP TO Q.5.10)
D Don't Know (SKIP TO Q.5.10)
R Refused (SKIP TO Q.5.10)

(IF YES, ASK:)
5.8. What energy efficiency improvements had you installed? What others?

01 Hardwired Fluorescent Fixtures
02 Hardwired Fluorescent porch/outdoor lights
03 Screw in Compact Fluorescent Lamps (CFLs)
04 Energy Star ceiling fans
05 Energy Star clothes washers
06 Energy Star Dishwashers
07 Energy Star programmable thermostats
08 High performance dual-paned windows
09 Attic or wall insulation
10 High efficiency exit signs
11 Occupancy Sensors
12 Photocell controls for exterior lighting
13 High efficiency boilers
14 High efficiency water heaters
15 High efficiency air conditioners or heat pumps
16 Natural gas water heater or boiler controllers
17 Solar water heating
18 Solar photovoltaic (PV) panels
19 Cool roofs
20 Shower heads/aerators
97 Other (SPECIFY) _____
DD Don't know
RR Refused

(IF PAST PARTICIPANT – Q.1.1 = 1, ASK; OTHERWISE SKIP TO Q.5.10)
5.9 Which of these measures, if any, were a result of your participation in the Multifamily Rebate program the year before? (SHOW ONLY THOSE MENTIONED IN Q.5.8)

01 Hardwired Fluorescent Fixtures
02 Hardwired Fluorescent porch/outdoor lights
03 Screw in Compact Fluorescent Lamps (CFLs)
04 Energy Star ceiling fans
05 Energy Star clothes washers
06 Energy Star Dishwashers
07 Energy Star programmable thermostats
08 High performance dual-paned windows

09 Attic or wall insulation
10 High efficiency exit signs
11 Occupancy Sensors
12 Photocell controls for exterior lighting
13 High efficiency boilers
14 High efficiency water heaters
15 High efficiency air conditioners or heat pumps
16 Natural gas water heater or boiler controllers
17 Solar water heating
18 Solar photovoltaic (PV) panels
19 Cool roofs
20 Shower heads/aerators
97 Other (SPECIFY) _____
NN None
DD Don't know
RR Refused

5.10. Do you have any plans to make any further energy efficiency improvements to this or other properties in the next two to three years?

1 Yes
2 No (SKIP TO Q.6.1)
D Don't Know (SKIP TO Q.6.1)
R Refused (SKIP TO Q.6.1)

5.11. What energy efficiency improvements do you plan to install in Tenant-occupied Spaces?
(DO NOT READ; TAKE ALL THAT APPLY)

01 Compact Fluorescent Lamps (CFLs)
02 Hardwired fluorescent fixtures
03 Energy Star ceiling fans
04 Energy Star Clothes Washers
05 Energy Star Dishwashers
06 Energy Star Programmable Thermostats
07 Energy Star Refrigerators
08 High efficiency window or through-wall air conditioners
09 High performance dual-paned windows
10 Attic or wall insulation
11 Shower heads/aerators
97 Other (SPECIFY) _____
NN None in Tenant-occupied spaces
DD Don't know
RR Refused

5.12. What energy efficiency improvements do you plan to install in Common Areas? (DO NOT READ; TAKE ALL THAT APPLY)

01 Compact Fluorescent Lamps (CFLs)
02 Hardwired Fluorescent Indoor lighting
03 Hardwired Fluorescent or high efficiency outdoor lighting
04 Energy Star Coin-operated clothes washers
05 High efficiency Furnaces
06 High efficiency Central Boilers
07 High efficiency Water Heaters
08 High efficiency Air Conditioning
09 Attic or wall insulation
10 High efficiency exit signs
11 Occupancy sensors for interior lighting
12 Photocell controls for exterior lighting
13 Natural gas water heater or boiler controllers
14 Solar water heating
15 Solar photovoltaic (PV) panels
16 Cool roofs
17 High performance dual-paned windows
97 Other (SPECIFY) _____
NN None in Common Areas
DD Don't know
RR Refused

Other

6.1. How many apartment units are located in the building or buildings at the address we have been talking about? (PROMPT. That is at: (SAMPLE ADDRESS)?

_____ (RECORD # UNITS) (4 DIGIT, RANGE 1-5000)
DD Don't Know
RR Refused

6.2. How many stories is the building(s) at (INSERT SAMPLE ADDRESS)?

_____(RECORD # STORIES) (4 DIGIT, RANGE 1-50)
DD Don't Know
RR Refused

6.3. Do you, or your firm own this property, manage it, or both own and manage? (ACCEPT ONE ANSWER)?

1 Own only
2 Manage only
3 Own and manage
R (DO NOT READ) Refused

6.4. In total, how many multifamily residential properties in California do you, or your firm:

a. Own and manage?
_____ (RECORD #) (4 DIGIT, RANGE 0-9999)
DD Don't Know
RR Refused

b. Own but do not manage?
_____ (RECORD #) (4 DIGIT, RANGE 0-9999)
DD Don't Know
RR Refused

c. Manage only?
_____ (RECORD #) (4 DIGIT, RANGE 0-9999)
DD Don't Know
RR Refused

6.5. How many years have you been in your current position at this property?

_____(RECORD # YEARS) (2 DIGIT, RANGE 0-99)
DD Don't Know
RR Refused

6.6. How many years have you been in the multifamily ownership and management business?
_____(RECORD # YEARS) (2 DIGIT, RANGE 0-99)
DD Don't Know
RR Refused

6.7. We have just one more question. Based on your experience, what suggestions do you have for improving the Multifamily Rebate Program? (PROBE FOR SPECIFICS – What do you mean by that? What else?)

1 Answer given
N None/no suggestions
D Don't know
R Refused

Thank you very much for participating in this survey. Would you like to have (UTILITY NAME) send you information about energy efficiency programs currently available to Multifamily Property Managers?

1 Yes
2 No

(SHOW PROPERTY STREET ADDRESS. IF THIS IS CORRECT, SKIP TO END. IF NOT, RECORD NEW ADDRESS, CITY, STATE AND ZIP)

(VERIFY NAME)

Those are all the questions I have for you. Thank you for your time and cooperation, and have a nice day.

11. APPENDIX B: ON-SITE VERIFICATION FORM

California Multifamily Onsite Verification Form 1								
Utility:		**SCE**		**Apartment Room Description**			Field Survey Preformed by:	
Application Number:				LR = Living Room DR = Dining Room H = Hall			Name:	
Applicant Name:				FR = Family Room BD = Bedroom BA = Bathroom				
Phone				P/E = Porch/Entry/Balcony Kit = Kitchen O = Other			Date:	
City, Zip			**Location Found Choices**	**Quantity Listed and Found Choices**		**Common Area Room Descriptions**	**Comments on Lighting: Choose the correct number and/or other comments.**	
			If Apartment, give unit number C = Common Area M = Mobile Home	Square Footage for windows and Insulation. For all other measures, count of the number installed per individual site verified.		ComIn = Common Inside Comout = Common Outside	1) The measure was originally installed. 2) The measure was not originally installed. 3) The measure was replaced in-kind. 4) The measure was replaced with an incandescent. 5) The measure was removed. If the measure was removed, where is the measure currently?	
Item #	**Measure Name**	**Location Listed**	**Location Found**	**Quantity Listed**	**Quantity Found**	**Apartment and Common Area Room Description**	**Comments on lighting:**	
1								

12. APPENDIX C: LETTER TO PROPERTY MANAGERS

May 2004

Dear Property Manager:

<utility name>, in conjunction with other California utilities, is conducting an important study of multifamily housing complexes to verify the installation of energy efficient measures resulting from the Statewide Residential Multifamily Energy Efficiency Rebates program. This study will be used to support a statewide effort to identify the impact of increased energy efficiency in multifamily housing. As a central part of the study, ASW Engineering has been retained to conduct an on-site survey of the treated multifamily complexes in the participating utility service areas. The survey will collect information on the measures that have been installed and rebated through the program. Your cooperation in providing ASW access to your facilities and tenant units where efficiency measures have been installed is necessary and greatly appreciated.

If you have any questions, please call <utility hot lines> and <utility contacts>.

Sincerely,

_____
Program Manager
_____

13. APPENDIX D: TELEPHONE QUESTIONNAIRE FOR ASW

Have you had any major renovation of apartment units since the Multifamily Rebated measures were installed?

How many dwelling units are typically vacant in any given month?

Have any tenants complained about the lighting measures (either fixtures or CFLs) that were installed in their units?

If yes, did you notify the contractor who installed the measures?

If yes, did you ask for a better replacement?