

Residential Contractor Program Evaluation Phase II Final Report Volume 1: Summary Report

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ES Executive Summary

1.1 Introduction

This report summarizes the key findings and recommendations resulting from Phase II of the Market Assessment and Evaluation (MA&E) research undertaken for the residential contracting market and the Residential Contractor Program (RCP). The RCP was established in 1999 by California's four investor owned utilities (IOUs), including Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SoCalGas), and San Diego Gas & Electric Company (SDG&E). This program addresses the existing home market, focussing upon locally-based contractors and their customer base. The RCP was created to provide training, market development assistance, and incentives for contractors providing energy efficient services to existing homes, both single-family and multi-family.

This evaluation is comprised of several components including:

- An assessment of the residential contracting market in California
- A process evaluation and assessment of program activity for Program Year 1999 (PY99) RCP
- Tracking of near term market effects of PY99 RCP.

Highlights from these tasks are summarized in this report.

1.2 Market Transformation Context

We have conducted the research, and prepared our recommendations, under the assumption that market transformation of energy efficiency markets remains the guiding policy objective within the California regulatory environment. Accordingly, this evaluation of the Residential Contracting Program, as well as the broader market assessment work undertaken in this project, has focused on efforts that address the market transformation policy objective under which the program was originally conceived and designed. The

analyses undertaken in this project have been geared toward providing information that can be used in optimizing these market transformation efforts.

1.3 Assessment of Program Activity in PY1999

One of the objectives of the research undertaken was to conduct an assessment of PY99 program activity. The RCP program has accomplished much in its first year, especially considering that the focus on market transformation with contractors represents a new type of approach for the utilities. In this first year, the program has maintained statewide planning and implementation for the program with a consistent set of incentives statewide. Each utility has also established effective training, distributed much of the allocated funds for the single-family program, and revamped the multi-family program.

Over the past year the program has provided for \$790,000 in incentives for 5,582 measures in 4,479 single-family homes across the state. The program has trained more than 500 firms and qualified 268 of these firms for participation in the program. Of these, 120 firms have performed at least one job.

Unquestionably, the RCP program has successfully begun introducing duct and HVAC diagnostics into the marketplace. The program has trained three hundred technicians in these service areas. The training received by HVAC technicians in the proper HVAC diagnostics is quite valuable and addresses a key barrier to achieving greater levels of energy efficiency in this market -- improving the quality and precision of its HVAC maintenance tests.

The most significant accomplishment of the RCP is probably the degree to which it has promoted the duct testing and duct sealing market. Without proper duct systems, consumers who invest in energy-efficient air conditioners and furnaces will continue to be disappointed by less-than-promised energy savings because their new, expensive, efficient "boxes" have been connected to old, leaky ductwork. Increased awareness among consumers is likely to bring greater interest in these services from contractors who now see little consumer demand for these measures. The program has raised awareness among many contractors of the potential energy savings and comfort gains that may result from duct repair. A growing number of firms now have the equipment and the experience to provide proper diagnostics and repair, and begin making a noticeable impact in the market.

Key findings from our analysis of program activity to date include:

- Market coverage by participating contractors was very small relative to the level of coverage that will be needed to support sustainable effects in the marketplace;
- Very few participants, under the PY99 program design, installed more than one type of measure;
- Program activity, especially for SCE/SoCalGas, favored lower income customers;
- Program activity did not reach minority households at levels that are relatively proportional to their percentage of the population.
- There was a concentration of incentives at SCE/SoCalGas among one contractor; and
- There was negligible program activity in the multi-family element in 1999.

1.4 Residential Contracting Market Assessment

Continuing earlier work undertaken to characterize and assess the residential contracting market, this project includes additional research into consumer baseline awareness, perceptions, and practices; segmentation analysis of contractors; and SF participant trends. Key findings from the market assessment research include:

- Analyses conducted in this and previous studies continue to highlight the fact that residential contracting markets are fragmented and specialized, with little overlap among trades;
- Overall, there is a weak level of demand for energy-efficiency services among consumers;
- Demand is weaker in the multi-family market as compared to the single family segment;
- There is a low level of awareness among consumers about the diagnostic approaches being promoted by the program;
- There are distinct segments of contractors who are likely to be interested in, and pursue, the cutting-edge approaches promoted by the program; and
- Consumer and general market awareness is a significant barrier to market transformation and is perhaps the biggest issue that needs to be addressed at this point in time.

1.5 Process Evaluation Findings

Process evaluation research was undertaken late in 1999, including interviews with program staff and both participant and non-participant contractors. Additionally, a telephone survey was conducted with 403 SF homeowner participants. Key findings from the process evaluation research include:

- Contractors value the training component of the program;
- Contractors repeatedly express a need for the utilities to promote the program and its products to consumers who know little about the value of diagnostic services;
- Participating homeowners are, overall, quite satisfied with their experiences in the program;
- The top recommendation made by participating homeowners is to promote the program and educate consumers in this area;
- Owners and managers of multi-family properties are not well informed about RCP;
- Owners and managers of multi-family properties most heavily rely on local contractors for information on equipment to select for retrofit applications;
- Program tracking databases need to be coordinated to ensure consistency in tracking and to ease analysis of statewide data; and
- A high percentage of participants (83%) report that they are receiving diagnostic services free of charge.

1.6 Market Effects Resulting from RCP

Results of this analysis indicate that the 1999 RCP has had some effect on the market. In particular, changes in HVAC contractor awareness and practices are found. Specifically, some of the stronger findings are the following:

- Increases have occurred in awareness among HVAC contractors of the benefits of duct testing and sealing,
- Increases have occurred in the level of energy efficiency per job for HVAC contractors,
- Increases have occurred in the number of HVAC contractors who offer diagnostics, and

- Increases have occurred in the number of jobs for window contractors and insulation contractors.

Moreover, all but the last one are expected to persist after the program, according to the responses of surveyed contractors. Because the increase in window and insulation jobs is due to the availability of vouchers, it is likely that these impacts may not be sustainable.

1.7 Implications for the Future

The SF RCP program is having near term market effects among contractors that are participating in the program. However, two inter-related issues that continue to challenge this market, including:

- A significant number of customers continue to not view these services as necessary, or are unaware of these services; and
- A significant number of contractors believe that consumers are not interested in these services

In order to have an impact upon the market for residential contracting services related to energy efficiency, there needs to be a significant increase in the number of contractors in the program. However, before the next wave of contractors will become involved with the program, the program will need to:

- Align program procedures and payment according to the contractor's business timelines.
- Minimize the number of contractors that drop out of the program;
- Continue with the positive training that has been undertaken thus far; and
- Provide a level of consumer marketing that will give contractors confidence that the program is something worth investing in.

Given the fragmentation in the contracting industry along the lines of business specialty, and if there is a desire to expand the program beyond the HVAC equipment and systems market, the program will need to work with each industry to tailor program

offerings and requirements. As the program evolves in this manner, it may be that technical training is less of an issue in some industries (windows), but that assistance with consumer marketing and sales approaches are more important in achieving market effects.

On the multi-family side, attention should be given to the fact that property owners and managers report a reliance on local contractors when making retrofit decisions and contractors report low demand for energy efficient options in this market. Ways to make the multi-family element of RCP more attractive to local contractors deserve special attention.

1.8 Future Directions for RCP Evaluation Research

In conducting this research, we have identified several areas that should be addressed in future MA&E research. Specifically, future evaluation efforts should:

- examine the diffusion of program awareness and interest among the contractor segments identified in this study;
- include a quarterly feedback process with contractors (this could easily be accomplished through a mail approach and potential follow-up phone calls or e-mail exchange); and
- address the issue of how long a firm needs to be in this type of program in order to transform its business base toward those promoted by the program.

1.9 Recommendations

In the absence of any explicit policy directives to the contrary, our recommendations assume that market transformation remains the overall policy goal. We have, however, felt that it would be beneficial to distinguish, in our recommendations, between those recommendations that are more process-oriented in nature (and are therefore relevant regardless of the overall policy context at this time) and those that are more closely related to broad market transformation objectives. This latter set of recommendations, stated in order of importance, should therefore be taken into consideration within the ultimate policy context that evolves in the California regulatory environment.

1.9.1 Process-related Recommendations

Recommendation No. 1: Work with contractors to mitigate payment issues.

There is no doubt that the program managers have given this issue a great deal of attention since we first raised the concern in our interim process evaluation, and some substantial improvement has resulted. However, most contractors work on a cash basis with their customers and are unprepared for the reporting requirements and the payment lag required by the program. For contractors that are new to the program, it may also be a good idea to send each contractor's first invoice through for payment upon receipt by the utility. The utility can work with the contractor to fix the issues in the form without holding up that first payment, but with the understanding that such leniency will not be shown on subsequent vouchers. The RCP program managers are clearly too busy to supply this level of support to individual contractors. Accordingly, each company should ensure that they each have sufficient knowledgeable staff to process payments, assist the contractor in filling out the forms, and be available to return calls to contractors.

Recommendation No. 2: Increase on-site training support.

The field training support offered by Proctor Engineering for SDG&E was given very strong marks by both experienced and novice contractors. These contractors felt that the hands-on experience was the most important component of the training. We recommend that more opportunities for hands-on and follow-up training be built into the program.

Recommendation No. 3: Develop and/or support existing energy-efficiency training institutions

The training offered to the contractors has been a tangible and highly significant benefit of the program. Indeed, such training is an important core element of this program. Importantly, however, contractors working in these fields turn over so frequently that both entry-level and progressively more challenging courses will need to be taught on an on-going basis. Sustaining such education and training typically require very large investments, and the utilities may wish to explore opportunities for building partnerships with existing training and certification institutions in order to increase the supply of contractor training opportunities.

Recommendation No. 4: Focus on more program support to promoting efficiency within specific trades.

For reasons outlined below, the whole house concept is unlikely to be a major factor in overall program services. Contractors tend to operate within a few related trade areas, and do not currently see any demand that they do otherwise. Therefore, it is important that RCP begin strengthening the training and outreach to the individual trades.

1.9.2 Market Transformation-related Recommendations

Recommendation No. 5: Continue increasing contractor involvement

If the SF element is to provide market transformation benefits, there is a serious need to increase the number of contractors participating in this program. There are an insufficient number of contractors in the program. Even in the small pockets where many of the contractors are concentrated, coverage still does not reach one qualified contractor for every 25,000 households. Even more importantly, there are vast geographic areas of the state that have no qualified contractors or coverage levels of less than one contractor per 100,000 households. To ensure that the RCP is successful in meeting its market transformation objectives, the program will likely need to train and qualify two to five times as many contractors in PY2000 as it did in PY99. Within future efforts to encourage more contractors to participate, the program should consider offering scaled incentives that encourage first-timer participation through higher incentives or bonuses.

Recommendation No. 6: Increase focus on consumer education.

One of the key barriers to achieving market transformation objectives in the residential contracting market is that of raising the level of awareness among consumers regarding the value of the diagnostic tests. Without this heightened awareness, most consumers will not be able to differentiate between contractors providing proper testing and those relying on less sophisticated techniques. This lack of consumer demand for energy efficiency appears to be a pervasive condition for most of the trades relevant to RCP. Contractors value the utilities' support in creating consumer awareness and establishing the services' legitimacy, giving this equal if not greater importance as compared to the incentives received. Many of them are eager to do duct work and build their business, but

needed some assistance in developing their customer outreach. This recommendation that RCP immediately embark on a consumer outreach effort does not imply that the utilities should use large amounts of funds broadcasting the benefits of duct services to broad audiences. Rather we think it is incumbent that the program develops contractor support materials that individual firms can use to promote their services. These independent, “third-party,” consumer education materials should take the form of brochures, videotapes, a web-based information package, support at home shows, and kiosks at home improvement stores. Another key to increasing the reach and effectiveness of consumer education efforts is partnering with a broad range of respected organizations.

Recommendation No. 7: Consider designing separate mobile-home program.

It is clear that at least one participating contractor has found a profitable niche serving the program. This contractor alone has performed more than half of the jobs in the SCE/SoCalGas region. The firm has been providing duct testing and sealing services in mobile home parks. There are many positive benefits of this situation. The firm provides an excellent service to mobile home coach owners; a segment of the residential market not often served by previous DSM programs. Many of these customers are elderly on fixed incomes. The firm has streamlined the duct testing and sealing process. In each home they visit, they reduce air leakage through relatively simple techniques at the furnace box and at the registers. Occasionally, their tests reveal a disconnected crossover duct, which requires reconnection or repair. Thus the firm always improves the duct delivery system of each coach it visits. Whether the energy savings are sufficient to justify the fee paid is an area of needed research.

What seems clear is that the program as it is now structured is not likely to develop a sustainable self-sufficient market for these services in mobile homes absent some utility incentive payment to the contractors. Few coach owners would pay the full cost to provide these services. The contractor succeeds because he does not charge the coach owners for the service provided. If energy savings do justify the payments to this firm, program managers might consider developing a separate mobile home program that does not have market transformation as its overriding objective. By doing so, the utilities can continue to

fund this contractor and/or encourage others to enter the program. Because mobile homes can be considered an under-served market niche, the program can easily be justified as a resource acquisition program, and quite likely as a low-income program, and funding can continue indefinitely. The program could also be expanded so that the services were more comprehensive, or at least included a full assessment of what opportunities the coach owners should pursue on their own.

Pulling the program out of RCP and into its own program does several things. It recognizes that previous programs have failed to reach the mobile home market and that the RCP's market transformation approach will never be self-sustaining for this market niche. Moving it into its own program gives the remaining RCP a better chance of developing its market transformation objectives. Most importantly, creating a separate mobile home program ensures the existing contractor a more stable longer-term program base where there is no expectation that incentives will eventually not be needed to support the services provided.

Recommendation No. 8: Develop an explicit strategy for reducing incentive levels over time.

Although none of the programs has confronted this issue directly yet, each of the programs will eventually face a time when program funds will be fully committed before the program year ends. There is already concern at SCE that they will run out of funding for this year's program. This budgetary concern has, in-turn, reduced the sense of urgency with which they recruit new contractors or market the program. Explicit policies or procedures have not been developed to deal with this eventuality. This creates the awkward possibility that program incentives will be cut off to contractors in mid-year. Program managers are keenly aware of contractors' complaints that previous programs stop abruptly, so avoiding the cold turkey mid-year program suspension should to be avoided at all costs. Unfortunately, the current approach, coupled with the strong desire to not let down contractors, creates the illusion that incentives will continue unaltered for an indefinite period of time.

Creating a program with indefinite incentives is not consistent with market transformation principles. In most businesses, when firms use rebates, validity periods and

redemption limits are explicitly stated. These rebates are recognized as a near-term incentive, not a long-term entitlement. Contractors entering the market understand the limited nature of the rebates and plan for the transition.

RCP must resolve two difficult issues in this area. What will the utilities do when all program funds are committed? How does the program reconcile a commitment to contractors to keep the program in place, unchanged for a substantial period, while at the same time knowing that a program year's funds could be used up before the year ends. Additionally, how does the utility balance the commitment to sustain the program for existing contractors while reaching out to bring in new contractors or develop leads in under-served market areas? These difficult policy issues need to be resolved and communicated to all parties so that contractors can understand how program funding works.

Recommendation No. 9: Improve marketing approaches for the program by undertaking customer preference research.

All successful market development has a hook to attract customers, and there is a need to identify those hooks that can be used by contractors interested in developing new marketing approaches. The original hook envisioned for this program, whole-house services, does not appear to be viable, at this point. Furthermore, energy savings alone is not likely to attract customers in California at present, and the program needs to identify stronger sales hooks onto which it can piggyback.

Recommendation No. 10: Document case-study results from program installations.

In order to build credibility for the measures and services that the RCP seeks to promote, it is important that contractors have documentation of savings and other benefits that they can cite with customers. The program administrators are in a good position to provide this type of objective case-study type of information to consumers as a means of transforming the market.

2 Introduction

2.1 Background

The Residential Contractor Program (RCP) was established in 1999 by California's four investor owned utilities (IOUs), including Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SoCalGas), and San Diego Gas & Electric Company (SDG&E). This market transformation program addresses the existing homes market, focussing upon locally-based contractors and their customer base. The RCP was created to provide training, market development assistance, and incentives for contractors providing energy-efficient services to existing homes, both single-family (SF) and multi-family (MF).

This evaluation examines the Program Year 1999 (PY99) experience as well as the retrofit market itself. In addition to providing program evaluation findings, this Phase II project establishes baseline information for both single-family and multi-family segments. Earlier Phase I¹ research had provided important background information on process issues and baseline data on the residential contractor population in California. This evaluation is prepared by a team consisting of Wirtshafter Associates Inc., Energy Market Innovations Inc., Kreitler Research & Consulting, Berkeley Geo-research Group Inc., Opinion Dynamics Corporation, and Regional Economic Research Inc.

2.2 Market Transformation Context

This evaluation of the Residential Contracting Program, as well as the broader market assessment work undertaken in this project, has been undertaken within the context of market transformation. As such, we have conducted the research, and prepared our recommendations, under the assumption that market transformation of energy efficiency markets remains the guiding policy objective within the California regulatory environment.

¹ Wirtshafter Associates, Inc. et. al. *Report of the Residential Contractor Program Evaluation: Volumes 1 & 2*; Pacific Gas and Electric Company, April 2000.

The analyses undertaken in this project have been geared toward providing information that can be used in optimizing these market transformation efforts.

2.3 Project Objectives

The scope of this evaluation includes a process evaluation of PY99 RCP, characterization of the baseline market for efficiency retrofits in California's residential market, and an examination of program impacts. More specifically, this research addresses the following issues.

Process-related Questions:

- What have been the program results / achievements to date
- Has the design of the program worked as intended?
- Is the program reaching all types of contractors and residential customers?
- How can the program be refined to work better (within the context of the market transformation objective)?

Market Effects / Impacts Questions:

- What are the intended market effects of this program?
- Is the program achieving desired market effects?
- What evidence, if any, do we have for any market effects occurring from this program?

Market Assessment Questions:

- What are the markets we are addressing?
- With the completion of the contractor baseline (SF & MF), SF customer baseline, and MF customer (owner/manager) baseline, what are the most important and overarching barriers to energy efficiency in this broad market?
- Are these market barriers different than previously hypothesized?
- How do the markets differ between the housing types?
- Do we think this is still a market that has potential for market transformation? Why?
- Given what we know about the market, is this program likely to generate on-going market effects?
- Should the existing program be modified to provide market effects and, if so, how?
- Are there other program options that should be considered for effecting change in this market?
- Will the political constraints of the post-restructuring energy-efficiency environment in California allow for the implementation of program options that we are recommending in this market?

2.4 Overview of Research Activities

To address the above-mentioned research objectives, the project team performed a number of data collection tasks in each of these three areas. Table 2.1 lists the tasks completed and identifies where the reader may find detailed information for each one. The chapter discussions in this report are primarily limited to key findings and implications from the research. Further detail on methods, and a more exhaustive coverage of findings, can be found in the respective appendices.

Table 2.1: Overview of Research Tasks

	Number	Location of Reporting in Final Report
Process Evaluation		
Interviews with participant and non-participant contractors	50	Chapter 5, Appendix A
Interviews with program managers	4	Chapter 5, Appendix A
Interviews with support persons and program trainers	5	Chapter 5, Appendix A
Ride-alongs with contractors	4	Chapter 5
SF participant survey	403	Chapter 5, Appendix F
Interviews with non-participant MF ESCOs	5	Chapter 5
Geographic information system analysis of contractor coverage and voucher distribution	--	Chapter 3, Appendix C
Market Characterization		
Contractor baseline survey analysis	444	Chapter 4
Contractor segmentation study	393	Chapter 4, Appendix B
Participant and non-participant contractor interviews	50	Chapter 4,5, Appendix A
SF baseline survey	828	Chapter 4, Appendix D
MF baseline survey	626	Chapter 4, Appendix E
Geographic information system analysis of contractor coverage and voucher distribution	--	Chapter 3, Appendix C
Market Effects/Impact Evaluation		
Market tracking surveys	105	Chapter 6, Appendix G

3 Residential Contractor Program Description

The program year 1999 (PY99) Statewide Residential Contracting Program (RCP) consists of two program elements -- the Single-family (SF) element and the Multi-family (MF) element. The programs implemented by the utilities are largely similar in design and concept from service area to service area, with some variations in actual implementation. In this chapter, we provide a description of each element, as the program was implemented in PY99.

3.1 Single-family RCP Element

3.1.1 Program Description

For the SF program, SCE and SoCalGas operate a joint program, and differences exist in the detailed program operation between SCE/SoCalGas's program and those run by SDG&E and PG&E. Contractors who wish to participate in the SF RCP program must first complete a utility-provided training in their service-type area and pass an examination, or if previously trained just pass the examination. To be eligible to participate, contractors must also be screened on their business, insurance and financial records by either the League of California Homeowners or the Electric & Gas Industries Association. Eligible contractors may then install any of the approved, incentive-provided measures for which they have passed the examination in homes of willing homeowners. To receive the voucher for the incentive, the homeowner or in one utility program the homeowner or the contractor, must obtain a voucher form and notify the utility to reserve the available funds. Upon completion of the work, the homeowner pays the contractor for the full price of the job minus the value of the incentive. The contractor must submit the voucher form and complete invoice to the utility. The contractor receives the incentive payment from the utility company. Each utility program processes their own voucher submittals and performs periodic inspections of contractors' work.

In the next sections, we provide a more detailed discussion of each of these SF RCP program design components. In assessing each of these components, we also provide a comparison of how these provisions vary across the three program administrators.

3.1.2 SF Contractor Screening and Eligibility

Each of the utilities is using a third party to handle the screening of contractors for RCP. Reliance on a third party is considered desirable as a means of providing for impartiality in the screening process. The League of California Homeowners (League) handles screening responsibilities for three utilities: SDG&E, SCE, and SoCalGas. The Electric & Gas Industries Association (EGIA) handles screening responsibilities for PG&E.

The screening requirements vary from the PG&E area to the remainder of the service areas, as outlined in Table 3.1.

Table 3.1: Comparison of Screening Requirements

		EGIA	League
License requirements	CA contractor's license	√	√ <i>(with appropriate license for specialty)</i>
	CA business license	√	√
	State & local licenses	√	√
Insurance requirements	Worker's Comp.	√	√
	General liability	√	√
	Commercial auto	√	√
	Employer's liability	√	
Agreements	Signed agreement with Implementation Administrator	√	
Legal check	Tax liens		√
	Supplier's liens		√
	Bankruptcy proceedings		√
	Outstanding judgements		√
Credit check	TRW score of 70+		√
	Good payment history for past 15 months		√
References	Customer references		√
	Supplier references		√

Eligibility for RCP is also contingent upon satisfying the respective training/testing requirements of each utility.

3.1.3 SF Contractor Training and Equipment

A major component of this program is its provision of contractor training on energy-efficiency products and practices. In most cases, RCP training is handled by third parties under contract to the utilities for this service. Training is provided by Proctor Engineering and Robert Mowris & Associates, respectively, for SDG&E and SCE/SoCalGas. Training for PG&E is handled internally by their Technical Applications Group.

The topics covered by training sessions vary from one utility to another as shown in Table 3.2 below.

Table 3.2: Topic Coverage of PY99 Contractor Training

Topics	PG&E	SCE/SoCal Gas	SDG&E
Combustion appliance safety (CAS)	√		√
Duct testing & sealing	√	√	√
HVAC	√	√	√
EE windows	√	√	√
Ceiling insulation	√		√
Wall insulation	√	√	
Plumbing		√	√

For the most part, the training sessions are technical in content. PG&E has a separate non-technical session, called an orientation session, for business owners that covers basic program information. Frequently, the business owners attending the orientation sessions enroll employees for the specialty classes at that time.

Table 3.3 provides an overview of the specific features of each utility’s training program for RCP.

Table 3.3: Comparison of PY99 Training Approaches

	PG&E	SCE/SoCalGas	SDG&E
Location	Stockton laboratory setting for duct and CAS sessions; multiple locations for window and insulation sessions and orientation.	Single site in Downey; classroom setting.	At contractors' premises and in residential locations served by firm.
Frequency of sessions	Flexible; to date once or twice per month.	Every two weeks.	Frequent; sometimes daily.
Skills assessment	Practical exams for duct and CAS classes; pen and paper tests for window and insulation sessions.	Pen and paper tests.	Practical exams in class and in field.
Follow-up	Telephone surveys to determine use of course material in business operations.	Attendee ratings of course content and instructors.	Data collected from field on refrigerant charging calls; attendee ratings of course.

Other features of key interest with respect to SF RCP contractor training include the following:

- ***Training or demonstration of skill mastery is required.*** In order for contractors to be eligible for SF RCP, they must complete utility-sponsored training classes and pass the skill assessment tests. Options also exist for contractors with previous training or experience to take the tests and become program qualified without attending the training sessions.
- ***Who must be trained?*** Requirements as to who must attend the training sessions differ to a degree across the utilities. PG&E requires that any field crew performing work for RCP be under the supervision of an on-site crew leader who has passed RCP training. Contractors are not permitted to have their trained supervisors train other supervisors within their firm and then participate in PG&E's area. The San Diego program, like the PG&E program, requires trained personnel working on the RCP jobs. In contrast, the SCE/SoCalGas approach allows for, and assumes that, individuals receiving RCP training will train their co-workers. The SCE/SoCalGas program places the responsibility for correct installation on the company in a similar manner to the licensing process. The licensed contractor does not need to be on-site continuously, but he/she assumes ultimate responsibility for the work.

- ***Inclusion of hands-on training.*** The training provided for the SDG&E program emphasizes fieldwork, with trainers accompanying contractors to provide on-the-job training after they have completed classroom training. The training offered by PG&E varies in the degree to which hands-on work is incorporated. Classes in windows and insulation consist of classroom sessions only. HVAC and duct testing and sealing include laboratory simulations and lab practicals as part of the exams. As of late October, some in-the-field training was being offered to selected firms deemed to need additional training prior to being approved for RCP. The training for the SCE/SoCalGas program consists entirely of classroom learning and testing.

- ***Monitoring Training Effectiveness.*** Each training program has an assessment mechanism in place to track the effectiveness of the training. PG&E, for example, is using telephone follow-up surveys 3-6 months later while the other training organizations collect feedback by means of pen and paper questionnaires at the conclusion of each training session. The focus of the surveys conducted by Robert Mowris & Associates is to provide quick feedback on the quality of the training. Proctor Engineering also conducts similar research with its attendees. They further track field performance of the workshop attendees using specialized software, which collects data relating to refrigerant charging. In contrast, the PG&E surveys will be used to determine whether or not attendees are using the training information in their business operations.

3.1.4 SF Eligible Measures

PY99 RCP addresses efficiency measures for residential space heating and cooling, water heating, and lighting. The list below includes the incentive levels provided.

- basic HVAC diagnostic tune-up (\$75)
- advanced HVAC diagnostics (\$300)
- duct testing (\$75)
- duct testing and sealing (\$200)
- high efficiency gas furnaces (\$250)
- high efficiency air conditioners and central heat pumps (\$225)
- programmable thermostats (\$25)
- attic insulation (\$0.15/ft²)
- wall insulation (\$0.14/ft²)
- insulation package bonus for doing both attic and walls (\$0.01/ft²)
- high performance windows (\$1.00/ft²)
- high efficiency gas water heaters (\$30)
- pipe insulation (\$5)
- water-saving showerheads (\$7)
- hard-wired fluorescent fixtures (\$15)

- screw-in compact fluorescent lamps (\$2)

On the whole, this set of eligible measures has been constant throughout the duration of the program, with some minor modification along the way. For example, the efficiency requirements for heat pumps were modified to conform to those used for the Energy Star program. Homes in some of the areas with milder climatic conditions were not eligible for air sealing and high efficiency air conditioning. The program was later changed to include high efficiency air conditioning in most areas of the State.

3.1.5 SF Financial Incentives

For the most part, incentives for these measures were uniform across the four utility service areas, reflecting the statewide nature of this program. The initial exception to this was for air conditioning equipment. In this case, certain areas were not eligible for air conditioning incentives, this being determined on the basis of climate zones.

Furthermore, RCP incentives were structured so as to encourage more comprehensive retrofits than might otherwise be performed. For example, some measures are eligible for incentives only when installed as part of a larger package of measures. This is the case for programmable thermostats, hard-wired fluorescent fixtures, screw-in compact fluorescent lamps, and water saving showerheads. In other cases, bonus incentives are available for installing measure packages. Installation of both attic and wall insulation would qualify for such a bonus.

3.1.6 Comparison of Statewide SF Programs

The SF RCP element is intended to be a statewide program. While the program is indeed very similar in structure across the state, there are some important differences. Table 3.4 provides a comparison of the program as implemented across the state. Because SoCalGas and SCE are jointly administering the RCP single-family program in their service areas, the table (and subsequent discussion in this report) speaks of a single program for these companies.

Table 3.4: Statewide RCP Comparison Overview (PY99)

Element	Detailed Task	PG&E	SCE/SoCalGas	SDG&E
Screening & Eligibility	Contractor screening	Electric & Gas Industries Association (EGIA)	League of California Homeowners (League)	League of California Homeowners (League)
	Program tracking	PG&E	SCE	Provided periodically by League to SDG&E
	General Requirements	Different from others (see Table 2-2)	Similar to SDG&E (see Table 2-2)	SDG&E
	Signed agreement with utility?	Yes	No	SDG&E
	Credit check required?	No	Yes	Similar to SCE/SoCalGas (see Table 2-2)
	Reference check required?	No	Yes	No
	Equipment ownership required?	No	No	Yes
	Updates to eligible contractor list	Provided periodically by EGIA to PG&E	Provided weekly by League to Mowris Associates	
	Quality control			
Training and Equipment	Technical training?	Provided by PG&E technical staff, primarily at Stockton Training Center	Provided by Mowris Associates at SoCalGas facility in Downey	Provided by Proctor Engineering using field-based approach under Third Party Initiative effort.
	Business and/or sales training?	Not provided	Initiated in Nov. workshops	Not Provided
	Diagnostics equipment discounts?	No; under consideration	Not in RCP; related program offers some discounts	Yes. Contractors required to own relevant equipment.
Marketing	Customer marketing in PY99	PG&E website	Limited. League website Utility websites	Limited., League website
	Lists of eligible contractors	Available via mail from EGIA	Available via mail or internet from League	Available via mail or internet from League
Vouchers	Obtaining voucher forms	Customer must request. Available upon request from EGIA or PG&E	Available through participating contractors or upon request from League	Customer must request. Available upon request from SDG&E
	Reservation of funds required	No, reserved when voucher is requested.	Yes, via telephone	
	Incentives	Consistent	Consistent	
	Voucher processing completed by	PG&E	SCE	SDG&E
	Vouchers paid by	PG&E	SCE	SDG&E
	Eligible measures	No restrictions	No restrictions	Some AC measures limited by CEC Climate Zone.

3.2 Multifamily RCP Element

The conceptual design for the RCP multifamily program follows that of the Statewide Small Business Standard Performance Contract (SPC) program. The process, at a top level, includes the following steps outlined in Table 3.5.

Table 3.5: Multi-family Components

Basic Project Application (BPA)	Establishes customer site control and reserves funding for a project
Detailed Project Application (DPA)	Establishes estimated energy savings, measurement procedures, and estimated incentive amount
SPC agreement (contract)	Documents agreement on payment terms and utility and EESP obligations
Performance Period (1 year)	Determines actual energy savings and determines corresponding incentives

The multifamily element of the Program has a fairly traditional performance contracting design. Its primary features are described below:

- **Measures.** Contractors can receive incentives based on the energy savings from virtually any energy-efficiency measure except the following: fuel switching; cogeneration or self-generation; bypass; personal computers; home electronics; repairs and maintenance; measures with lives under three years; decreasing plug loads; or operational changes.
- **Incentive Structure.** Incentives are based on demonstrated first year savings, with the size of the incentives (per kWh or per therm) depending upon the class of measure. Electric incentives range from 14 to 39 cents per kWh, while gas incentives range from 60 to 80 cents per therm. PY99, incentives are paid in two installments: 50% upon completion of installation, and the remainder upon the approval of first-year verified savings.
- **Incentive Limits.** In order to maintain equity in the payment of incentives, limitations are placed on total payments to individual contractors and to individual customers.
- **Contractor Eligibility and Training.** The program has minimal contractor eligibility requirements (primarily license and insurance requirements), and does not require specific contractor training.

- **Marketing.** Contractors are expected to market the Program.
- **Application, Implementation and Verification Process.** For each project, contractors go through a process involving a Basic Program Application, which establishes site control and provides basic information about the intended actions; a Detailed Project Application, which provides more detailed information about the intended activities and defines a measurement and verification process, a Project Installation Report, which provides information on actual installations; and an Annual Savings Report, which presents the one-year verified savings resulting from the installation of energy-efficiency measures.
- **Measurement and Verification.** Program materials provide recommended measurement and verification (M&V) protocols for a set of common measures; however, contractors are able to propose M&V approaches for these and other measures.

4 Summary and Analysis of PY99 RCP Program Activity

In this chapter, we provide a summary and analysis of activity in the RCP that occurred during the 1999 program year (PY99). Because there was substantially more activity in the PY99 SF RCP element, the data for this component of the program have been examined in more detail.

4.1 SF Database Analysis

In developing an analysis of program activity, two sets of data are available from each of the utilities, including:

- contractors who have attended training and are certified by either the League of California Homeowners or the Electric Gas Industries Association; and
- vouchers that have been requested, a subset of which has been returned, and a subset of which has been paid.

Using these two sets of data, we have analyzed contractor participation. In this analysis, one of the tools we have applied is a geographic information system (GIS) that enables us to visualize the actual market coverage potential by qualified contractors. This GIS analysis is also used to examine the types of vouchers submitted and their locations, and to determine what demographic constituents are currently being served by the program.

4.1.1 Voucher Data and Analysis Timeframe

We received these tracking databases from each of the utilities. Table 4.1 shows the number of vouchers in each database. Each of the utilities maintains its own protocols for recording the data. For example, PG&E and SDG&E create a voucher record at the point that a customer calls up to reserve program dollars and a voucher is sent to the customer. SCE/SoCalGas does not record the voucher record until a voucher is sent back to the utility signifying that the work is completed. Thus the PG&E and SDG&E databases contain

some voucher records where no action was ever taken while the SCE/SoCal database only tracks completed jobs.

Table 4.1: Voucher Data in for the Analysis

	Statewide	PG&E	SCE/SoCal Gas	SDG&E
Number of Vouchers in Original Files	10,234	5603	3198	1433
Vouchers Actually Redeemed	5313	1592	3198	523
Vouchers Initiated by 12/31/99	4539	1326	2733	480
Vouchers with no measures listed	58	56	2	0
Other Invalid Data	2	1	1	0
Total Available for Analysis	4479	1269	2730	480

Because the databases contain all program records from the start of the program to the date the data was sent to the evaluation team, there are many records that are rightly part of the 2000 program. For SDG&E, the program year was clearly recorded; however, no clear year demarcation exists in the database provided for the other two service areas. For this analysis, we consider any record with an initiation date before 1/1/00 and a returned voucher by 2/15/00 as part of the Year –1999 program. This approach may not be consistent with the utility’s official cutoff parameters, and therefore may not be exactly consistent with each programs’ official regulatory filing.

A third issue that we encountered is missing cost data for PG&E. PG&E’s database does not include actual voucher incentive amounts until the voucher check is actually paid. To develop comparable summary data, it was necessary to fill in this information. For most measures the incentive amount is preset, however for insulation and windows the incentive depends on the job size. For those missing records, we estimated windows at \$105, wall insulation at \$140, and attic insulation at \$150, approximately the average value for these items.

4.1.2 Analysis of Incentives Paid

Table 4.2 shows the number of measures and the amount of incentives by each qualified measure. Table 4.3 shows the percentage of each utility's total incentives that are distributed to each of the qualified measures.

Table 4.2: Measures Installed and Incentives Paid by Measure Type (Total)

	Rebate Amount	Statewide		PG&E		SCE/SoCalGas		SDG&E	
		Number of Measures	Incentives	Number of Measures	Incentives	Number of Measures	Incentives	Number of Measures	Incentives
Total Measures/Incentives		5583	\$790,478	1841	\$247,937	3124	\$469,859	618	\$72,682
Basic HVAC Diagnostics	\$75	926	\$72,225	375	\$28,125	207	\$16,800	344	\$27,300
Advanced HVAC Diagnostics	\$300	227	\$70,800	82	\$24,600	77	\$24,900	68	\$21,300
Duct Test Diagnostics	\$75	924	\$70,425	67	\$5,025	823	\$62,775	34	\$2,625
Duct Test and Sealing	\$125	1163	\$233,600	88	\$17,600	1054	\$211,600	21	\$4,400
Attic Insulation	\$0.15/ft2	613	\$123,626	363	\$68,061	231	\$51,692	19	\$3,873
Wall Insulation	\$0.14/ft2	334	\$44,728	233	\$31,663	85	\$11,174	16	\$1,891
Insulation Package Bonus	\$0.01/ft2	156	\$3,398	98	\$2,139	48	\$1,051	10	\$208
Energy Star Air Conditioner	\$225	167	\$39,825	90	\$20,250	65	\$16,650	12	\$2,925
Energy Star Furnace	\$250	88	\$22,050	58	\$13,050	22	\$6,500	8	\$2,500
Energy Star Heat Pump	\$225	9	\$2,025	1	\$225	4	\$900	4	\$900
High Performance Windows	\$1.00/ft2	651	\$98,524	248	\$33,155	390	\$62,485	13	\$2,884
Programmable Thermostats	\$25	315	\$8,250	129	\$3,225	117	\$3,150	69	\$1,875
Pipe Insulation	\$5	3	\$15	3	\$15	0	\$0	0	\$0
Energy-efficient Gas Water Heater	\$30	5	\$150	5	\$150	0	\$0	0	\$0
Water-Saving Showerhead	\$7	2	\$14	1	\$7	1	\$7	0	\$0
Compact Fluorescent Lamps	\$2-\$15	0	\$0	0	\$0	0	\$0	0	\$0

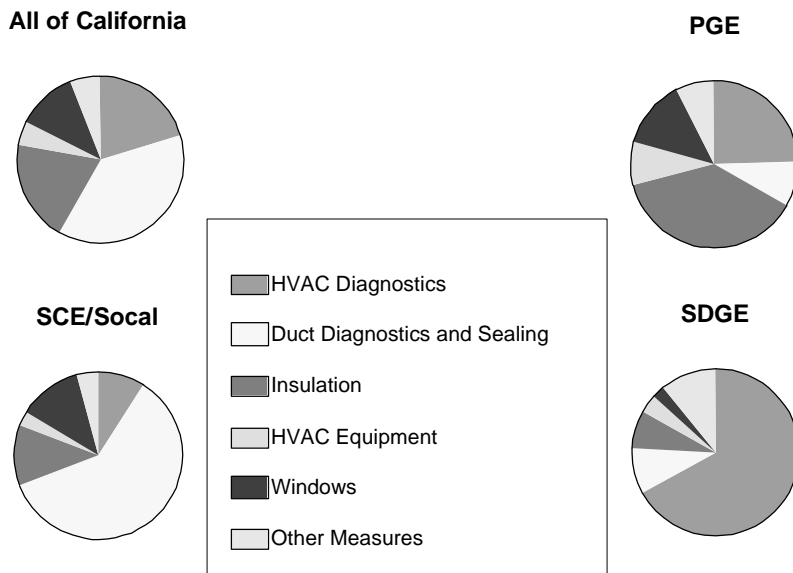
Table 4.3: Measures Installed and Incentives Paid by Measure Type (Percentage)

	Statewide		PG&E		SCE/SoCalGas		SDG&E	
	Percentage of Measures	Percentage of Incentives	Percentage of Measures	Percentage of Incentives	Percentage of Measures	Percentage of Incentives	Percentage of Measures	Percentage of Incentives
Basic HVAC Diagnostics	16.6%	9.1%	20.4%	11.4%	6.6%	3.6%	55.7%	37.6%
Advanced HVAC Diagnostics	4.1%	9.0%	4.5%	9.9%	2.5%	5.3%	11.0%	29.3%
Duct Test Diagnostics	16.6%	8.9%	3.6%	2.0%	26.3%	13.4%	5.5%	3.6%
Duct Test and Sealing	20.8%	29.6%	4.8%	7.1%	33.7%	45.0%	3.4%	6.1%
Attic Insulation	11.0%	15.7%	19.7%	27.5%	7.4%	11.0%	3.1%	5.3%
Wall Insulation	6.0%	5.7%	12.7%	12.8%	2.7%	2.4%	2.6%	2.6%
Insulation Package Bonus	2.8%	0.4%	5.3%	0.9%	1.5%	0.2%	1.6%	0.3%
Energy Star Air Conditioner	3.0%	5.0%	4.9%	8.2%	2.1%	3.5%	1.9%	4.0%
Energy Star Furnace	1.6%	2.8%	3.2%	5.3%	0.7%	1.4%	1.3%	3.4%
Energy Star Heat Pump	0.2%	0.3%	0.1%	0.1%	0.1%	0.2%	0.6%	1.2%
High Performance Windows	11.7%	12.5%	13.5%	13.4%	12.5%	13.3%	2.1%	4.0%
Programmable Thermostats	5.6%	1.0%	7.0%	1.3%	3.7%	0.7%	11.2%	2.6%
Pipe Insulation	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Energy-efficient Gas Water Heater	0.1%	0.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%
Water-Saving Showerhead	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Compact Fluorescent Lamps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

If one looks at the types of measures that have been completed on a utility comparison, the predominant measures are different for each utility. (See Figure 4.1.) Duct testing and sealing is by far the most important measure in the SCE/SoCalGas program, representing 39 percent of the measures and 58 percent of the incentives. For SDG&E the predominant measures have been the HVAC diagnostics. For PG&E, insulation and then HVAC diagnostics have been the most popular measures.

The reason that SCE/SoCalGas has a large number of duct test and sealing jobs is that most of this activity has been performed by one firm, who has found a niche in serving trailer parks. This firm performed work in 1670 homes in the SCE/SoCalGas service area in 1999 and submitted \$250,475 in vouchers. This represents 53 percent of the jobs and the dollars performed in SCE/SoCalGas in 1999.

Figure 4.1: Distribution within Measure Category by Utility



4.1.3 Analysis of Combinations and Packages of Measures

Table 4.4 shows an analysis of the number of measures done for each job that was paid an incentive. The large majority (87 %) of the vouchers is for a single item. There was an expectation that the RCP program would lead to the development of whole house services. There is a small representation of whole house services in PY99: 121 out of 4479

or 2.7 percent of all provided 4 or more measures at a single home and thus fit the study’s criterion for the whole-house category.

Table 4.4: Number of Measures per Job

	Statewide	PG&E	SCE/SoCal Gas	SDG&E
Total Number of Jobs	4479	1269	2730	480
1 Measure	3906	1010	2517	379
2 Measures	203	44	91	68
3 Measures	249	145	75	29
4 Measures	90	47	39	4
5 Measures	25	18	7	0
6 Measures	5	5	0	0
8 Measures	1	0	1	0

Because homes receiving both wall and attic insulation also receive a bonus incentive which is listed as an additional measure, there is the potential that the number of multiple jobs is somewhat overstated. As shown in Table 4.5, very few (11) of the homes that receive four or more measures actually received the insulation package. In addition, the vast majority of package insulation jobs had no other measures done. Instead, the typical combination of three and/or four measures includes a duct and/or HVAC diagnostic test, a new piece of HVAC equipment, and a programmable thermostat. Virtually no one is installing heat pumps, water heaters, pipe insulation, or low-flow showerheads. Not a single compact fluorescent lamp, either hardwired or screw-in, was installed.

Table 4.5: Percentage of Three Measure Jobs That Included Insulation Package (Attic, Wall and Bonus Combination)

Number of Measures	Total Number of Jobs	Jobs With Insulation Package	Jobs Without Insulation Package
8	1	1	0
6	5	2	3
5	25	3	22
4	90	5	85
3	249	145	104

4.1.4 Contractor Qualification and Participation

Table 4.6 provides statistics on the number of contractors trained and the number actually submitting a voucher. Only a small percentage of the qualified firms actually have submitted vouchers. In fact, if one considers the number of contractors trained, the number actually participating is quite a small percentage.

SCE/SoCalGas provided data on the number of contractors attending training sessions. SCE/SoCalGas training sessions included 909 attendees, though many of these records double count contractors who attended more than one session and include multiple contractors from the same firm. A total of 514 individuals representing 321 unique firms attended a training session. Approximately one-half of these contractors became qualified by passing the test and getting League approval. Finally, only 18 percent of the trained contractors and 35 percent of the qualified contractors actually completed a job and submitted a voucher.

Table 4.6: Contractor Qualification and Participation

	Statewide	PG&E	SCE/SoCal Gas	SDG&E
Number of Firms Qualified	268 ¹	68	166	56
Number of Firms Submitting Vouchers	120 ²	45	58	19

¹ 22 contracts qualified for 2 programs, 4 contractors were in both SCE/SoCalGas and PG&E, 16 were in both SDG&E and SCE/SoCalGas, and 1 was in all three programs.

² two firms have submitted vouchers in two different programs.

4.1.5 Voucher Distribution Across Participating Contractors

The program participation rate by contractors who have qualified is actually somewhat lower than depicted in Table 4.6, above. As shown in Table 4.7, the vast majority of vouchers are being submitted by a relatively small number of firms.

Table 4.7: Voucher Submittal Distribution by Contractor

	PG&E	SCE/SoCal Gas	SDG&E
Percent of Vouchers Submitted by Most Active Firm	16 %	53 %	27 %
Percent of Incentive Dollars Received by Most Active Firm	17 %	53 %	27 %
Percentage of Dollars Received by the 10 Percent Most Active Firms	47 %	71 %	41 %
Percentage of Dollars Received by the 25 Percent Most Active Firms	74 %	85 %	68 %
Percentage of Dollars Received by the 50 Percent Least Active Firms	8 %	5 %	12 %
Number of Firms with Five or More Returned Vouchers/ All Firms Submitting Vouchers	31/45	39/58	15/19
Number of Firms with Twenty or More Returned Vouchers/ All Firms Submitting Vouchers	17/45	19/58	5/19

The question arises as to why most of the firms that participate in the training are either not active, or minimally active, in the program. One issue has to do with the timing of the training. Because the program only started in the spring/summer of 1999, there may be contractors who entered the program too late in the year to have an impact. As Table 4.8 indicates there appears to be a relationship between the length of time since the initial qualification date (the date for passing the qualifying test and obtaining League or EGIA approval) and the percentage of contractors who have submitted vouchers to SCE/SoCalGas. Active participation drops as the length of time since qualification drops. It is not clear whether part of the drop-off is also due to the fact that the earliest enrollees also were more interested enthusiastic about the program, and that maybe they already offered the services, and therefore were more likely to participate than were later enrollees.

Table 4.8: Percentage of SCE/SoCalGas Trained Contractors Submitting Vouchers By First Training Month

Month in which company first trained	Number of firms first trained in month	Number of firms submitting voucher	Percentage of firms participating	Number of vouchers submitted by these firms	Sum of voucher dollars submitted by these firms
May	37	14	38%	2069	\$334,603.87
June	26	11	42%	228	\$49,493.76
July	41	9	22%	82	\$14,928.30
August	35	7	20%	130	\$33,704.91
September	59	7	12%	152	\$22,467.16
October	45	5	11%	34	\$8,635.00
November	37	1	3%	5	\$1,064.09
December	45	0	0%	0	0

4.2 SF Element Geographic Information System Analysis

A geographic information system was developed to study the contractor and voucher databases. Details of the methodology along with copies of the maps and data tables are presented in Volume 2: Appendix C. Summarized below are the two case studies showing how well the existing contractor base provides coverage to the utilities' households, and a study of the geographic distribution of vouchers and the income and racial characteristics of the areas served by the program.

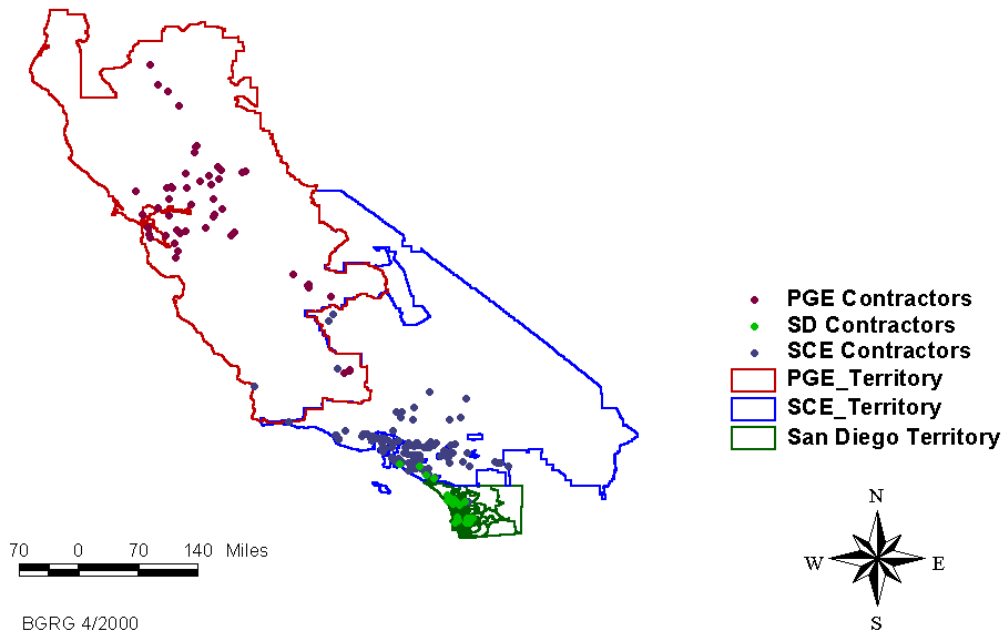
4.2.1 Analysis of Contractor Coverage

One pressing issue confronting program planners is the need understand the degree of coverage in the market, and across service territories, that is provided by contractors participating in the program. Program managers had a rough idea of the coverage by examining the counties in which contractors indicated they worked, and this provided the knowledge that some areas of their service territories were without qualified contractors. This crude assessment did not, however, provide information on how many contractors served a particular area or the number of contractors as a percentage of the number of available households. To develop more sophisticated assessments, geographic information

system (GIS) techniques were used. The GIS used program data to analyze the potential service area of each contractor, and how well the collective areas provide coverage for homes in the California.

As a first step, we prepared a map in which the location of each contractor's home office is plotted. Figure 4.2 illustrates the results of this exercise, which provides a visual product similar to the program managers' rough assessment. The map clearly outlines areas of the state where no contractors have their headquarters, but it does not readily answer the question as to what areas lack contractor coverage.

Figure 4.2: Location of RCP Qualified Contractors



We then wanted to create a map that showed the range of area that each contractor actually covered. Each contractor has a self-determined service area. This area is somewhat fluid in that it shrinks and expands based on current workload and size of prospective job. Our analysis assumes a sixty-mile buffer for rural/suburban areas and thirty miles for San Francisco, Oakland, Los Angeles, San Diego, and Orange Counties.

This step indicates that there are still large areas of the state without any contractor coverage, but the step is not sufficient to quantify how much coverage is available, and more importantly how does the level of coverage compare to the number of households that potentially could be participants. An additional index, the Contractor Coverage Potential is created to answer this last query.

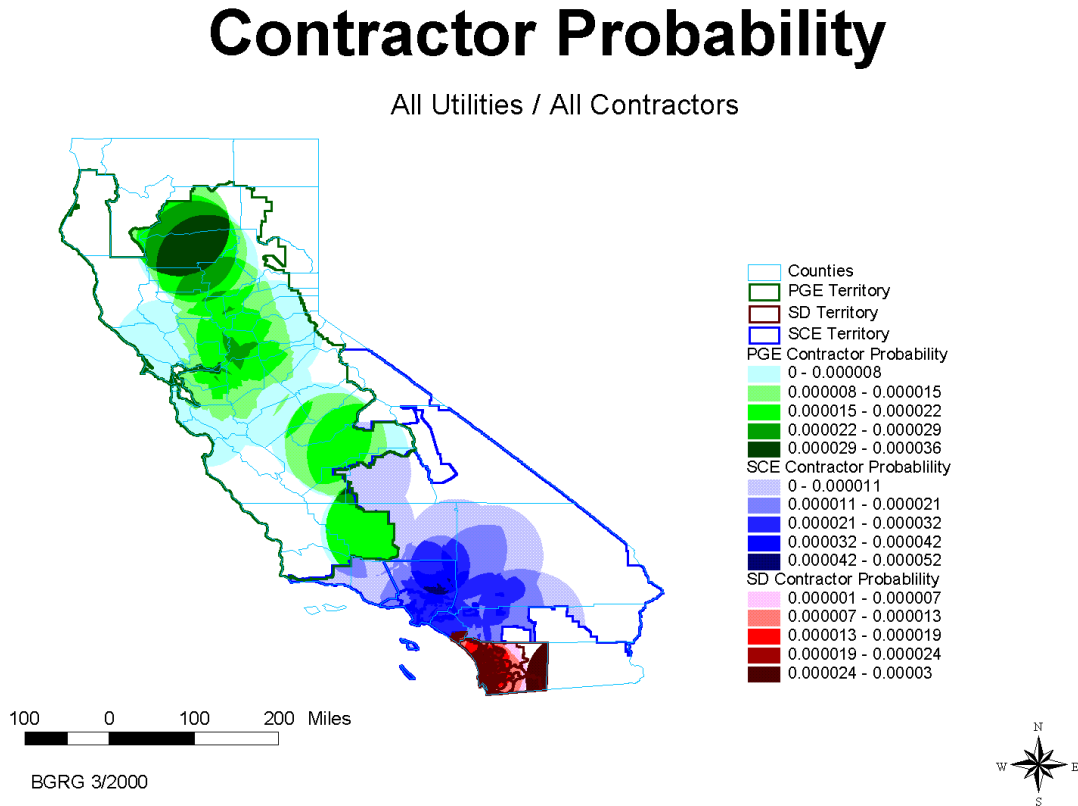
As we define the real issue, the objective of the analysis is to determine the probability that a program-eligible contractor could service a household. The probability of a specific contractor servicing a household is shown in Equation 1.

$$\text{Contractor Service Probability by specific contractor} = \frac{\text{no. crews}}{\text{no. of households in contractor range}}.$$

The probability that a household will be serviced by any of the available contractors is the summation of the individual contractor probabilities for those contractors whose service territory overlaps a particular location, as shown in Equation 2.

$$\text{Overall Contractor Coverage Probability} = \sum \text{Contractor Service Probability (Equation 1)}$$

Figure 4.3: Contractor Coverage Potential



Using 1999 program participation data, most of the state has in fact very low probabilities of contractor coverage. Keep in mind that a contractor coverage probability of less than 0.00004 means that it will take 25 years to service all of the homes assuming contractors can do 5 homes a day, 200 days per year. The results show that there are not enough participant contractors, and in most areas of the State the coverage is so light that there are effectively no available contractors.

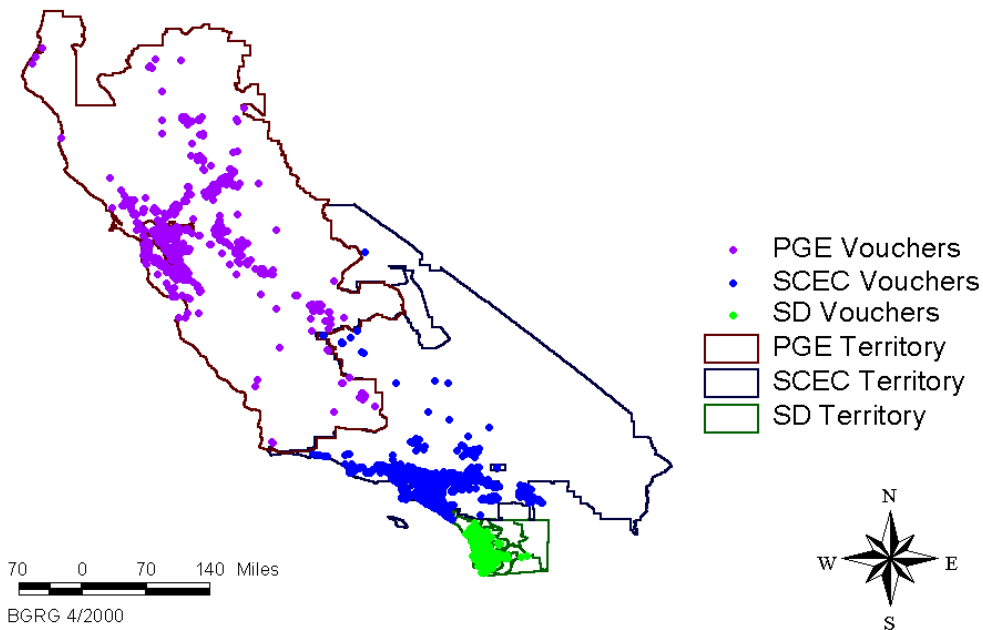
4.2.2 Analysis of Voucher Distribution and Demographics

A second issue of concern to the program managers is the question of which residential customers are participating in the program. Many DSM programs have been criticized because they tend to attract mostly better-educated and wealthy households. Program managers are thus sensitive to this issue and need intelligence regarding who is

participating. Unfortunately, the data necessary to make such an assessment is not typically available to program managers until after evaluations are completed. Utilities do not generally know the income or ethnicity of their customers unless they have entered into a payment arrangement, so the program managers generally must wait for survey results to determine program participant characteristics.

Because the GIS can pinpoint the exact location of participants, the opportunity exists to superimpose the participant data onto the underlying census data. We do this by summing incentive dollars by census tract and then using standard database queries to relate incentive dollars to average income, and ethnicity. We begin by geocoding the voucher locations into the database as shown in Figure 4.4.

Figure 4.4: 1999 Voucher Locations



The voucher data can be overlaid with census data to determine the types of households that are participating. This gives evaluators an approach for determining ethnicity or income level that is more reliable than post-facto survey responses. In this

analysis we have aggregated the census blocks into four quartiles, based on the median income of the census block. Table 4.9 gives the results of the data aggregation.

Table 4.9: The Distribution of Program Benefits by Census Tract Median Income Quartile

	Census Tract Income Quartile	Median Income of Entire Quartile	Number of Vouchers	Total Incentive Dollars	Vouchers/ Household
PG&E	Lowest	\$25,463	365	\$63,015	0.00356%
	2 nd	\$34,212	251	\$51,218	0.00211%
	3rd	\$42,023	315	\$61,261	0.00262%
	Highest	\$53,914	246	\$42,127	0.00223%
SCE/SoCalGas	Lowest	\$26,050	1073	\$161,560	0.00907%
	2 nd	\$35,652	530	\$85,022	0.00382%
	3rd	\$43,383	505	\$95,920	0.00393%
	Highest	\$54,218	572	\$119,516	0.00460%
SDG&E	Lowest	\$26,646	36	\$5038	0.0145%
	2 nd	\$35,888	98	\$14,855	0.0371%
	3rd	\$43,484	173	\$30,034	0.0704%
	Highest	\$54,613	173	\$25,648	0.0707%

The results of Table 4.9 show that for SCE/SoCalGas there is marked skewness towards support of the lowest income quartile. This is largely the impact of the single largest contractor, who has done over half of SCE/SoCalGas’s jobs, and targets the mobile home community. This emphasis on the mobile home market puts the RCP program -- at least for SCE/SoCalGas -- in a unique position of having their voucher distribution favoring the lower income areas. SDG&E which has focused mostly on air-conditioning services has a perceptible bias towards areas with higher median incomes.

The GIS gives an opportunity for further examining issues of ethnicity. In Tables 4.10-4.12 the distribution of census tracts by race is examined. The results of Table 4.10 demonstrate that census tracts with higher percentages of white persons are more likely to have had participants in RCP. This is particularly true of the lower income census-tract quartiles. This indicates that RCP’s positive record in reaching lower-income households, is not as positive in reaching non-white households.

Table 4.10: Race Distribution Differentiated by Census Tracks with and without Program Participation

Income Quartile	Percent of Entire Quartile Population that Is White	Percent of Population that is White for those Census Blocks in Quartile that Had a Participant	Percent of Population that is White for those Census Blocks in Quartile that Did Not Have a Participant
PG&E			
Lowest	61%	65%	60%
2 nd	74%	77%	73%
3 rd	76%	80%	75%
Highest	79%	82%	79%
SCE/SoCalGas			
Lowest	45%	69%	41%
2 nd	63%	70%	60%
3 rd	73%	78%	71%
Highest	81%	82%	80%
SDG&E			
Lowest	61%	66%	59%
2 nd	77%	81%	73%
3 rd	81%	84%	75%
Highest	88%	87%	89%

Table 4.11 shows the distribution of vouchers by percentage of population that is black. The quartile representing those census tracts with the highest percentage of black inhabitants have had the least program activity.

Table 4.11. Distribution of Incentives by Percentage of Black Population

Black Population Quartiles (Sorted by Percentage of Population that is Black)	Percentage of Blacks in Census Tract	Number of Vouchers Received	Amount of Incentives Received
PG&E			
Lowest	0.0-0.0080%	503	\$87,148
2 nd	0.0080-0.0224%	319	\$63,458
3 rd	0.0224-0.0675%	341	\$67,022
Highest	>0.0675%	193	\$34,100
SCE/SoCalGas			
Lowest	0.0-.0178%	1385	\$230,365
2 nd	0.0178-0.0227%	98	\$18,005
3 rd	0.0227-0.0623%	681	\$122,577
Highest	>0.0623%	516	\$91,069
SDG&E			
Lowest	0.0-0.0072%	107	\$14,640
2 nd	0.0072-0.0249%	200	\$32,382
3 rd	0.0249-0.0572%	132	\$22,191
Highest	>0.0572%	41	\$6362

Table 4.12 shows a similar assessment for the distribution of vouchers to Hispanic households. In SDG&E and SCE/SoCal Gas programs, the census tracts with the highest percentage of Hispanic inhabitants are receiving the least program support.

Table 4.12. Distribution of Incentives by Percentage of Hispanic Population

Hispanic Population Quartiles (Sorted by Percentage of Population that is Hispanic)	Percentage of Hispanics in Census Tract	Number of Vouchers Received	Amount of Incentives Received
PG&E			
Lowest	0.0-0.0616%	535	\$96,464
2 nd	0.0616-0.1061%	250	\$46,947
3 rd	0.1061-0.2028%	226	\$44,765
Highest	>0.2028%	345	\$63,552
SCE/SoCalGas			
Lowest	0.0-0.1031%	682	\$122,604
2 nd	0.1031-0.2180%	1244	\$210,461
3 rd	0.2180-0.4448%	635	\$109,514
Highest	>0.4448%	119	\$19,437
SDG&E			
Lowest	0.0-0.077%	155	\$22,233
2 nd	0.077-0.0113%	161	\$27,118
3 rd	0.0113-0.0222%	104	\$17,283
Highest	>0.0222%	60	\$8,941

4.3 Multifamily Element Program Activity

As noted in the introduction to this report, the MF element of the RCP had considerably less activity than the SF element during PY99. This has been attributed to a variety of factors, including the fact that these projects take longer to market, package and submit for approval than the smaller projects oriented toward single-family homeowners. In addition, a number of the Energy Service Companies (ESCOs) that were considered good candidates for participating in the MF element were busy completing work that had been

committed to under the PY98 Residential Standard Performance Contracting (SPC) Program.

Table 4.11, below, provides a limited snapshot of the MF element, based upon information provided to the evaluation team by the program managers at each utility. More detailed information was not available at the time this report was written. Note that two of these projects are installed, and the remainder are under development.

Table 4.11 MF Activity Summary

Utility	ESCO / sponsor	Measures	\$ Value of Incentives
SoCalGas		water htr. Controller / new boiler	
		water htr. Controller / new boiler	
		water htr. Controller / new boiler	
PG&E	EUA Citizens		\$229,618
	EUA Citizens		\$61,777
	EDC Technologies		\$26,838
SCE	UCONS	lighting	\$203,343
	ASC	lighting	\$459,296
	SLI	lighting	\$103,076
	The Lighting Company	lighting	\$63,357
SDG&E	ProStar	water heater controller	\$10,000
Total			\$1,157,305

5 Findings from PY99 RCP Process Evaluation

5.1 Overview and Sources of Information

Process evaluations are typically undertaken to review and assess the implementation-related aspects of a program. Research undertaken for the process evaluation components of this project included the following:

RCP Single-family Element:

- Interviews with program managers (December, 1999)
- Interviews with participating contractors (December, 1999)
- Interviews with non-participant contractors (December, 1999)
- Ride-alongs with participant contractors (January, 2000)
- Telephone survey with participating SF homeowners (April, 2000)
- CPUC workshop feedback on SF and MF elements² (December, 1999)
- GIS Analysis of Participants and Contractors (February, 2000)

RCP Multifamily Element:

- Interviews with program managers (December, 1999)
- CPUC workshop feedback on SF and MF elements³ (December, 1999)

As noted in Chapter 3, the majority of activity for this program during PY99 involved the SF element. Eleven BPAs were submitted for the MF program at the end of the year, and two of these projects were installed as of the time this report was prepared. With so little implementation experience in PY99 upon which to base a comprehensive process evaluation, the primary focus of this report was therefore placed upon providing early feedback for the single-family element of the program. An interim report on the findings resulting from this research was prepared in January 2000 and disseminated to program managers.⁴ Since the completion of that report, a broad-based telephone survey

² The evaluation team participated in this workshop. CPUC: "Workshop Report on Energy-efficiency Residential Contracting Programs for single and Multifamily Dwellings" held December 2, 1999.

³ See footnote above.

⁴ See Appendix A of this report.

was conducted with SF homeowner participants, and three days of ride-alongs were completed with participating contractors.

In this section, we include the following information:

- Summary of findings and recommendations from SF RCP Interim Process Evaluation report
- Summary of findings and recommendations from the SF homeowner participant survey
- Summary of observations from SF participating contractor ride-alongs
- Discussion of issues related to the MF program
- Important Process-related Issues for Future Research

5.2 SF Process Evaluation

5.2.1 Review of PY99 SF Process Evaluation Interim Report

Important findings resulting from this initial research include the following:

- *Timeliness of Payments is a Critical Issue* -- Interviews with participating contractors indicate that issues related to paperwork requirements and timeliness of voucher payments are an over-riding concern. Many of the contractors within the target market are small in size and simply do not have the financial resources to cover the cost of expenses for periods of 45+ days. There is no doubt that the program managers have given this issue a great deal of attention since we first raised the concern in our interim process evaluation, and some substantial improvement has resulted. The payment turn-around time on vouchers is reported to be significantly shorter at all of the utilities than was earlier noted. Although the average time fluctuates depending upon volume received, PG&E, for example, reports that average turn-around time for all vouchers received between March 1, 2000 and July 1, 2000 has averaged 27 days.

The following is a partial list of initiatives that the utilities have taken to improve the voucher turn-around time:

- PG&E has instituted a 5-day "automatic waiver" if the jobs are not selected for inspection within 5 days. The inspection target for RCP is a minimum of 20% on all jobs and 100% on attic insulation.
- Information to contractors has been expanded to include letters specifying and summarizing voucher and documentation submittal requirements,
- All of the utilities are contacting contractors by phone or fax to correct any errors on vouchers instead of returning the entire package to contractor. Generally, only those vouchers that require contractor modification (e.g. missing signatures) are sent back to contractors.

- Additional training is being provided to contractors -- including personal assistance in paperwork completion as necessary.
 - PG&E began a series of implementation workshops throughout its service territory to familiarize contractors with changes to the PY2000 program, as well as to answer questions contractors have about the RCP(including paperwork).
 - Utilities have developed detailed instructions for all required forms.
 - Utilities have refined internal processes for reviewing applications and expediting approval.
 - Field training added for contractors failing inspection of measures to avoid payment reductions.
 - SDG&E has introduced the use of the "Check Me" Program to assist with AC/HP Diagnostic/Tune-up inspections and reduce turn-around time on these applications.
-
- Paperwork is Viewed by some Contractors as Being Burdensome -- In a market transformation program such as RCP, the administrative requirements should be as transparent as possible in order to allow private sector firms to concentrate on developing their businesses and promoting the services / practices of the program. When contractors are not paid in a timely manner and feel that they are spending an inordinate amount of time completing paperwork, the participation experience becomes dominated by administrative concerns rather than the business of transforming markets.
 - Training Approaches -- Each of the utilities has provided technical training to contractors, with each using a markedly different approach. The approach used in the SDG&E service area seems to have been the most successful in terms of feedback offered by contractors through our research. There are pros and cons to each approach used, and it is recommended that the utilities conduct a workshop to review the approaches used and to assess what training methods have worked best and coordinate future training efforts as much as possible.
 - Reasons Why Some Contractors are Not Participating -- Contractors that have not participated in the program to date cite an array of perceived issues that appear to be based largely upon prior experiences with utility programs, including (1) paperwork requirements, (2) time to receive payments, and (3) incentive levels. It is recommended that program overview workshops be offered on an on-going basis in order to provide up-to-date and accurate information to the contractor community - including participants and non-participants.
 - Program Tracking -- Efforts to collect and analyze tracking data from each of the utilities highlights the need for a coordinated tracking effort. At present, each utility is using a different format and collecting different types of information. Merging the data for statewide analysis is unnecessarily time-consuming. More importantly, better access to these data by Program Managers might assist them in managing the

program. They are unable to see aging studies on contractors who are trained but not approved or obtain data on vouchers submitted but not paid. There is a concern as well that there is inadequate coordination between the contractor training/approval data management process and the voucher tracking process. The potential exists for a contractor removed from the program to still receive a voucher payment.

Recommendations in this report for immediate consideration include:

- Shorten the Voucher Payment Cycle -- a target of 10-15 days will be most effective for encouraging market transformation.
- Streamline all Installation Paperwork -- while it is not within the scope of this evaluation to scrutinize all of the installation forms, it appears simply combining forms and eliminating redundancies will go a long way. Freer distribution of voucher forms to contractors, as is being done in the Edison/SoCalGas service area, would also eliminate many of the delays that are now occurring for other participants.
- Re-evaluate Processing O/C Requirements -- ensure that QC efforts are matched to the level of incentive in question.
- Provide Paperwork Training to Contractors -- At this point, it may be worth preparing a "sample form" and a list of Frequently Asked Questions (FAQ) in paper copy and available on the Internet.
- Standardize and Consolidate Program Tracking -- At the very least, the utilities should ensure that they are tracking consistent data in terms of customer information, measures installed, and rebates paid. Each utility should track voucher submittal dates and payment times, and develop aging reports on these payments. For SCE/SoCalGas and PG&E, there is no single source for approved contractors accessible to both program managers and voucher processors. There needs to be one official approved list controlled by the program manager, which the voucher processors will use to track contractors. The passing of lists back-and-forth between screening agencies, trainers, program managers, and voucher processors has the potential to lead to payments to contractors not in or no longer in the program.

Additional recommendations for the RCP program that should be considered once the high priority issues are first addressed include:

- Expanded Availability of Eligible Contractor Lists -- With careful attention to ensuring that one central party maintains the current list of eligible contractors, it would then be beneficial to have these lists made available to any and all organizations that would like to make these lists available to consumers. For

example there are numerous home improvement related Internet services that may wish to promote RCP contractors. Retail outlets may wish to advertise the program and provide lists of eligible contractors. In making this recommendation, we assume that the list of "eligible" contractors (i.e. those who have been screened by the League or EGIA and have received all required training) is public information and is not proprietary to any single organization.

- Contractor Recruitment -- There are areas of coverage that will need to be addressed as the program moves forward. Targeted marketing to contractors in certain geographic areas, as indicated through GIS analysis, is recommended. Moreover, it is recommended that training classes be offered in these areas in order to minimize the inconvenience and costs of taking part in this training.
- Additional Measures -- It has been suggested by numerous parties that additional measures should be added to the RCP program. It is recommended that the program managers first develop a public list of potential additional measures, followed by the development of a ranking criteria for identifying measures that should first be added. While there are certainly measures that can be added, it is also important to keep the program manageable and that training / outreach efforts be in place to transform the markets into new areas. Simply including additional measures because there is some number of specialist contractors, without undertaking efforts to increase the size of that pool of eligible contractors, will not likely lead to market transformation.
- Relaxing the performance requirements for duct sealing -- Difficulties in meeting the performance requirements for duct sealing are a deterrent to contractors for those jobs involving the leakiest of existing systems. This is a tough issue to resolve, but modification of the current standard may be appropriate for houses in which ducts are sealed to a level that is significantly better than when they started, even though the 15 % leakage standard is not met. Another option would be to have a separate duct replacement incentive for catastrophic ducts.
- Promote and Disseminate Program Results -- Feedback to the contractor community, promoting program activity and successful business models, will stimulate word-of-mouth interest in the program and technologies promoted by the RCP program.
- Continue and Expand Training Offerings -- Options to consider, for example, include (1) providing a series of on-going state-wide introductory workshops to provide a program overview for new contractors, (2) including energy-efficiency sales training as a core course for all contractors, and (3) making low-cost equipment available for all training participants.
- Begin Promotion to Customers -- The utilities have been rightly reluctant to promote this program before there were contractors able to provide the services. However,

for the program to expand and truly develop as a market transformation program, it must promote itself to customers. Many contractors are not following through on the approval process because they do not believe that there is adequate demand for these services. The utilities should begin with very targeted promotional activities. The GIS system will help identify and monitor the results of these activities.

5.2.2 Summary of the SF Homeowner Participant Survey

In the March-April, 2000 timeframe, a broad-based survey was conducted with over 400 SF homeowner participants. The complete findings of this survey effort are documented in a report included as Volume 5: Appendix F. Significant findings are highlighted below.

- On the whole, participants appear to be quite satisfied with the program.
- A sizeable number of customers in the SDG&E service area (25%) report that they were not at all satisfied with the duct sealing services provided.
- Participants in the PG&E service area are most likely to recommend the program and/or the contractor who provided services.
- The top two recommendations provided by customers include (1) include more education and/or advertising for customers, and (2) include more measures.
- Participants rank the importance of energy costs similar to respondents in previous statewide baseline surveys.
- Participant awareness of energy-efficiency options is higher for air conditioning and furnace options than is the awareness of these measures in other surveys of the general population. Awareness of other measures is somewhat lower than the level of awareness of these measures in the other surveys.
- Significant telemarketing and direct mail is being undertaken by one contractor in the combined SCE/SoCalGas service areas.
- Customers in PG&E and SDG&E service areas are more likely to have initiated contact with contractors (as opposed to the contractors initiating the contact), and were more likely to have already heard about the program prior to speaking with a contractor.
- Overall, 83% of participants did not pay for the diagnostic services received.

- Participants in the SCE/SoCalGas service areas are more likely to receive diagnostic services at no cost. This is largely because of the activities of SCE/SoCalGas's most active one contractor.
- In 62% of cases where contractors recommended specific measures for customers, customers report that they had not previously heard of these measures.
- The frequency with which recommendations were made, as well as the likelihood of customers to act upon these recommendations, varies considerably across both measures and utility service areas.
- Approximately 57% of participants indicate that they are likely to purchase additional energy-efficiency equipment and services.
- Approximately 30% of participants indicate that they are likely to make more improvements following the program.
- SCE/SoCalGas has a large percentage of program participants living in mobile homes (57%) relative to program participants in other service areas. Again, more than 92% of these jobs were done by the most active contractor.
- A higher-than-expected number of participants indicate that they have lived in their homes for more than ten years (46%) and, significantly, expect to stay in their homes for more than ten years (76%).

5.2.3 Summary of Observations from SF RCP Contractor Ride-alongs

A series of phone calls and personal interviews were conducted in January with participating HVAC contractors. The intention was to do ride-along observe first-hand the operations of contractors. Three days of visits were planned, though due to cancellations by contractors or homeowners, only four sites were visited. In addition, interviews were conducted with six other contractors.

Most of the contractors spoken with were still enthusiastic about the program, though two no longer were participating. One felt that the costs of the diagnostic and CAS tests cost his customers more than the rebates offered and were not worth it. The other stopped participating because it took too long to get paid by the utility. All of the contractors mentioned that payment time was still a major issue, and that none had noticed any improvement in the process since November when the issue was first raised to the utilities.

Several of the enthusiastic contractors were frustrated because they had no jobs scheduled. The mid-winter period is a slow one for HVAC contractors and they were hoping that the utilities would have advertised the program to generate some sales. These contractors were looking for utility advertising as a way to alert homeowners that the diagnostic services were a legitimate service.

One set of observations involved SCE/SoCalGas's biggest provider, who concentrates on providing duct diagnostics to mobile home parks. This contractor has set up an efficient operation with seven crews providing 6 to 8 jobs per day. The company canvases a trailer park by mail. They secure the support of the trailer park management by agreeing that the service will be provided at no cost and that no additional work will be generated.

The crew observed provides excellent service. They are able to provide efficiently and effectively a duct test since most coaches have similar systems. While one crewmember seals around the furnace, the other seals the boxes around the registers. If a very high leakage rate is found, the crew knows that the crossover ductwork connecting the two coaches has become detached and involves crawling under the coach to fix. This type issue happens once or twice a week. In both observed cases, the crew was able to reduce leakage to below the targeted goals. In one case from 31 percent to 15 percent and in the other from 17 percent to 11 percent.

One duct diagnostic test performed by another contractor in a large single-family home was also observed. In contrast, this technician was unfamiliar with the duct diagnostic process and sought information on how to handle issues not covered or fully comprehended in the training sessions. This was a case where on-site training would have been very valuable. The contractor was also unfamiliar with all of the techniques used for sealing the ducts.

This particular job presented a different interaction with the homeowner. The contractor initially charged the homeowner \$20 for the diagnostic test. The test showed that the ducts were leaking especially in around the furnace box, which was located in the closed garage. The technician explained the test to the elderly woman who owned the home, and told her that the sealing would save money and make her home safer as she was

now pulling in car exhaust into her home through the leaks in her garage. He informed her that the repairs would cost another \$90. The woman's reaction was anger and resignation. She said that she should have expected that there would be additional costs when she agreed to the deal in the first place. However, the idea that she was bringing in car exhaust into her home convinced her to do the work. The sealing repairs lowered the leakage from 28 percent to 18 percent, but since the repairs did not bring the level below 15 percent, the job did not qualify for a sealing incentive. This seemed inequitable in relation to the coach contractor's work that was far less complicated. In the future, the program should adjust incentives based on the reductions actually achieved and not on achieving a finite level.

One HVAC basic test was also observed. This was a straightforward test that the HVAC technician handled easily. The system failed to pass and needed Freon. However, the technician recommended that the homeowner wait to add the Freon until the summer. At that point, he would do a second test and be able to gauge how fast the leak was. If it was large than he would recommend replacing the old unit. Putting the Freon in now would mean some more of it would leak out before it was needed in the summer.

5.3 Discussion of Issues Related to the Multi-family Program

As noted above, program participation in the MF element during 1999 did not provide sufficient basis for conducting a process evaluation of this part of the program. Nevertheless, we have prepared a discussion of implementation issues related to the multifamily element of the program.

During our conversations with non-participant contractors, we did receive a fair amount of comments related to the MF program. A brief summary of the issues raised is included below.

5.3.1 CPUC Workshop Issues for MF Element

At a CPUC workshop in December, 1999, participants and interested parties were invited to comment on the program design and implementation. Issues raised at the CPUC workshop included the following:

- Targeting under-served markets
- Costs and complexity of participation -- application fee, installation deposit, complex forms
- Onerous M&V - direct measurement is required, with no option for pre-calculated savings
- MF incentive prices -- no parity between SF and MF incentives; no financial incentive for comprehensiveness
- MF customer limits -- eliminate \$40K Host customer site limit

These and other comments were taken into consideration by the program managers during the redesign effort undertaken in advance of the PY2000 RCP MF element.

5.3.2 Issues Specific to Multifamily Component

- Participation levels -- Activity in the multifamily component was non-existent for the first six months of PY99. Toward the end of 1999 a handful of applications began to come in. The slow start was partially attributable to longer project lead times in the MF sector, other project activities among contractors and other factors apart from the program's design. However, the slow start also reflected dissatisfaction among the larger ESCO-type market actors regarding incentive levels, and discomfort among other firms with the paperwork and the M&V requirements, indicating that program design issues are noticeably limiting contractor involvement in the program.
- M&V requirements -- Smaller contractors that do not typically operate on a standard performance-contracting basis in utility programs find the M&V requirements of RCP daunting. While the utilities attempted to ameliorate this problem by allowing a great deal of flexibility in how contractors could address the M&V requirements in PY99, many contractors were still left floundering as to how they could proceed. The utilities continue to refine this aspect of the program to try to alleviate this very significant participation barrier.
- Paperwork -- Excessive paperwork seems to be a very common complaint about the multifamily component of RCP. Electronic application files were created to assist contractors in filling out the paperwork, transferring common information from form to form to lessen the burden of filling out BPAs and DPAs. Still complaints exist about the paperwork, and the utilities should continue to look at this issue throughout the year to identify additional opportunities for easing the application process. This will be particularly important for encouraging participation among contracting firms that do not specialize in performance contracting work.
- Incentives-- ESCO type firms who have participated in the Small Business Program and other prior programs using a standard performance contracting approach object to the size of the incentives in PY99 RCP. Their desires for larger incentives are at odds with the utilities' desire for a customer contribution. The concern that

incentives are too small is not shared by all market actors; a number of smaller indigenous contractors have indicated that they like the incentives and find that they can offer better value to their customers using the RCP incentives.

- *Project size requirements--* The minimum project size requirements have been found to effectively exclude small multifamily structures from participation in the MF component of RCP. Since these buildings are by definition excluded from the single-family component, the program design blocks participation by facilities of 5-8 dwelling units market segment to share in the benefits of RCP.

6 Summary of RCP Market Effects Evaluation

This Section presents the results of an assessment of near-term market effects for the single-family portion of the 1999 California Residential Contractor Program (RCP). The research completed for this part of the study entails identifying key market-effect indicators, collecting data on those indicators from participant and non-participant contractors, and analyzing the survey responses for near-term market effects. Note, because of the low level of activity in the MF element, no MF market effect tracking is performed.

The remainder of this Section describes the approach used in the analysis, summarizes the indicators identified in the research, describes the data collection effort, presents the results, and concludes with some recommendations for continuing RCP market effect studies.

6.1 Approach

The assessment of near-term market effects entails testing a series of distinct hypotheses relating to the potential effects of specific program interventions. Self-reported impacts from contractors are used to determine if the RCP has had a perceptible influence on contractors' awareness, perceptions and behavior relating to energy-efficiency measures. In addition, survey responses of participants and non-participants are compared.⁵ Where a change is found, the attribution to the program is assessed. Furthermore, the sustainability of any program-induced effects is also considered.

⁵ Due to the potential for self-selection into the program, comparisons between participants and non-participants may be weak evidence of program-induced effects. In some cases, these comparisons are enhanced by also considering a third group of respondents, non-participants who received training under the program but have not yet submitted vouchers.

6.2 Indicators of Market Effects

In developing indicators of market effects for this study, previous research from the Baseline Study⁶ is used along with market effects indicators identified by the utilities in the PY99 program design. The following is a list of indicators used to develop the hypotheses of market effects and the survey questions used in the data collection. For each, contractors were asked to report their perceptions and behavior regarding.

- Cost effectiveness of energy-efficient measures,
- Consumer awareness and demand,
- Equipment availability,
- Availability of qualified labor,
- Increase in jobs,
- Changes in efficiency levels recommended and installed,
- Changes in contractor practices,
- Increase in awareness of whole-system treatments (HVAC only),
- Ownership of diagnostic equipment (HVAC only), and
- Increase in contractors offering diagnostic services (HVAC only).

6.3 Data

A set of preliminary in-depth interviews with HVAC contractors was conducted. This information was used to refine the questions for use in the telephone surveys with the remaining contractors. HVAC contractors were chosen for the initial set of in-depth interviews as these contractors are exposed to a broader set of measures under the program than are the remaining contractors.

6.3.1 Sample Design

For this analysis, participant contractors were defined as contractors who were certified under the program and had requested or submitted a program voucher by December 31, 1999. Non-participants were defined as all other licensed contractors

⁶ Wirtshafter Associates, Inc. et. al. *Report of the Residential Contractor Program Evaluation: Volume 2: California Residential Retrofit and Repair Baseline Contractor Survey Summary Report*, Pacific Gas & Electric, April 2000.

providing services to the existing single-family homes in California, and includes contractors who got training under the program but did not submit a voucher.

Because HVAC, window and insulation measures were the most active measures, these contractors were surveyed. For each type of contractor surveyed, roughly equal numbers of contractors were contacted from each utility area. Table 6.1 presents the targeted and completed sample sizes for the market effects evaluation of the PY99 SF RCP.

Table 6.1: Targeted and Completed Sample Sizes

Contractor	Type of Survey	Program Participation	Targeted Sample	Completed Sample
HVAC (including HVAC contractors offering diagnostics)	In-depth	Participants	5 to 10	9
	In-depth	Non-participants	5 to 10	8
	Short	Participants	15	15
	Short	Non-participants	65	66
Windows	Short	Participants	15	15
	Short	Non-participants	65	65
Insulation	Short	Participants	15	10
	Short	Non-participants	65	30
Total			255 to 260	218

As shown, all of the targets are reached with the exception of the short surveys done with non-participant insulation contractors. In this case, it was found that most of the insulation contractors listed by the licensing board were out of business. For this reason, the targets were unreachable.

6.3.2 Interview Guides and Survey Instruments

The in-depth and short surveys were designed to collect information on contractors' attitudes and practices regarding energy-efficient measures incentivized by the program, background characteristics on the contractors' businesses, and perceptions regarding customer demand and market potential. Questions designed to collect data to test market effect hypotheses asked about beliefs or business practices, if they had changed over the

past year, why they had changed, and if in their belief the change would continue in the absence of the program.

Market effect hypotheses for each type of contractor were tested by analyzing the self-reported impacts of respondents for evidence of changes induced by the RCP. Mean responses of participants and non-participants were compared for each hypothesis. Due to the variability of company sizes, responses are weighted by a variable representing the number of homes worked in during 1999.

6.3.3 Non-participants With Training

Upon reviewing the survey responses, it was found that twenty-four respondents were by definition non-participants but had attended some or all of the required training for the RCP and were planning to participate in the program in 2000. The data belonging to these respondents is classified in a separate group called “non-participants with training.”

6.4 Hypothesized Market Effects and Near-term Results

6.4.1 HVAC Contractors

The following are the hypothesized market effects for HVAC contractors and the resulting conclusions.

Hypothesis 1. *By training contractors and by providing experience in working with high efficiency equipment and duct measures, the RCP increased contractors’ awareness of the energy-efficiency benefits of these measures.* Sufficient evidence was found to support a program-related change in participant contractors’ awareness of the benefits of duct testing and sealing. In addition, evidence was found to show that participants are recommending more high efficiency measures as a result of the program. Due to the sustainable nature of awareness, and to evidence from survey responses showing recommendations for high efficiency measures will continue without the program, these effects are likely to be sustainable.

Hypothesis 2. *By training and certifying contractors and by providing incentives to customers (thus stimulating demand), the RCP increased the number of jobs for contractors.* Some evidence to support an increase in retrofit and diagnostic jobs that could be attributed to the RCP was found. Interestingly, most respondents think the increase for retrofit jobs was due to better marketing and customer awareness related to the program rather than actual incentivized jobs obtained through the program. For diagnostic jobs, however, they feel the increase was due to the incentive and therefore would not continue without the program. Due to small sample sizes (ten or less contractors answer within each measure type), the results for this hypothesis are weak.

Hypothesis 3. *By training and certifying contractors and by providing incentives to customers (thus stimulating demand), the RCP increased the level of energy efficiency achieved per job.* Sufficient evidence was found to support the hypothesis that the level of energy efficiency per job increased as a result of the RCP. Moreover, these changes directly relate to duct testing and sealing methods that were learned in the training sessions offered by the program.

Hypothesis 4. *By training and certifying contractors and by providing incentives to customers (thus stimulating demand), the RCP increased the number of contractors who provide HVAC diagnostics.* Sufficient evidence was found to support the hypothesis that the RCP increased the number of contractors who offer diagnostic services, particular for duct testing. A significant proportion of participant contractors surveyed started duct testing service as a result of the program and plan to continue it. Many of the contractors said they already offered air conditioning maintenance using diagnostics. There are not enough new practitioners of air conditioning diagnostics to produce significant result for the tracking issues.

Hypothesis 5. *By providing training for contractors on diagnostic/tune-up procedures, RCP improved these practices.* This hypothesis applies to contractors who already were offering the service before the program began, and thus excludes all but three of the duct

practitioners of duct testing. Some evidence was found to support the hypothesis that the RCP improved diagnostic procedures for these three participant contractors. Since most of the air conditioning practitioners were engaged in the services prior to PY99, there is a larger sample available and there is significant evidence that the air conditioning maintenance training did improve their practices.

Hypothesis 6. *By offering incentives for packages of measures, the RCP increased contractor awareness of whole-system treatments.* Some evidence was found to support a program-related change in contractors' awareness of whole-system treatments. While the percentage of participants who report increasing their offers is much less than non-participants, the majority of non-participants with training report increasing their offers of whole-system treatments over the past year. Furthermore, the survey responses indicate that most attribute this to the RCP and will continue even without the program.

Hypothesis 7. *By offering incentives for packages of measures, the RCP increased the number of customers who are aware of whole-system treatments, duct diagnostics and sealing, and diagnostic tune-up procedures.* Some evidence was found to support a program-induced change in customer awareness of whole-system treatments. Moreover, due to the sustainable nature of awareness, this change is expected to continue even in the absence of the program.

6.4.2 Window Contractors

The following are the hypothesized market effects for window contractors and the resulting conclusions. The number of window contractor respondents was small (13 participants and 28 non-participants) so none of the specific statistical tests produce significant results.

Hypothesis 1. *By training contractors and by providing experience in working with high performance windows, the RCP increased contractors' awareness of the energy-efficiency benefits of these products.* The strongest finding is that four out of the six responding

participants report that they are now recommending more high performance windows to their customers as a result of being involved with the program. In addition, all say they would continue the practice even in the absence of the program.

Hypothesis 2. *By training and certifying contractors and by providing incentives to customers (thus stimulating demand), the RCP increased the number of jobs for contractors.* Evidence was found to support an increase in the number of contractor jobs due to the RCP. The program effected this change in two ways: through program incentive vouchers and through increased customer awareness. To the extent jobs increase via the latter, this change is sustainable.

Hypothesis 3. *By providing training to contractors on installation methods, the RCP increased the level of energy efficiency achieved per job.* This hypothesis was not supported by the survey responses. While some contractors are changing their practices, most are doing it as a result of market stimuli other than the RCP training.

6.4.3 Insulation Contractors

The following are the hypothesized market effects for insulation contractors and the resulting conclusions.

Hypothesis 1. *By training contractors and by providing experience in working with insulation with higher R ratings, the RCP increased contractors' awareness of the energy-efficiency benefits of these products.* Evidence was not found to support a change in contractors' awareness of the benefits of more efficient insulation that could be attributed to the RCP. Only four of the 17 contractors who participated in training say they made changes in their recommendation practices for insulation levels over the past year.

Hypothesis 2. *By training and certifying contractors and by providing incentives to customers (thus stimulating demand), the RCP increased the number of jobs for*

contractors. Four of the ten responding participant window contractors saw an increase in the number of contractor jobs last year, and all four feel the increase was due to the RCP. However, as some of the increase was reportedly due to the use of program vouchers, this change may not outlive the program.

Hypothesis 3. *By training contractors in installation methods, the RCP improved these practices.* Only three of the 17 contractors reported that they made changes in their practices in the previous year, though all three attributed the changes to the RCP program.

6.5 Conclusion and Recommendations

Results of this analysis indicate that the 1999 RCP has had some effect on the market. In particular, changes in HVAC contractor awareness and practices were found. Specifically, some of the stronger findings are the following:

- Increases in the awareness among participant HVAC contractors of the benefits of duct testing and sealing,
- Increases in the level of energy efficiency per job for participant HVAC contractors,
- Increases in the number of HVAC contractors who offer diagnostics,
- Increases in the number of jobs for participant window contractors, and
- Increases in the number of jobs for participant insulation contractors.

Moreover, all but the latter two are expected to persist after the program, according to the responses of surveyed contractors. To the extent the latter two are due to program vouchers, however, they may not be sustainable.

As the majority of incentivized measures and training offered through the program is targeted at HVAC contractors, it is not surprising that these market players are found to have experienced the greatest amount of change from the program. In particular, program benefits in the area of duct sealing and duct testing are evident. For this reason, future market effect evaluations for the RCP should concentrate on these areas

Interestingly, the non-participant contractors who have received the training and League or EGIA approval, but have yet to submit a voucher, form a new category of player in the market. Specifically, these are the contractors who had joined the program, received

training and certification, but have not yet actually participated by obtaining a voucher for incentivized work. These individuals gain the knowledge from the training and start using it in their marketing and practices. Therefore, in many ways they respond and behave as full participants. The comparison of survey responses from both of these groups with true non-participants is an interesting exercise. Tracking these trained non-participants gives an idea of the relative importance of the training and the incentive components of the program.

The multi-family element of the 1999 RCP attracted minimal participation from contractors and therefore was not included in this analysis

7 Market Assessment

7.1 Introduction

During the past 2 years, considerable research has been undertaken to help define the residential contracting market for energy-efficient products and services. The overall objective of this research has been to understand and quantify the dimensions of this market, from a variety of perspectives, such that intelligent and successful market transformation strategies can be implemented using California Public Goods Charge (PGC) funds that are being collected from ratepayers throughout the State.

The discussion in this chapter endeavors to tie this research together, highlighting key findings from the major market perspectives relevant to the residential contracting market. The specific research upon which this assessment draws include the following:

- ***The Residential Contractor Baseline Survey.*** A statewide survey of California contractors undertaken as part of the PY98 (Phase I) evaluation.⁷
- ***Contractor Segmentation Study.*** Cluster analysis using data from The Residential Contractor Baseline Study. Detailed results are found in Volume 2: Appendix B.
- ***Single-family Household Baseline Survey.*** A survey of 400 households conducted by Opinion Dynamics Corporation in the fall of 1999. Detailed results are provided in Volume 3: Appendix D.
- ***Multi-Family Baseline Survey.*** A survey of 626 property owners and managers conducted by Opinion Dynamic Corporation in February of 2000. Detailed results are provided in Volume 4: Appendix E.
- ***Single-family Participant Survey.*** A survey of 402 households who participated in the PY99 RCP program conducted by Opinion Dynamics Corporation in the winter of 2000. Detailed results are provided in Volume 5: Appendix F.

⁷ Wirtshafter Associates, Inc. et. al. *Report of the Residential Contractor Program Evaluation: Volume 2: California Residential Retrofit and Repair Baseline Contractor Survey Summary Report*, Pacific Gas & Electric, April 2000.

The information presented in this chapter provides insights from the following perspectives:

- Contractors that provide residential retrofit contracting services to the marketplace;
- SF Homeowners who purchase residential retrofit contracting services in the marketplace; and
- MF Owners and Managers who purchase residential retrofit contracting services in the marketplace.

7.2 Residential Contractors

The background for much of our characterization of the market for energy-efficient measures by contractors in existing homes comes from work performed in 1998-1999 including the Baseline Survey of Residential Contractors and qualitative research with both contractors and consumers. This section summarizes key findings from that research, presented in the context of the residential contractors providing services to homeowners, including the following:

- Potential for comprehensive energy retrofit services;
- Barriers that prevent contractors from selling energy-efficiency services; and
- Segments of the contracting industry that appear to be more interested in selling energy efficiency.

7.2.1 Is there Potential for Comprehensive Energy Retrofit Services?

A key area of interest in the market characterization effort was to assess the prevalence of comprehensive retrofit ("whole house") services in the existing contracting market. "Whole house" services are defined as services that a contractor or set of contractors would provide to address the combined issues of air conditioning and heating system performance, infiltration reduction, comfort problems, and other inter-related issues that can affect the performance of a residential building. Such an approach has been suggested by some as a viable business model, and one that would be desirable from an energy-efficiency perspective since it would address multiple end uses and a majority of the energy savings potential in a home at the same time.

Earlier analysis of the state licensing board records indicates that there is substantial fragmentation among those trades relevant to energy-efficiency retrofits that would impede the ability of the existing traditional contracting network in providing this type of "whole house" service. For example, virtually no overlap exists between glazing and the other efficiency-related specialties, with the exception of the general contractors. To a lesser degree, this relative independence from other trades affecting household efficiency is the norm for the other specialties as well.

The most common pattern of dual licensing is the practice of holding (1) a general contracting license, and (2) one or more specialty licenses. Interviews with contractors indicated that the most common practice used for offering homeowners a comprehensive set of retrofit services involves the use of subcontracting arrangements rather than developing in-house expertise. By assembling a team of specialized subcontractors, a lead contractor can readily assemble the manpower with the required capabilities for most jobs.

The data from the Baseline Contractor Survey conducted in Phase I reinforce other information developed in this current evaluation suggesting that, when it comes to efficiency-related services, contracting businesses tend to operate within a narrow focus and seldom have the staff, or the capabilities, to provide a comprehensive set of efficiency-improving upgrades as part of a bundled service offering. Anecdotal information reported during the process evaluation interviews of this project indicates that the reasons for the lack of whole-house provision include significant structural constraints. These constraints pertain primarily to staffing issues (although it can be projected that there would be attendant licensing issues as well).

To be able to offer whole-house services, a firm would need to retain a work force with training and licenses in a range of trades. (It seems to be the exception that individual employees would pursue licensing in a multiplicity of trades.) Each trade, apparently, holds a different position in an informal pecking order, with some specialties being regarded as more skilled - and therefore more prestigious - trades than others. This differentiation is, itself, an impediment to developing more generalized, whole-house crews. One outcome of this differentiation is differing pay scales across trades, making it uneconomical to utilize a skilled tradesman to perform a more generalized set of jobs at the site. Further, there is

unwillingness among many of the skilled tradesmen to perform these other, less skilled tasks.

From the business owner's perspective then, there are no economies in staffing readily available when creating a staff capable of delivering more comprehensive retrofit services. This staffing barrier creates a situation in which a business owner either assumes the risk for keeping contractors fully occupied/billable or avoids this risk by relying on subcontracting arrangements. It becomes apparent then that the contractors segment themselves along well-defined trade specialties, each trade addressing its own distinct niche in the residential contracting market.

In addition to the structural barriers, there is skepticism among a number of contractors that there is sufficient market demand or profit potential to warrant entry into the house-doctoring business. Qualitative interviews identified some key contributing factors in this area. Some contractors we interviewed simply were unclear how they would integrate the services into their existing business operations and would have benefited from some business planning assistance. Others had attended presentations promoting house doctoring, had considered the evidence, and judged that there was not sufficient market demand or potential for increased revenue. Still others who had explored the house doctor services concept found that it offered lower profitability per man-hour at the site compared with their other services. It was clear to these business owners that their profits were better maximized by continuing with their current practices rather than broadening their operations to incorporate house doctoring. Overall, then, the qualitative interviews suggest there is little contractor momentum to expand the whole-house services market. Confirming this, the Residential Contractor Baseline Survey finds that fewer than two percent of contractors in these trades provide whole-house or house doctoring inspections.

7.2.2 What Factors Prevent Contractors from Selling Energy Efficiency?

One of the most dramatic findings of this Contractor Baseline study is the weak demand, as seen from the contractors' perspective, for high efficiency options in the residential retrofit market. Low consumer demand appears to be a prevalent condition facing contractors who are in a position to promote energy efficiency to homeowners. The

baseline consumer survey supports these findings. While most consumers report an interest in improving energy efficiency, less than a third regard it as a major consideration in purchasing new household equipment. There is also a reported low awareness of most of the energy –efficiency measures offered in the RCP, particularly the HVAC and duct related measures.

As the contractor baseline indicates, seven out of ten HVAC contractors report that fewer than ten percent of their customers request SEER of 12 or better. Similarly, one-half of the contractors providing duct services indicate that consumer demand for these services is almost non-existent; nearly one out of five indicate that they have seen no consumer demand at all. Likewise, lighting contractors report very limited consumer demand for higher efficiency lighting alternatives. For many contractors then, the key issue impeding greater sales of energy-efficient measures is a pervasive lack of market demand for these products and services.

Certain portions of the market diverge from this overall pattern. In marked contrast to the above, it is reported that approximately half of retrofit window consumers express an interest in energy-efficient products. This information may suggest that these product categories are in different phases of diffusion in the residential marketplace. An alternative explanation is that many consumers and a surprisingly number of contractors define energy-efficiency windows as any double-paned window regardless of its other features, and therefore there is really not a heightened demand for truly efficient windows. The validity of this alternative is supported by the finding that only one-third of the window contractors indicate an awareness of Energy Star windows and low-e efficiency features are not widespread in the market.

Residential contractors from all trades feel that the most important factors preventing contractors from providing more energy-efficient equipment and services are the ‘lack of consumer demand’ and ‘the higher cost or unfavorable economics’ of the high efficiency options. ‘Equipment availability’ and ‘equipment reliability and performance’ are not significant market barriers in any of the trades. Table 7.1 summarizes the results for this question by each contractor specialty addressed in this survey.

Table 7.1: Factors Preventing Contractors from Installing More Energy-efficient Equipment and Services (Percentage of Contractors Mentioning Factor)

Barrier	HVAC	Ducts	Windows	Insulation	Weatherization	Lighting
Lack of consumer demand	14%	42%	12%	35%	35%	47%
Cost of the system or unfavorable economics	45%	14%	32%	26%	13%	21%
Equipment availability	5%	1%	4%	0%	13%	7%
Equipment reliability and performance problems	3%	1%	1%	0%	6%	4%
My firm is not in a position to provide these services	3%	19%	5%	26%	30%	1%
Something else	1%	3%	1%	4%	0%	2%
There are no factors	0%	0%	45%	8%	6%	20%

It is interesting that cost factors are the largest perceived barrier for HVAC and windows, and lack of consumer demand is the primary barrier for all other service types. It is also noteworthy that a large proportion of window contractors feels there are no significant barriers impeding sales of energy-efficient windows.⁸

Contractors generally attribute low consumer demand to the high cost to purchase and install higher efficiency equipment. While many of these respondents see the first-cost barrier as being important in and of itself, some also feel that the cost is high relative to annual savings. However, knowledge of payback is limited; most contractors either do not know the paybacks for major items, or see the paybacks as being greater than 5 years for major energy-efficiency measures.

⁸ This finding may again reflect the misconception among many window contractors as to what constitutes an energy-efficient window model.

7.2.3 What Types of Contractors Sell Energy Efficiency?

As part of the current study, an innovative segmentation analysis was undertaken to explore the linkage between contractors' perceptions of their industry and their willingness to market new products or to change their installation practices. Earlier focus groups had suggested that certain segments are more innovative and entrepreneurial while others are more entrenched and unchanging, some more inclined to position their businesses as offering higher quality services and some more focused on offering the lowest competitive price. It was hypothesized that such differences in business strategy would affect contractor willingness to embrace new higher efficiency products and practices as well as the value ascribed to training courses such as those offered through RCP.

To investigate the importance of these differences in perceptions of the status of their industry and business strategy choices, a series of questions was included in the Contractor Baseline Survey addressing:

- contractors' views on the degree of change occurring in their respective industries and the implications for business changes
- the perceived importance of price vs. other considerations to their customers
- the degree to which contractors strive to differentiate their firms from those of their competitors
- willingness to use new products, and
- perceived value of training employees.

Data on these topics were analyzed using cluster analysis to define independent segments in the contractor population. The analysis found the following three discrete segments in the contractor market.

- **Segment 1 Contractors.** These contractors report that the market is changing and they are trying to change with it. This group was more likely than the other segments to indicate that they have made changes to their business in the past or are planning changes in the way they run their businesses. These contractors try to differentiate their firm from their competitors and are most likely to indicate they advertise to attract new business. These contractors see value in sending their employees to training.

- **Segment 2 Contractors.** These contractors are more static in their approach to their businesses. They see less change in the market and less need to change their business practices. This segment places less value on training for their employees or on differentiating themselves from their competition.

- **Segment 3 Contractors.** These contractors are similar to those in Segment 1 in many respects, seeing change in the market and a need to change with it, trying to differentiate themselves from their competitors, and placing value on employee training. A noteworthy difference is that they are much more likely to report that they have run their business in the same way for some time and they are not planning any major changes in their business practices. One explanation for this apparent inconsistency may be that these contractors' practices have been responsive to market flux for a number of years; therefore, they do not see themselves in a change mode. Interestingly, they are most likely of any of the segments to believe that 'equipment and installation approaches change frequently' in their industry, yet are least likely to favor new products.

To develop a fuller understanding of these contractor segments, the survey data were further analyzed to profile each segment in terms of business type, business size, and similar characteristics. Table 7.2 shows that these segments differ somewhat in terms of their business characteristics. Segment 1 firms, on average, have more employees and perform less work as a subcontractor. These larger, more independent contractors may take a somewhat more aggressive approach to business development as compared to other contractors. Segment 1 businesses are willing to travel the furthest for a job. Segment 2 firms are the least willing to travel to remote jobs. Segment 3 generally does not stand out as highest or lowest on any of the parameters we examined. The segments are not significantly different from one another in terms of the proportion of work they do in existing homes or in the multi-family market, or the number of years they have been in business.

Table 7.2: Mean Business Characteristics by Segment

Contractor	Segment 1	Segment 2	Segment 3
Works in existing homes	74%	67%	69%
Works in existing multi-family buildings	73%	75%	71%
Number of employees	11	5	7
Years in business	20	20	21
Miles away from office that contractor will accept work	94	74	82
Percentage of business in 1998 worked as subcontractor	24%	31%	31%
Familiarity with RCP (1 to 4 scale)	1.7	1.7	2.0

The contractor trades were examined with regard to their distribution into each of the segments. Table 7.3 provides a comparison of segment membership for each trade.

Table 7.3: Percentage of Segment Type for each Type of Contractor

Contractor	Segment 1	Segment 2	Segment 3
HVAC	36 %	39 %	25 %
Glazing	31 %	27 %	42 %
Insulation	21 %	32 %	47 %
Electrical	34 %	24 %	42 %
General	32 %	35 %	33 %

Importantly, the three segments are found to differ in their usage of higher efficiency products on their retrofit jobs. As Table 7.4 illustrates, the more traditional segment is the least likely to utilize high efficiency products or practices. This is most significant with respect to air conditioning system efficiencies, use of diagnostic for assessing duct function, and installation of wall insulation.⁹

⁹ Despite the appearance of differences in the frequency of use of Energy Star windows, the segments' answers were only marginally different on a statistical basis.

The differences in retrofit practices identified for these segments underscore the fact that the contractor market is varied with respect to readiness to use and promote higher efficiency product or service alternatives, and that these differences are linked to the individual firm's business strategy.

Table 7.4: Use of Energy-efficient Equipment

Indicator	Segment 1	Segment 2	Segment 3
Percentage of gas furnaces installed by HVAC contractors that are > 80% AFUE	20.8%	14.1%	21.3%
Percentage of air conditioners installed by HVAC contractors that are >10 SEER	40.9%	17.7%	30.9%
HVAC contractors who own diagnostic equipment	48.5%	14.3%	43.5%
Percentage of windows sold by window contractors that are ENERGY STAR [®]	58.8%	82.5%	60.6%
Average R-value of attic insulation installed	23	22	19
Percentage of homes worked in by insulation contractors that included installing wall insulation	36%	8%	25%

7.2.4 Demand for Efficiency Services from Contractors in the MF Market

Data from the Contractor Baseline Survey suggest that there is markedly less demand for energy-efficient equipment in the multi-family market as compared to the single-family market. Responding contractors were asked to characterize what proportion of their annual activity consisted of jobs in the single-family market and what proportion was work in the multi-family market. By disaggregating the respondents on the basis of this parameter, we are able to compare practices used in the two markets. This analysis indicates that there is less demand for higher efficiency furnaces and air conditioning equipment in the multi-family sector, as shown in Table 7.5.

Table 7.5 Customer Demand for High Efficiency Equipment in SF and MF Markets

Type of Residential Work Done by Firm	Customers Requesting +90 AFUE Furnaces	Customers Requesting +12 SEER Air Conditioning
Less than ten percent of work is in multi-family	48%	67%
10 to 49% of jobs are in multifamily	27%	24%
50 to 74% of jobs are in multifamily	23%	0%
75 to 100% of jobs are in multifamily	5%	0%

In most cases, the contractor baseline data suggest that the efficiency practices of contractors active in the MF market also tend toward lower efficiency products than those used by contractors with more business in the SF market. This holds true for efficiency ratings on furnaces, and to a lesser degree air conditioning systems, for the use of double paned vs. single paned windows, for vinyl-framed windows, and for use of compact and T8 fluorescent lamps. The two contractor populations most active in the multi-family market are also less likely to use pressure and temperature to evaluate refrigerant charge levels in air conditioning systems. The only case where the use of high efficiency products is greater among MF-active contractors is in the area of outdoor security lighting. We would suggest that the numbers in this category probably simply reflect the fact that MF sites have more outdoor lighting applications than do SF residences.

7.3 Single-family Homeowners

The preceding section discusses data developed from baseline research on the contractors in the California market. In order to develop baseline data for consumers as well as contractors, a telephone survey with 400 SF homeowners was conducted in late 1999. This section provides a summary of the key overall findings resulting from this RCP Single-family Household Baseline Survey found in Volume 3: Appendix D.

7.3.1 Homeowner Attitudes toward Energy Efficiency

An interesting finding, in light of the information provided from the contractors, is that homeowners in this baseline survey reported that energy efficiency is important to them. Participants in this research study rate their knowledge of ways to save energy in their homes and their overall efforts to save energy in their homes significantly higher than did respondents in the earlier CBEE Baseline Study on Public Awareness and Attitudes Toward Energy Efficiency.¹⁰ Respondents to this more recent study also indicate that energy costs are important in relation to overall household expenses and over fifty percent indicate that they are interested in making home improvements that will increase energy efficiency, comfort, or health or safety. Furthermore, nearly one-half indicate that a whole-house approach to energy efficiency sounds ‘cost effective.’¹¹

Despite this stated interest in energy efficiency, the majority of single-family homeowners do not feel that they ‘probably need’ any given energy-efficiency improvement evaluated in this study. For example, fewer than one-quarter of the respondents feel that specific HVAC and duct measures targeted by RCP are ‘probably needed’ in their own homes. This includes duct testing, air conditioning system tune-ups, installing a more efficient furnace, and diagnostics and service to their heating and cooling systems. This low level of interest reflects respondent beliefs about the applicability of the service to their own home, not their opinion about the value of the service in general. These survey responses may indicate that, in many cases, homeowners are not aware of any particular efficiency needs in their homes - at the same time that they feel that they are quite knowledgeable about energy efficiency. Thus low awareness is responsible for low product demand. If this is the case, improved information may alter consumer perceptions about their home efficiency and increase their probability of adopting more efficiency improvements.

The measures which homeowners are most likely to believe are needed in their own homes are energy-efficient windows (42%) and attic and wall insulation (30% and 26%,

¹⁰ CBEE Baseline Study on Public Awareness and Attitudes Toward Energy Efficiency, prepared for California Board for Energy Efficiency by Hagler Bailly (June 18, 1999)

¹¹ The following five measures were described as part of a whole house approach to energy-efficiency: testing and sealing ducts; sizing heating and cooling units properly; installing a programmable thermostat; putting in energy-efficient windows; and insulating ceilings and walls.

respectively). These measures, then, appear to have achieved a different level of consumer appreciation in the retrofit market as compared to other options evaluated in this research. The needs for transforming these markets may hinge less on informational support than is the case for HVAC, duct, and lighting measures.

7.3.2 Penetration of Efficiency Measures in Existing Homes.

According to the respondents in this consumer baseline survey, several energy-efficiency measures have already been installed in at least one-fifth of the existing single-family homes in California. The most widespread of these is the low flow showerhead. Table 7.6 summarizes the data on prior adoption of efficiency measures.

Table 7.6: Market Penetration of Selected Efficiency Measures

Efficiency Measure	Penetration in SF Homes (self-reported data)
Low flow showerhead	38%
Energy-efficient water heater	22%
Pipe insulation	22%
Fluorescent fixtures	22%
Compact fluorescent bulbs	21%
Energy-efficient windows	20%

Homeowners were also asked about their reasons for installing new equipment. The most frequently mentioned reason for adding insulation and HVAC equipment is to improve occupant comfort while windows are typically added to increase the amount of natural light brought into a home or because of a home addition. Energy efficiency generally is not reported to be the primary motivator for adding new equipment of this type, yet respondents indicate it is the most common concern once the decision to add new equipment is made. This finding is somewhat at odds with the contractor feedback suggesting that budgetary concerns are paramount. The two reports suggest that energy efficiency is a meaningful, though unlikely primary, consideration in many consumer decisions.

7.3.3 Energy Services Marketing to Homeowners.

The survey data suggest that there is limited marketing of the whole-house concept occurring at the present time. When efficiency investments are promoted, it is usually in a less comprehensive approach. For example, homeowners replacing or adding HVAC equipment report that contractors most frequently mention the need to properly size equipment (58% of the time) and also frequently recommend installing a programmable or set-back thermostat (51% of the time). Duct testing is recommended about one-third of the time. These consumers report that contractor marketing of other, more comprehensive services (such as replacing windows or adding insulation to permit downsizing of HVAC equipment) is relatively uncommon.

7.3.4 Homeowner Awareness of Residential Contractor Program

At the time of this survey, very few residential homeowners were aware of the RCP. Awareness levels ranged from five to fifteen percent across the service areas of the administering utilities. Furthermore, many customers claiming to be aware of the program were unable to give any specific information about it. Homeowners were also largely unaware of the roles played by the Electric and Gas Industries Association (EGIA) or the League of California Homeowners in the RCP.

Higher awareness levels would have been a surprising finding at the time of this research as the level of marketing in 1999 had been deliberately limited while contractor training and approvals were addressed. It seems clear that increased marketing, along with increased consumer awareness, would be likely to increase the level of consumer demand for the products and services targeted by the Residential Contractor Program in light of the findings summarized above.

7.4 Multi-family Property Owners and Managers

A telephone survey was undertaken in the first quarter of 2000 to develop market baseline data from the multi-family market, addressing property owners and managers. This research investigates awareness of efficiency options, importance ascribed to making efficiency upgrades, sources of information used when planning retrofit or renovation projects, factors influencing property owners decisionmaking, and reactions to efficiency

programs. A total 626 surveys were completed. The detailed results are presented in Volume 4: Appendix E.

7.4.1 Attitudes toward Energy Efficiency

A majority of property owners/ managers (62%) rate energy costs as very important in relation to the total costs of owning and operating their facilities. Though energy costs are not seen to be more important than other services such as water, sewers, or trash removal. For example, in the San Francisco Bay area where trash removal costs are high, energy is seen as a far less important. In addition, 46% report an interest in efficiency improvements to common areas and 39% are interested in making improvements to individual dwelling units. However, efficiency improvements generally are not the top priority among the array of upgrades they might make to their properties. Facility improvements generally given higher priority than efficiency include improvements to the appearance of the building's exterior, improvements to the appearance of the interior of the apartment units, and security and safety upgrades. Interest in making improvements to their facilities also will rise and fall with the vacancy rates anticipated for their properties.

Property owners and managers cite unacceptably high costs as the primary barrier to investing in efficiency upgrades to their properties. This reason is cited ten times as often as any other specific barrier.

It is also noteworthy that twenty-five percent of property managers have 'no particular reason' for failing to make efficiency improvements. This response suggests a fairly low level of motivation toward efficiency upgrades among at least one-quarter of the multi-family market. This may be linked to a feeling that energy efficiency is not particularly important to tenants. Less than half of multi-family facility owners or managers feel that prospective tenants place importance on utility bills when shopping for an apartment.

7.4.2 Awareness of Efficiency Opportunities

Lighting changeouts are the most widely recognized area of opportunity for improving the efficiency of common areas in multi-family facilities. For the individual units,

lighting retrofits, caulking/weatherstripping, and high efficiency refrigerators are the most widely recognized opportunities. Other possibilities were mentioned by fewer than one out of five respondents, overall.

To determine where the multifamily segment obtains information on high efficiency options, respondents were asked to identify where they would seek out information on products and equipment. Importantly, MF property owners and managers indicate that contractors are the single most important source of information on appropriate products and equipment to use in renovation or retrofit projects. Local contractors were mentioned far more often than ESCOs, manufacturers, or architects in this regard - by a seven-to-one margin in each case. After local contractors, utilities are the next most likely source of information for this market.

Trade associations are also reported to provide information on how to improve facility energy efficiency as well as locating qualified contractors. Approximately half of the property owners and managers belong to a trade association, giving these associations considerable reach in this market.

7.4.3 Reactions to Programs

Awareness of utility programs is fairly low. While roughly one-quarter claim to have some knowledge of RCP or of another program, fully forty percent of these respondents could not name any specific information of any kind about any utility programs. Among those giving specifics, none mentioned shared savings or performance contracting; rebates and audit programs are the known program types.

More than half of this market (57%) expresses an interest in incentives for energy efficiency and nearly half (46%) is interested in a program involving guaranteed savings. An offer of an RCP type package of services modestly increases respondents stated likelihood of making efficiency improvements over a two-year horizon.

7.5 Conclusion

As noted at the outset of this discussion, residential contractors play an important role in installing and maintaining building shell components, furnaces, air conditioners, water heaters, and lighting. Encouraging these contractors to promote and utilize more

energy-efficient products and practices is a logical approach for market transformation efforts focused on the residential retrofit market. The design of the Residential Contractor Program, focusing on contractors to transform the market for energy efficiency in existing housing, reflects this concept.

It is apparent from this research that a number of barriers are affecting the adoption of, and even the promotion of, energy-efficiency options in the retrofit marketplace. A majority of contractors perceive that there is low consumer awareness of and demand for energy-efficiency services and products, and that "unfavorable economics" constitute a major barrier in this regard. This status is reflected in the lower efficiency of equipment and measures being installed in much of the retrofit market. Demand for high-efficiency options seems to be weakest in the duct services, lighting, water heating and HVAC markets.

Our surveys confirmed that most consumers do not perceive a need for HVAC efficiency services -- tune-ups or duct testing -- indicating that market transformation efforts may require that a substantial emphasis be placed upon educating consumers in this area. On the other hand, consumers indicate greater expectations that their homes would benefit from other energy-efficiency products, especially windows and insulation.

In addition to establishing that market acceptance of products and services varies, this research has also documented that the large majority of contractors serving the residential market are narrowly specialized. This situation is so pervasive that it seems unlikely that more comprehensive, whole-house service delivery will exert any sizable influence in the marketplace any time soon. Consequently, changes in efficiency-related practices are likely to occur trade-by-trade, with market transformation advancing at different rates, and confronting different barriers in each sub-market. Program interventions, then, will need to be customized to each of the trades to address effectively their unique needs and characteristics. In the near term, there actually may be more convergence in program tactics to address common market barriers identified in this baseline work - namely, public information and other consumer-directed stimuli to ratchet up consumer demand for high-efficiency products and services and to increase awareness of RCP. Over time, the unique market-diffusion characteristics of each specialty market will

likely necessitate that the program designs evolve into increasingly distinct market transformation initiatives.

Analysis of the multi-family building owners and managers surveys and the baseline responses of the contractors serving the multi-family sector, portray a bleaker outlook for the multi-family sector. Most multi-family decisionmakers do not currently give much consideration to energy-efficiency issues. If they do consider energy efficiency, it is a secondary decision made subsequent to a decision to replace equipment due to breakdown or the need to improve the unit's rental appeal. When work is sought, the managers are most likely to choose a local contractor to perform this work. Given these findings, even the less complicated application process for the PY2000 program may generate limited interest in the multi-family market.

8 Summary and Recommendations

In this section, we provide a summary of significant findings resulting from the program evaluation and market assessment activities undertaken in this project, as well as important recommendations to be considered as these programs progress into the future. At this point, our discussion is split into two sections -- Multifamily (MF) and Single family (SF). This reflects the fact that, although these programs are both included under the RCP, they are in actuality entirely different initiatives that bear little resemblance to each other. We first begin with the MF and then discuss the SF program.

8.1 Multifamily RCP

The Multifamily element was, as discussed earlier, modeled in part after the Small-Business Standard Performance Contract (SPC) program. At the time, it was perceived that this arrangement would permit Energy Services Companies (ESCOs) to develop sustainable businesses working with MF owners and managers. Reflecting the emphasis on market transformation as opposed to resource procurement, the resulting program is based upon a performance contracting model, including measurement and verification and deferred payment streams for incentives.

From a process perspective, the MF element has been slow to gain momentum. As of the end of PY99, a total of 11 applications were submitted for incentives totaling approximately \$1.2 million. As of the time this report was prepared, two of these projects were reported as installed. Reflecting feedback received from ESCOs that were and were not participating in the program, the program managers have revamped the program and addressed many of the predominant concerns. In turn, the program managers are confident that these changes will attract considerable interest among the ESCO community and, ultimately, lead to a successful program.

Given the limited program activity to date, this evaluation has not devoted substantial resources to evaluating the MF process. Indeed, it is perhaps too early to

determine whether this program design will succeed. Moreover, the program has undergone significant changes for PY2000, and these alterations may have a significantly beneficial impact upon program participation. However, this project has included considerable market assessment work pertaining to the MF market for energy efficiency and, unfortunately, the conclusions from this research indicate that it is likely to be quite difficult for the program design in place to promote lasting and fundamental changes in the provision and procurement of energy services in the MF sector.

Perhaps most importantly, this research underscores the fact that energy-saving investments are simply not a priority for MF owners and managers. The first priority for these owners and managers is generating the maximum profits possible from their property investments. In addition, there are far too many competing investment priorities within this market, most linked to maintaining profitability. Finally, equipment decisions are usually made on an as-needed basis.

Additionally, our survey with MF decision-makers indicates that these decision-makers rarely seek out ESCOs as sources of information and/or services. Rather, when they do seek out such services, they are far more likely to call a local or familiar contractor to provide them with the specific services needed. This supports the findings of our contractor baseline research in which we found that a large portion of the traditional contracting industry works with both SF and MF customers.

The current program will need to be watched very carefully as it progresses to assess whether or not there are any indications of effects in the marketplace. We believe it is important to wait to see whether program changes for PY2000 spark greater interest in the program and generate identifiable market effects, before any radical changes are proposed. This scrutiny should not only monitor participation numbers, but the extent to which projects encourage real savings beyond projects that would have been completed even had their been no program.

Program managers currently have the discretion to let contractors apply for SF vouchers for small apartment buildings. They may want to consider exercising this option more frequently, and perhaps publicizing the availability of this approach. This approach could be implemented on a pilot basis and would make it easier for those contractors who

sometimes (but not exclusively) work in the MF sector to expand services from SF to MF. If this approach were implemented, it should be viewed as a complement to, and not an alternative to, the new MF program for PY2000.

8.2 Single-family RCP

The single family RCP targets contractors serving the existing housing market, one of the most highly fragmented "markets" in the US. The program has made significant accomplishments during the past year and, indeed, is one of the more innovative programs undertaken in the residential market for energy-efficiency services. A highlight of this program is the emphasis placed upon technical training provided to contractors and level of technical competence required for contracting firms participating in the program.

Below, we highlight significant accomplishments in the PY99 program, followed by a series of program recommendations for consideration as the program moves forward in 2000 and beyond. Importantly, the RCP managers have already recognized the need for program changes, some of which are included in the planned PY2000 program improvements.

8.2.1 PY99 Accomplishments

The RCP program has accomplished much in its first year, especially considering that the focus on market transformation with contractors represents a new type of approach for the utilities. In this first year, the program has maintained statewide planning and implementation for the program with a consistent set of incentives statewide. Each utility has also established effective training, distributed much of the allocated funds for the single-family program, and revamped the multi-family program.

Over the past year the program has provided for \$790,000 in incentives for 5,582 measures in 4,479 single-family homes across the state. The program has trained more than 500 firms and qualified 268 of these firms for participation in the program. Of these, 120 firms have performed at least one job.

Unquestionably, the RCP program has successfully begun introducing duct and HVAC diagnostics into the marketplace. The program has trained three hundred technicians in these service areas. The training received by HVAC technicians in the proper

HVAC diagnostics is quite valuable and addresses a key barrier to achieving greater levels of energy efficiency in this market -- improving the quality and precision of its HVAC maintenance tests.

The most significant accomplishment of the RCP is probably the degree to which it has promoted the duct testing and duct sealing market. Without proper duct systems, consumers who invest in energy-efficient air conditioners and furnaces will continue to be disappointed by less-than-promised energy savings because their new, expensive, efficient “boxes” have been connected to old, leaky ductwork. Increased awareness among consumers is likely to bring greater interest in these services from contractors who now see little consumer demand for these measures. The program has raised awareness among many contractors of the potential energy savings and comfort gains that may result from duct repair. A growing number of firms now have the equipment and the experience to provide proper diagnostics and repair, and begin making a noticeable impact in the market.

8.2.2 Overview of Recommendations

As noted earlier, this evaluation research, and the broader market assessment research, has been undertaken within the context of market transformation. In the absence of any explicit policy directives to the contrary, our recommendations assume that this remains the overall policy goal. We have, however, felt that it would be beneficial to distinguish, in our recommendations, between those recommendations that are more process-oriented in nature (and are therefore relevant regardless of the overall policy context at this time) and those that are more closely related to broad market transformation objectives. This latter set of recommendations should therefore be taken into consideration within the ultimate policy context that evolves in the California regulatory environment.

8.2.3 Process-related Recommendations

The following four recommendations relate to directly to program operations and should be considered by the program managers as they move forward with the PY2000 program implementation.

Recommendation No. 1: Work with contractors to mitigate payment issues.

One of the problems that was cited early in this study by many of the participants is the difficulty these contractors have in getting paid by the program. Importantly, the administrative process should be as transparent as possible to program participants. Most contractors work on a cash basis with their customers and are unprepared for the reporting requirements and the payment lag required by the program.

There is no doubt that the program managers have given this issue a great deal of attention since we first raised the concern in our interim process evaluation, and some substantial improvement has resulted. The payment turn-around time on vouchers is reported to be significantly shorter at all of the utilities than was earlier noted. Although the average time fluctuates depending upon volume received, PG&E, for example, reports that average turn-around time for all vouchers received between March 1, 2000 and July 1, 2000 has averaged 27 days.

The following is a partial list of initiatives that the utilities have taken to improve the voucher turn-around time:

- PG&E has instituted a 5-day "automatic waiver" if the jobs are not selected for inspection within 5 days. The inspection target for RCP is a minimum of 20% on all jobs and 100% on attic insulation.
- Information to contractors has been expanded to include letters specifying and summarizing voucher and documentation submittal requirements,
- All of the utilities are contacting contractors by phone or fax to correct any errors on vouchers instead of returning the entire package to contractor. Generally, only those vouchers that require contractor modification (e.g. missing signatures) are sent back to contractors.
- Additional training is being provided to contractors -- including personal assistance in paperwork completion as necessary.
- PG&E began a series of implementation workshops throughout its service territory to familiarize contractors with changes to the PY2000 program, as well as to answer questions contractors have about the RCP(including paperwork).
- Utilities have developed detailed instructions for all required forms.

- Utilities have refined internal processes for reviewing applications and expediting approval.
- Field training added for contractors failing inspection of measures to avoid payment reductions.
- SDG&E has introduced the use of the "Check Me" Program to assist with AC/HP Diagnostic/Tune-up inspections and reduce turn-around time on these applications.

Recommendation No. 2: Increase on-site training support.

The field training support offered by Proctor Engineering for SDG&E was given very strong marks by both experienced and novice contractors. These contractors felt that the hands-on experience was the most important component of the training. Ride-alongs with contractors in the other utility areas revealed a need for a field-training follow-up, especially for the duct-testing component. Contractors were not entirely comfortable using the duct blaster when the conditions were somewhat different from the training example, and some needed more assistance learning proper sealing techniques. We recommend that more use of hands on and follow-up training be incorporated into the program.

Recommendation No. 3: Develop and/or support existing energy-efficiency training institutions

The training offered to the contractors has been a tangible and highly significant benefit of the program. Indeed, such training is an important core element of this program. Importantly, however, contractors working in these fields turn over so frequently that both entry-level and progressively more challenging courses will need to be taught on an on-going basis. Sustaining such education and training typically require very large investments, and the utilities may wish to explore opportunities for building partnerships with existing training and certification institutions in order to increase the supply of contractor training opportunities.

Recommendation No. 4: Focus on more program support to promoting efficiency within specific trades.

For reasons outlined above, the whole house concept is unlikely to be a major factor in overall program services. Contractors tend to operate within a few related trade areas, and do not currently see any demand that they do otherwise. Therefore, it is important that

RCP begin strengthening the training and outreach to the individual trades. This means greater cooperation with existing organizations within the trades and specific training programs for those licensed contractors. If resources are available, an area to consider for expansion would be program development for electricians.

8.2.4 Market Transformation-related Recommendations

The following recommendations are particularly relevant in a market transformation context and should be considered if the policy environment continues to emphasize this objective.

Recommendation No. 5: Continue increasing contractor involvement

If the SF element is to provide market transformation benefits, there is a serious need to increase the number of contractors participating in this program. Two concerns arise in this regard. First, the bulk of the program dollars and jobs are at this point concentrated among a small number of the qualified contractors. This is particularly acute within the SCE/SoCalGas program where 53% of all incentive dollars went to a single firm in PY99. Second, there are an insufficient number of contractors in the program. Even in the small pockets where many of the contractors are concentrated, coverage still does not reach one qualified contractor for every 25,000 households. The coverage levels are much lower for specific trade types. Even more importantly, there are vast geographic areas of the state that have no qualified contractors or coverage levels of less than one contractor per 100,000 households.

To ensure that the RCP is successful in meeting its market transformation objectives, the program will likely need to train and qualify two to five times as many contractors in PY2000 as it did in PY99. Within future efforts to encourage more contractors to participate, the program should consider offering scaled incentives that both encourage first-timer participation through higher incentives or bonuses, and scaled back incentives for those firms that have already benefited substantially from the program. This approach should be promoted as “helping reduce risks” associated with investing in training and equipment to enter a new business. We feel that this type of flexible approach will, if

possible, provide a framework that truly encourages participating contractors to build a sustainable business model around the innovations promoted by the program.

Recommendation No. 6: Increase focus on consumer education.

One of the key barriers to achieving market transformation objectives in the residential contracting market is that of raising the level of awareness among consumers regarding the value of the diagnostic tests. Without this heightened awareness, most consumers will not be able to differentiate between contractors providing proper testing and those relying on less sophisticated techniques.

Consumer education was a central element of our initial recommendations in this market, and evidence of this need is showing up again. During PY99 implementation, the utilities held back from promoting RCP to the general market. This approach needs to be amended because our quantitative baseline survey data indicate that customers do not perceive a need for many of the energy-efficiency services. In fact, this lack of consumer demand for energy efficiency appears to be a pervasive condition for most of the trades relevant to RCP. More importantly, the participating contractors have expressed concern and disappointment over the lack of consumer outreach. Many of the contractors we interviewed are most enthusiastic about the development of duct service businesses but are disappointed that the consumer outreach aspect of the market development is missing. They value the utilities' support in creating consumer awareness and establishing the services' legitimacy, giving this equal if not greater importance as compared to the incentives received. Many of them are eager to do duct work and build their business, but needed some assistance in developing their customer outreach.

Our recommendation that RCP immediately embark on a consumer outreach effort does not imply that the utilities should use large amounts of funds broadcasting the benefits of duct services to broad audiences. That type of approach would use too much of the program's resources and, if successful, flood the market with demand that current contractor capacity could not adequately fill. Rather we think it is incumbent that the program develops contractor support materials that individual firms can use to promote their services. These independent, "third-party," consumer education materials should take

the form of brochures, videotapes, a web-based information package, support at home shows, and kiosks at home improvement stores.

A key fact that needs to be conveyed is that duct and HVAC diagnostics are worthy investments for homeowners. Customers want, and contractors need, independently produced literature that explains the difference between legitimate services and those that are less legitimate. They both need consumer guides on the benefits of these diagnostic tests and how to calculate energy savings. Additionally, the materials should stress other benefits including improved comfort, health benefits—especially for people with allergies -- and eliminating the waste associated with heating and cooling the outdoors.

While program budgetary constraints make it likely that contractors will bear the brunt of advertising responsibility and costs, there are several options that the program should consider supporting. These include targeted mailings coordinated with follow-up contractor marketing efforts and workload, and co-op advertising with the contractors. A web-based approach could also be effective for providing more detailed information. We recognize that the budgetary constraints limit how much advertising each utility can afford. There is a tug-of-war between incentive payments and consumer outreach activities for limited program funds. It should be recognized that if outreach is successful, then incentive payments will no longer be necessary. If exhausting incentive funding is a concern, and a barrier to promoting the benefits of specific measures among customers, then these incentives should be revised downward or controls put in place to limit the amount of market transformation funding for which each firm is eligible.

Another key to increasing the reach and effectiveness of consumer education efforts is partnering with a broad range of respected organizations. Of course, HVAC manufacturers are natural partners with respected brand names and share an interest in seeing that their efficient products live up to their claims. Some “home performance” contractors have obtained listings with organizations such as the American Lung Association, allergy clinics, local HMOs and other healthcare organizations. Imaginative use of partnerships will be critical to building consumer awareness and trust in these “new” technologies and services.

Recommendation No. 7: Consider developing a separate mobile home program.

It is clear that at least one participating contractor has found a profitable niche serving the program. This contractor alone has performed more than half of the jobs in the SCE/SoCalGas region. The firm has been providing duct testing and sealing services in mobile home parks. There are many positive benefits of this situation. The firm provides an excellent service to mobile home coach owners; a segment of the residential market not often served by previous DSM programs. Many of these customers are elderly on fixed incomes. The firm has streamlined the duct testing and sealing process. In each home they visit, they reduce air leakage through relatively simple techniques at the furnace box and at the registers. Occasionally, their tests reveal a disconnected crossover duct, which requires reconnection or repair. Thus the firm always improves the duct delivery system of each coach it visits. Whether the energy savings are sufficient to justify the fee paid is an area of needed research.

Unfortunately, as successful as the firm has been in providing service, the effort may not be consistent with the broader market transformation objectives of the SF RCP. It is hard to envision how continued funding of such a firm's services will ever lead to market transformation. The contractor charges coach owners no fee for the service and he is completely dependent on the incentive payments to make the business work. The problem with this direct service of mobile home parks remaining in the current RCP program is that this one firm is so good at what they do that they are likely to dominate the funds available.

If energy savings do justify the payments to this firm, program managers might consider developing a separate mobile home program. By doing so, the utilities can continue to fund this contractor and/or encourage others to enter the program. Because mobile homes can be considered an under-served market niche, the program can easily be justified as a resource acquisition program, and quite likely as a low-income program, and funding can continue indefinitely. The program could also be expanded so that the services were more comprehensive, or at least included a full assessment of what opportunities the coach owners should pursue on their own.

Pulling the program out of RCP and into its own program does several things. It recognizes that previous programs have failed to reach the mobile home market and that the

RCP's market transformation approach will never be self-sustaining for this market niche. Moving it into its own program gives the remaining RCP a better chance of developing its market transformation objectives. Most importantly, creating a separate mobile home program ensures the existing contractor a more stable longer-term program base where there is no expectation that incentives will eventually not be needed to support the services provided.

Recommendation No. 8: Develop an explicit strategy for reducing incentive levels over time.

Although none of the programs has confronted this issue directly yet, each of the programs will eventually face a time when program funds will be fully committed before the program year ends. There is already concern at SCE that they will run out of funding for this year's program. This budgetary concern has, in-turn, reduced the sense of urgency with which they recruit new contractors or market the program. Explicit policies or procedures have not been developed to deal with this eventuality. This creates the awkward possibility that program incentives will be cut off to contractors in mid-year. Program managers are keenly aware of contractors' complaints that previous programs stop abruptly, so avoiding the cold turkey mid-year program suspension should to be avoided at all costs. Unfortunately, the current approach, coupled with the strong desire to not let down contractors, creates the illusion that incentives will continue unaltered for an indefinite period of time.

Creating a program with indefinite incentives is not consistent with market transformation principles. In most businesses, when firms use rebates, validity periods and redemption limits are explicitly stated. These rebates are recognized as a near-term incentive, not a long-term entitlement. Contractors entering the market understand the limited nature of the rebates and plan for the transition.

RCP must resolve two difficult issues in this area. What will the utilities do when all program funds are committed? How does the program reconcile a commitment to contractors to keep the program in place, unchanged for a substantial period, while at the same time knowing that a program year's funds could be used up before the year ends. Additionally, how does the utility balance the commitment to sustain the program for

existing contractors while reaching out to bring in new contractors or develop leads in under-served market areas? These difficult policy issues need to be resolved and communicated to all parties so that contractors can understand how program funding works.

Recommendation No. 9: Improve marketing approaches for the program by undertaking customer preference research.

All successful market development has a hook to attract customers, and there is a need to identify those hooks that can be used by contractors interested in developing new marketing approaches. The original hook envisioned for this program, whole-house services, does not appear to be viable since, at this point, it does not appear that many contractors desire to, or have the capacity to, offer these whole-house services.

Energy savings alone is not likely to attract customers in California at present, and the program needs to identify stronger sales hooks onto which it can piggyback. In other regions of the country, contractors have used moisture issues as the hook, but this issue is also not of major concern in California. It may be, therefore, health or comfort-related issues that will have the best chance of motivating customers to make upgrades, which improve their home's energy efficiency.

Recommendation No. 10: Document case-study results from program installations.

In order to build credibility for the measures and services that the RCP seeks to promote, it is important that contractors have documentation of savings and other benefits that they can cite with customers. The program administrators are in a good position to provide this type of objective case-study type of information to consumers as a means of transforming the market.