1999 STATE-LEVEL SMALL/MEDIUM NONRESIDENTIAL MA&E STUDY

FINAL REPORT

Volume 1 of 2

PG&E-SW035

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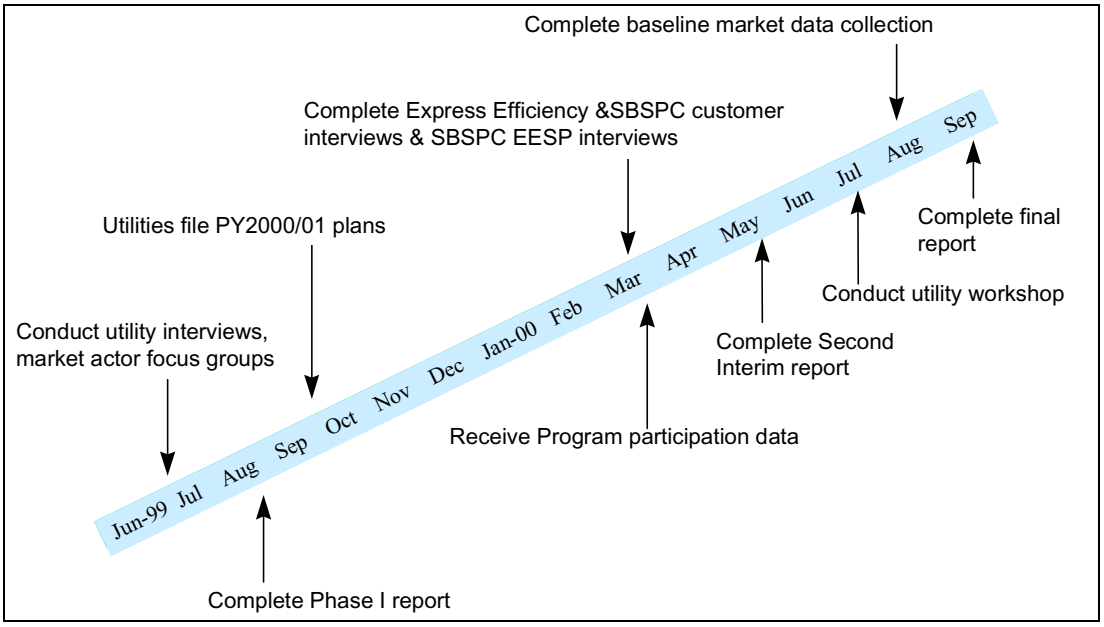
EXECUTIVE SUMMARY

This is the Executive Summary of the final report prepared for the *1999 State-Level Small/Medium Nonresidential Study.* The study consists of two primary components:

1) An assessment of the baseline characteristics of the small nonresidential market
2) A broad process evaluation of the1999 Small Business Standard Performance Contract (SBSPC) Program and the statewide 1999 Express Efficiency Program.[1]

Figure E-1 presents the timeline for the study.

Figure E-1
Study Timeline



E.1 APPROACH

This study utilized a variety of primary and secondary research approaches. Most of the key results are based on primary research conducted with a broad array of market actors active in small/medium nonresidential markets.

[1] Note that a program theory was also developed as part of this Study, see Section 3 of this report.

E.1.1 Program Theory

Much of the research was guided by a program theory developed early in the project. This theory is presented in Section 3 of this report.

E.1.2 Baseline Data Collection

We developed a characterization of both the customers and key supply-side actors involved in the small/medium customer market. Most information resulted from detailed interviews of samples of the market actors. We conducted focus groups and interviews with a random sample of customers distributed across the three utility areas. We interviewed a total of 403 customers in California. We also compiled baseline information for a representative sample of 200 similar customers in randomly selected areas outside of California.

Supply-side baseline market information was developed from prior research, focus groups, and detailed interviews conducted with specific market actors. We focused on actors in the lighting and HVAC (primarily packaged air conditioner) markets. In the lighting market, we interviewed 100 California lighting contractors and 48 distributors. Sixty contractors outside of California were interviewed. In the HVAC market, we interviewed 100 California and 59 out of state contractors. We interviewed 35 distributors in the California market.

E.1.3 SBSPC Program Assessment

To assess the SBSPC Program we conducted in-depth interviews with the following 1999 program participant groups:

- Eighteen customers who represented 13.5 percent of the participating customers, or 25 percent if customers are weighted based on their incentive amounts
- Thirteen representatives from energy-efficiency service providers (EESPs) who participated, or 28 percent of all participating EESPs.

E.1.4 Express Efficiency Program Assessment

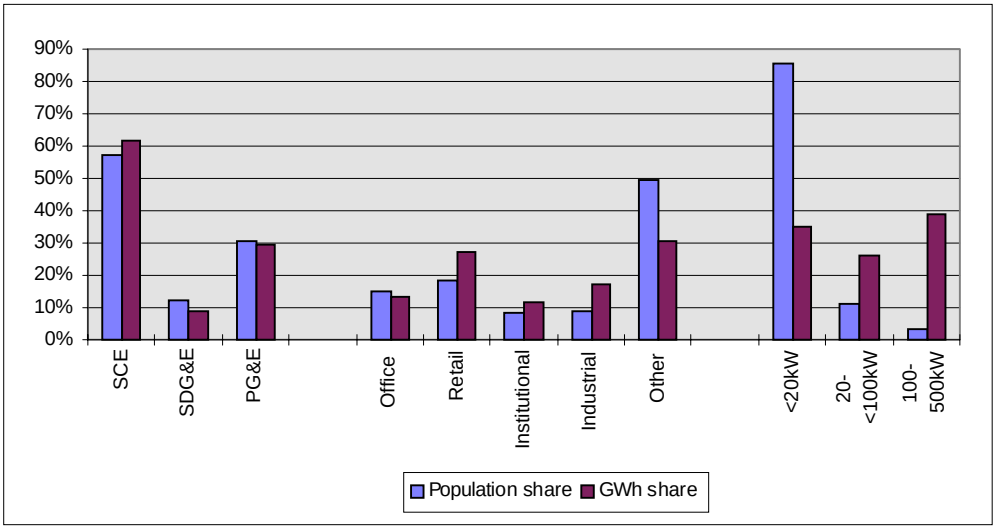
To assess the 1999 Express Efficiency Program, we conducted in-depth interviews with a sample of 209 customers who participated in the program. The customers were proportionally distributed among the service areas of the participating utilities, with 63 representing Pacific Gas & Electric (PG&E), 55 for Southern California Edison (SCE), 35 for Southern California Gas (SCG), and 56 representing the San Diego Gas & Electric (SDG&E) area. The project sites for the interviewed customers constituted at least 6.3 percent of the unique project sites involved in the 1999 program.

E.2 SUMMARY OF KEY FINDINGS

E.2.1 Customer Baseline Information

The small/medium business market consists of approximately one million accounts and probably roughly three-quarters of a million customers. Below the 100-kW demand level, ***this is*** for all intents and purposes ***a mass market***. An overview of the distribution of key segments of this market is shown in Figure E-2. Median electricity bills are about $700 for California customers, compared to about $400 for out-of-state (OOS) customers. Median bills are three times the average for institutional customers, and they are most likely to consider energy costs to be very important.

Figure E-2
Small/Medium Business Customer Distribution



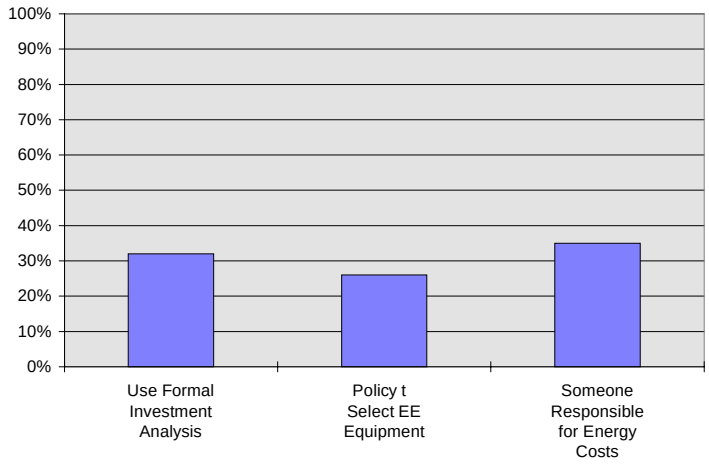
Source: XENERGY analysis of PG&E, SCE, and SDG&E customer data.

This market is characterized by a number of significant barriers to the implementation of cost-effective energy-efficiency measures. These customers lack the expertise, staff, experience, time, and other resources to assess energy-efficiency opportunities comprehensively and confidently. Only one-third of California small/medium business customers indicate that they have someone (internal or external) who is responsible for tracking energy usage and costs or that they use any formal investment analysis to make energy-related equipment decisions. Even fewer, only about one-quarter, report having any formal policies to select energy-efficiency equipment when making equipment purchases. This is well below the percentage of the largest customers in the state who report such a policy (61 percent).[2] In addition, many of these customers do not view energy costs as a variable cost over which they have some control, but as a fixed cost over which they have little or none. ***Half the customers rent or lease their space*** and, hence, have concerns about their ability to control and benefit from energy-efficiency

[2] See XENERGY, 1999. Evaluation of the 1998 Nonresidential Standard Performance Contract Program, Final Report, prepared for Southern California Edison and the California Advisory Board for Energy Efficiency, June.

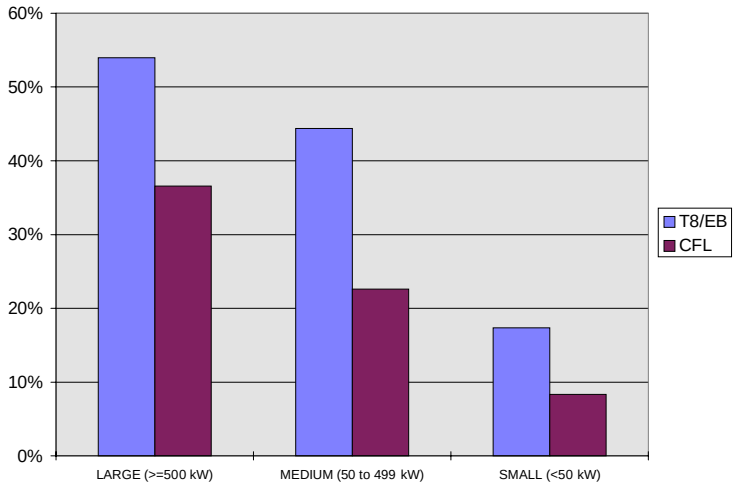
investments. These customers also report having moderate concerns over the reliability of energy savings estimates and note that energy-efficiency investments often fall below other priorities for their business.

Figure E-3
Selected Indicators of Focus on Energy Management (Energy Weighted)



Actual implementation rates for even the most cost-effective, easily retrofitted energy efficiency measures is low. It has been hypothesized in recent studies that the small/medium market has a significantly lower saturation rate for most measures as compared with the over-500-kW market. As shown in Figure E-4, our analysis of data from a relatively recent large sample of on-site data for the PG&E service territory confirm this hypothesis. The saturation of

Figure E-4
Saturation of T8 Lamps/Electronic Ballasts By Customer Size, PG&E Territory



Source: XENERGY analysis of PG&E's 1996/1997Commercial End Use Survey data

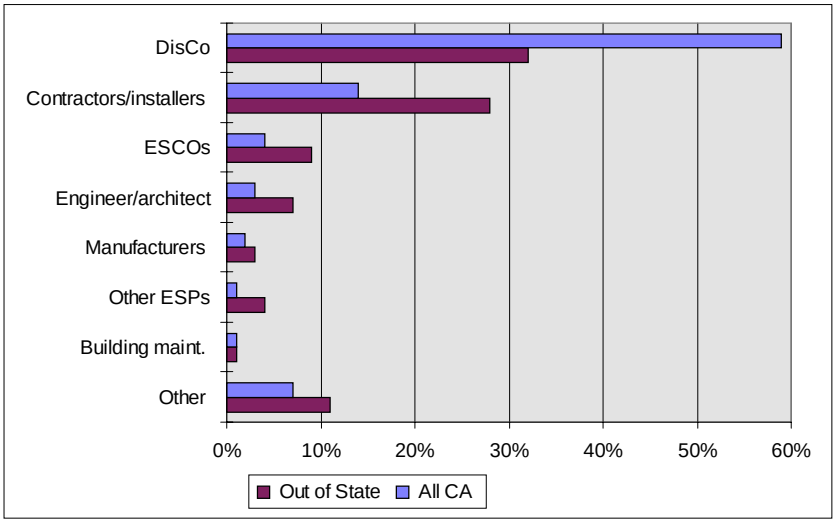
T8 lamps/electronic ballasts is roughly 17 percent for customers under about 50 kW and over 50 percent for those larger than 500 kW. Similarly, the saturation of compact fluorescent lamps varies from a low of under 10 percent for the smallest customers to about 35 percent of the

largest. In addition, ***only 18 percent of small/medium customers say that they will replace their existing ballasts with electronic ballasts at burnout***. This indicates that there remains a significant opportunity in the small market for high-efficiency lighting retrofits. This market could provide a source of short-term peak demand and energy savings, though the cost of achieving these savings may be significant.

Similar to the residential market, there appears to be only a weak correlation between efficiency-related attitudes and behaviors. Despite the low actual saturation rates noted above, almost 80 percent say that energy efficiency is at least somewhat important. Perceptions and attitudes about energy efficiency are generally more positive among office customers and more negative among retail customers. The larger customers are more likely they are to feel in control of efficiency investments, have more positive attitudes, and encounter fewer financing barriers.

Most customers are generally unaware of current efficiency programs but consider their distribution company the "first choice" of whom to call about efficiency matters. Most say that utilities are their first source of energy-efficiency information. Institutional and larger customers are the most likely to contact suppliers first. Although 80 percent use the Internet, less than one-third of these use it to obtain energy information. Only 20 percent are aware of any energy-efficiency programs; office and institutional customers are most likely to be aware. There is little awareness of the SPC programs; about 11 percent are aware of "general" rebate/incentive programs.

Figure E-5
First Choice for Whom to Call About Energy Efficiency



E.2.2 Supply-Side Baseline Information

There are a large number of lighting and HVAC contractors, most of whom are very small businesses. We estimate there are over 6,200 lighting and almost 6,300 HVAC contractor locations in California. The vast majority have fewer than 10 employees and less than $5 million of annual revenue. A large majority has been in business over 10 years.

Most California lighting and HVAC suppliers say that they often recommend efficient equipment. The percent of high-efficiency sales is higher for lighting than HVAC equipment. More than 70 percent of the suppliers say that for competitive reasons it is at least somewhat important to offer high-efficiency equipment. Cost is cited most often as an obstacle to high-efficiency lighting or HVAC sales.

Contractors and distributors are somewhat more aware of utility efficiency programs than customers but awareness of incentive programs is low. About 20 percent of California contractors are aware of the Express Efficiency, SBSPC, or Large NSPC Programs, and over 60 percent are aware of utility audit programs. Utilities are their primary source of program information. More than 65 percent of suppliers say they use the Internet, mostly for information on manufacturers and wholesalers; about 14 percent have looked at the utility's energy-efficiency section of its web site.

E.2.3 Overall Program Participation Statistics

As expected, based on their program designs and objectives, the Express Program had over an order of magnitude more participants and over four times the incentive dollars reserved as did the SBSPC Program. Table E-1 summarizes the participation statistics for the two programs (based on early 2000 data). PG&E dominated the Express participation, while the SBSPC participation generally followed the relative size of each utility. End-use participation differed significantly between the two programs, again as expected given program design differences (Express was dominated by lighting measures, which lend themselves to prescriptive rebates, while the SBSPC was dominated by HVAC and control measures, an intended result of the SBSPC Program's higher incentives for non-lighting end uses).

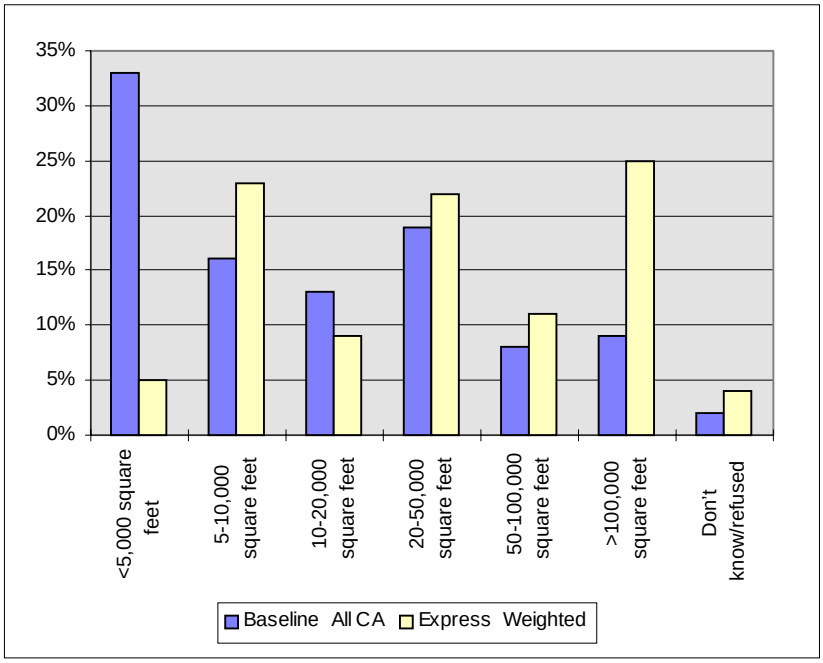
Table E-1
Overall Program Statistics

Characteristic	Express Efficiency	SBSPC
Total customer participants	3,297 (unique sites)	133
Incentives paid	$7.6M	$1.7M
Distribution of incentives by utility	PG&E = 60% SCE = 17% SDG&E = 23% SCG = 7%	PG&E = 41% SCE = 45% SDG&E = 14% SCG = N/A
Distribution of incentives by end use	Lighting = 64% HVAC/Refrig. = 26% Other = 10% (*Lighting is 90% of kWh savings)*	Lighting = 22% HVAC/Refrig. = 33% Other = 45%

Neither program penetrated a significant portion of the target market. This is probably attributable to limited budget in the case of Express and lack of awareness and perceived hassle

and transaction costs (including measurement and verification (M&V)) in the case of SBSPC. Only about 0.5 percent of eligible customers participated in the Express Efficiency Program. Participation in Express was spread relatively evenly among participants of different sizes, with the exception of the very smallest customers, who were underrepresented, as shown by Figure E-6. Only 0.01 percent of the eligible customers participated in the SBSPC. The SBSPC expenditures appear to have been less than 20 percent of the amount budgeted.

Figure E-6
Distribution of Population and Express Efficiency Participants by Floor Area



A significant proportion of SBSPC incentives went to dairies and chains upgrading multiple sites. Dairies comprised over half the PG&E and SCE participants. The EESP participants were very diverse. About two-thirds of their business was with the small customers targeted by the program.

E.2.4 Express Efficiency Program Findings

Virtually all participants were somewhat or very satisfied with the program and their experiences with providers. About 80 percent used a third party to install equipment under the program but were less likely to do so on smaller projects. Almost all customers who used a third party said that it was influential in the efficiency level selection.

Express Efficiency appeared to be influential on customer efficiency attitudes and practices. Participants appeared to be more positive about energy-efficiency measures than the general population. The program also appeared to have increased participants' confidence in energy efficiency, was said to have played an important role in their decision to install efficient equipment and was considered important in influencing their future considerations of efficient equipment. Most said that the rebate was very important in overcoming potential cost barriers.

Free-ridership levels were moderate, no formal attempt to quantify spillover was made. We estimated the free ridership rate to be about 34 percent.

Early replacement and remodeling/renovations were the key market events occurring in the program. Three-fourths of participating customers said they had used the program to replace fully functional equipment. Remodeling appeared to be a key market event; lighting and HVAC installations were included in remodels at about two to three times the baseline rate.

E.2.5 SBSPC Program Findings

Most SBSPC end user and EESP participants were satisfied with their program experiences. Although participation in the 1999 SBSPC may have been limited by spillover of negative perceptions among EESPs about the paperwork and M&V costs associated with the 1998 NSPC program, most actual EESP participants in the 1999 SBSPC were satisfied with their experience.

Weaknesses identified were excessive paperwork, excessive M&V requirements, and lack of advertising. EESPs estimated that their costs of participating consumed about 40 percent of the incentive amount.

The EESPs provided some evidence that the SBSPC Program was having a positive effect on the market they served. Over half the projects EESPs conducted were with new customers. The large number of SBSPC projects with dairies in the PG&E and SCE areas also illustrated noteworthy market changes. One third party initiated steps to recruit several dairy equipment suppliers, who became active promoters of variable-speed drives to dairies. It appeared that participation increased dramatically among the dairies through observation and communication, either from one dairy to another or by way of EESPs.

SBSPC customer participants generally rated their experience with EESPs as good or excellent. About half the customers said that they were receiving other services from the EESP. Two-thirds said they expected to use the EESP in future projects. In contrast to information provided by the baseline customer sample, customers participating in the SBSPC relied heavily on the EESPs. SBSPC customer participants were most likely to describe their contract arrangement as a fee-for-service contract.

Free-ridership levels were moderate, no formal attempt to quantify spillover was made. We estimated free ridership for the SBSPC customer participants to be 38 percent. The incentive was mentioned most often as the major benefit of the program, allowing customers to install equipment they would have been unable to otherwise.

Both customer and EESP participants recommended ways to improve the SBSPC: 1) simplify and increase consistency, 2) shorten the process, and 3) increase advertising. Customer participants also recommended more literature or materials that could be used to convince their

decision-makers to participate. A number of program changes were planned for PY2000 to address these issues.

E.3 CONSIDERATIONS FOR FUTURE PROGRAMS

Based on this study of the 1999 programs, we offer several strategic recommendations as input to the on-going planning process. We offer these more as strategic guidelines rather than detailed, conclusive recommendations. We note that the small/medium market has only recently been broken out as a separate programmatic area and, as such, policy goals are still evolving for this market. Although some recommendations apply to a specific program, many are overarching suggestions that are built on basic fundamentals about how to address the overall small/medium market. We offer these as concepts to consider in the on-going program planning process.

E.3.1 Consider Developing and Conveying a Mass Market Message

An effective mass marketing campaign is likely to increase program awareness and interest, especially among the hundreds of thousands of customers that make up the bulk of the under-500-kW establishments (though only about one-third of the consumption). Awareness and participation may increase if the portfolio of interventions is presented under one umbrella or "brand name." A broad, mass market message should be complemented with targeting to unique customer segments. Specific recommendations include:

- ***Consider establishing a single "brand name" for a range of programs targeted at small/medium customers, or even covering all programs.***
- ***Implement an integrated mass marketing strategy to build awareness and interest.***
- ***Identify and characterize key market segments and conduct targeted marketing for hard-to-reach segments.***

E.3.2 Minimize the Actual and Perceived Hassle of Program Participation

The small nonresidential market is encumbered with numerous barriers to energy-efficiency investments—many market actors perceive that some programs introduce additional costs that act as barriers to participation. We offer the following for consideration:

- ***Focus design and implementation of small/medium programs on significantly reducing participants' net hassle and transaction costs associated with making energy-efficiency investments***.
- ***Consider consolidating the Express Efficiency and SBSPC offerings or repackaging them under a single program name.***
- ***Further simplify the SBSPC Program application and M&V process***.

E.3.3 Improve Efforts to Help Customers Move from Intent to Action

Although energy-efficiency awareness and interest are relatively high among smaller customers, action can lag in this market if the path to implementation is not an easy one. We suggest the following for consideration:

- ***Leverage the audit process to develop leads for efficiency improvements and aid end users in finding and selecting trade allies.***
- ***Consider the use of third-party product labeling (e.g., Energy Star) and market-based provider certification.***
- ***Consider significantly increasing rebate levels for lighting measures for small customers (e.g., less than 50kW) to address the need for summer peak savings and capture this otherwise untapped resource.***
- ***Consider financing approaches that create immediate positive cash flow for small customers' efficiency investments.***

E.4 THE NEED FOR CLEAR GOALS AND LONGER-TERM POLICIES

It is important for regulators and stakeholders to have a clear, common understanding of the goals of the small/medium nonresidential programs for them to be fully effective. The regulatory uncertainty of the last few years has resulted in a variety of mixed signals to market actors in the small/medium nonresidential sector. We suggest the following as guidance to the California Public Utilities Commission as well as the utilities:

- ***Continue to assess the small/medium nonresidential market to determine its resource potential and clarify how its unique characteristics affect the feasibility of and best approaches to acquiring cost-effective savings (e.g., what is the best mix of resource acquisition versus market transformation approaches).***
- ***Establish strategic goals and tactical objectives along with a realistic mid- to long-term time horizon for achieving them (in our opinion, significantly affecting this difficult-to-reach market will take at least 5 to 10 years).***
- ***Consider a new regulatory compact that sets rewards for desired outcomes over multiple years in exchange for more utility flexibility in making annual or sub-annual program changes.***

1 INTRODUCTION

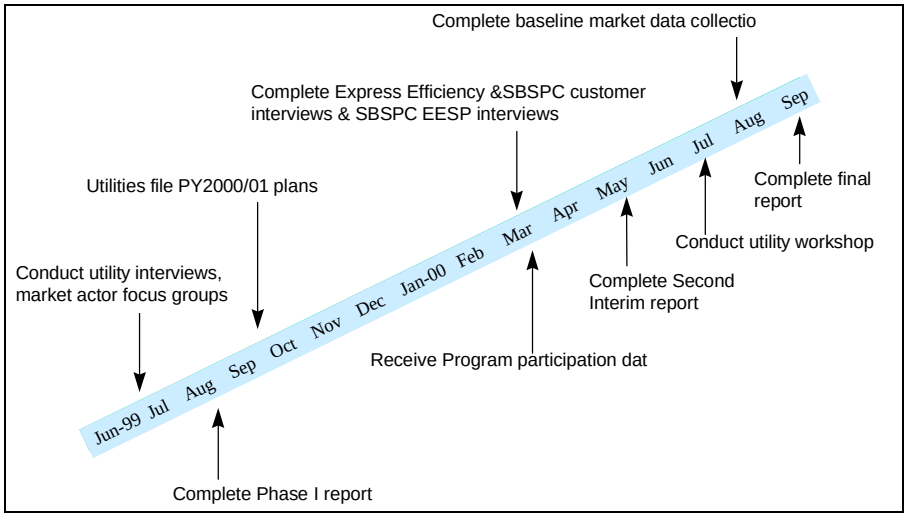
This is the final report prepared for the *1999 State-Level Small/Medium Nonresidential Study* (hereafter referred to as "the study"). The overall study consists of two primary components:

1) An assessment of the baseline characteristics of the current market for the small nonresidential sector programs, as well as any other types of energy-efficiency products and services that early analysis suggests may be significantly affected by the programs; and
2) A broadly focused process evaluation of a) the1999 Small Business Standard Performance Contract (SBSPC) Program and b) the utility incentive programs (the statewide 1999 Express Efficiency Program) to assess their effectiveness at reaching and influencing the target market sector.

Figure 1-1 presents the timeline for the study. The Phase I report was completed in August 1999. The intent of that report was to support the 2000/2001 program planning process, and the research activities were limited to tasks that could be conducted within one month. About one month after we delivered the Phase I report, the utilities filed their PY2000/2001 program plans.

The Second Interim report was completed in May 2000 and it presented the results of interviews conducted with participants in the 1999 Express Efficiency and 1999 SBSPC Programs. It was intended to provide a preview of results from these data-collection activities and constitute the starting point for preparation of the overall project final report. The report was circulated to utility staff for comment and a workshop was held with utility staff in July to review the report and receive staff comments and feedback.

Figure 1-1
Study Timeline

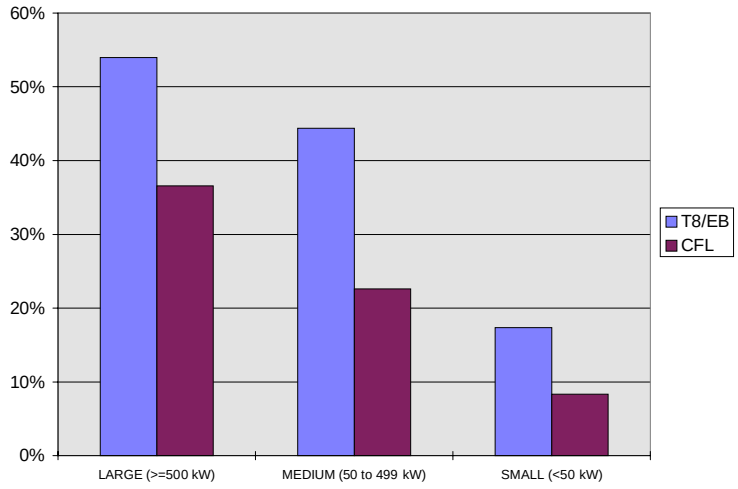


This report is the final report for this project. It adds both supply-side and end-user baseline information to the findings presented in the Second Interim report.

1.1 CONTEXT––ENERGY EFFICIENCY IMPLEMENTATION IS HIGHLY CORRELATED WITH CUSTOMER SIZE

Industry experts have noted since the inception of energy-efficiency programs that larger nonresidential customers tend to implement more projects than smaller customers. There are a number of reasons for this fact, most of which are discussed throughout this study. Despite widespread agreement that smaller customers implement less energy efficiency, there has been to date limited empirical quantification of this fact. To address this issue, we recently analyzed data from Pacific Gas and Electric (PG&E) Company's latest Commercial End-Use Survey, which includes close to 1,000 detailed on-site surveys, which together form a representative picture of the entire commercial market. Our analysis of the saturation levels of key efficiency technologies in the customer segment of <500-kW demand confirm that saturation levels are considerably lower than those for larger customers for virtually all measures. Figure 1-2 shows that the saturation level for interior 4 ft. T8/electronic ballast fixtures and compact fluorescent lamps is about ***three times as high*** for the large customers as it is for the small customers.

Figure 1-2
Saturation of T8 Lamps/Electronic Ballasts By Customer Size, PG&E Territory



Source: XENERGY analysis of PG&E's 1996/1997Commercial End Use Survey data

1.2 1999 PROGRAM DESCRIPTIONS

The evaluation component of this study focuses on two California statewide programs that target the small/medium business customers, which are defined to be those with electricity demands of less than 500 kW. The utilities designed these programs to address the special needs of these customers.

As noted earlier, the principal program interventions directed at the small/medium business customers that are included in the scope of the study are the SBSPC and Express Efficiency incentive programs. The utilities' 1999 energy audits were included only in the Phase I elements of the study, no participant surveys are included within the scope of the full study and, hence, no information on them is presented in this final report. Descriptive information on the 1999 energy audit activities was provided in the Phase I report.

The SBSPC program was implemented for the first time in 1999. It was created during the PY1999 planning process in response to a lack of participation of smaller customers in the overall 1998 Nonresidential SPC program.[1] The SBSPC program was implemented statewide in 1999 by Pacific Gas and Electric (PG&E), Southern California Edison, (SCE), and San Diego Gas and Electric (SDG&E).

As part of the move toward consistent, statewide programs, the Express Efficiency Program was implemented on a statewide basis also for the first time in 1999 (this statewide program was generally modeled on PG&E's 1998 Express Efficiency Program). Express Efficiency was implemented by each of the three electric utilities plus Southern California Gas (SCG). SCG's program was somewhat unique compared to the others in that only gas measures were included and these measures were not standardized statewide as were the electric measures.

1.2.1 1999 Express Efficiency Program

The 1999 Express Efficiency Program was a statewide rebate program targeted to adoption of high-efficiency measures by businesses with electricity demands <500 kW. The program has been available to PG&E's nonresidential customers in one form or another for almost 10 years (although prior to 1998, there was no customer size requirement). Each of the other utilities has had nonresidential rebate programs in some form or another for most of the past 10 years as well. Annual rebate expenditures peaked in the mid-1990s and are currently dramatically lower than what they were during this peak period.

The statewide 1999 Express Efficiency Program was similar to PG&E's former Retrofit Express Program, except that it was designed to encourage market transformation and includes two upstream components (HVAC and motors), although SCE did not include upstream components in 1999. Under the 1999 Express Efficiency Program small/medium businesses could receive rebates for a number of high-efficiency HVAC, lighting, refrigeration, and other measures. Rebates were paid to customers generally within one month of completed installation paperwork. Payment was subject to utility verification of appropriate installation, at the utility's discretion. Examples of HVAC and lighting rebates are provided in Table 1-1.

[1] This was in response to the fact that there were few small customer participants in the 1998 Nonresidential SPC Program (see *Evaluation of the 1998 NSPC Program, Final Report*, prepared by XENERGY Inc. for the California Board for Energy Efficiency and Southern California Edison Company, June 1999).

Table 1-1
Selected 1999 Electric Express Efficiency Rebate Levels

HVAC and Refrigeration	Lighting
$36/HP for variable-frequency HVAC fan drives	$2.75-$5.00 per screw-in CFL lamp depending on wattage
$7 per time clock	$7.25-$14.50 per hardwired fluorescent fixture depending on wattage and existing incandescent vs. mercury vapor
$12 per setback programmable thermostat	$1.75 per lamp-controlled, Non-dimming electronic ballast
$.45 per square foot for reflective window film	$10 per lamp-controlled, dimming electronic ballast with daylighting
$70 per ton for evaporative coolers	$1.50 per 2-foot T8/T5 lamp installed and $.75 per delamp, up to $7.50 per 8-foot T8/T5 lamp installed, $2 per delamp
$25 per linear foot for glass/acrylic refrigerator doors	$18-32 per fixture for internal HID, depending on wattage and incandescent vs. mercury vapor
$40-45 per linear foot for new refrigeration case with doors	$7.50 to $20 per occupancy sensor depending on which type
$25 per linear foot for low/no-heat refrigeration case doors	$3.50 per exit sign retrofit and $10.75 per LED exit sign
$40 per auto-closer for coolers/freezers	$7.25 per time clock
For CACs, the incentive is $50 per ton, paid to distributors (PG&E and SDG&E only)	$2.75 per photocell

1.2.2 1999 Small Business Standard Performance Contract Program

The SBSPC is also a statewide program. Under the 1999 program, third-party project sponsors (including contractors) were paid for measured, verified savings, based on a fixed schedule for verified savings amounts. End users could not self-sponsor projects. A standard contract between the program administrator (utilities) and third-party sponsors specified incentives, performance measurement and verification (M&V) options and protocols, payment terms, and other operating rules. Measures had to have a useful life of at least three years, and save 20,000 to 200,000 kWh/year (or 2,000-20,000 therms/year). Third-party participants submitted applications that might or might not be accepted, depending on adherence to program requirements, including detailed justification for expected savings.

M&V options existed, and an M&V plan had to be submitted to the utility. Verification of installation was an M&V option for some types of lighting projects; short-term or continuous monitoring was preferred for non-lighting projects. In either case, equipment loads and operating hours were subject to verification. Computer modeling based on changes in customer billing data also was an option, as was computer-based building simulation of savings. Sponsors were responsible for M&V.

Incentives were paid to project sponsors, with 40 percent after installation and 60 percent after one year, based on verified savings. One component of the project sponsor incentive was a fixed

"participation incentive" of $1,000 for lighting projects and $2,500 for HVAC projects. The second component of the project sponsor incentive was based on verified savings—$0.055/kWh for lighting and $0.185/kWh for HVAC/refrigeration ($0.09/kWh for HVAC fan motors). The program allowed the third party (referred to in this report as the Energy Efficiency Service Provider, or EESP) to contract with the customer as they preferred, although establishment of performance type contracts between EESPs and customers was one of the desired program outcomes.

1.3 APPROACH

This study utilized a variety of primary and secondary research approaches. Most of the key results are based on primary research conducted with a broad array of market actors active in small/medium nonresidential markets. Much of the research was guided by a program theory developed early in the project. This theory is presented in Section 3 of this report.

1.3.1 Baseline Data Collection

We developed a characterization of both the customers and key supply-side actors involved in the small/medium customer market. Most information resulted from detailed interviews of samples of the market actors.

Customers

We conducted focus groups and interviews with a random sample of customers distributed across the three utility areas. We interviewed a total of 403 customers in California. We also compiled baseline information for a representative sample of 200 similar customers in randomly selected areas outside of California.

Our baseline customer interviews were conducted using an instrument designed to obtain information on the following topics:

- Customer facility and respondent characteristics
- Attitudes toward and awareness of energy costs and energy efficiency
- Changes in lighting, HVAC, and industrial process equipment
- Use of vendors to provide energy-efficient equipment and services
- Reasons for installing energy-efficient equipment
- Satisfaction with energy-efficient equipment
- Sources of information about energy efficiency
- Energy-efficiency decision-making
- Participation in energy-efficiency programs.

We analyzed customer results by the following categories: California utility area, California customer type and size, all California customer groups combined (weighted as described earlier), and location out of state (OOS).

Supply-Side Actors

Supply-side baseline market information was developed from prior research, focus groups, and detailed interviews conducted with specific market actors. We focused on actors in the lighting and HVAC (primarily packaged air conditioner) markets.

In the lighting market, we interviewed 100 California lighting contractors and 48 distributors. Sixty contractors outside of California were interviewed.

In the HVAC market, we interviewed 100 California and 59 out-of-state contractors. We interviewed 35 distributors in the California market.

Our baseline supply-side interviews were conducted using an instrument designed to obtain information on the following topics:

- Basic firmographics, including types of customers served and products/service provided
- Changes in lighting, HVAC, and industrial process equipment
- Practices related to sales of high-efficiency products and services, including building commissioning
- Awareness and participation in utility efficiency programs
- Use of the Internet
- Comments and recommendations.

1.3.2 SBSPC Program Assessment

To assess the SBSPC Program, we conducted in-depth interviews with the following 1999 program participant groups:

- Eighteen customers who represented 13.5 percent of the participating customers, or 25 percent if customers are weighted based on their incentive amounts; and
- Thirteen representatives from EESPs who participated, or 28 percent of all participating EESPs.

The comprehensive SBSPC customer interviews solicited the following types of information:

- Types of measures installed
- Reasons for participating in the program
- Sources of information

- Decision-making processes
- Program experiences
- Experiences with third parties
- Awareness of and experience with performance contracting
- Program strengths and weaknesses
- Suggestions for improving the program.

The data collected from customers who participated in the SBSPC also permitted us to conduct a preliminary analysis of the program effects in terms of whether the customers would have implemented efficiency improvements in the absence of the program.

The information collected from EESPs that participated in the SBSPC included the following:

- Utility areas where they had participated
- Experiences under the program
- Business and marketplace effects of the program
- Experience with performance contracting
- Program strengths and weaknesses
- Suggestions for improving the program.

1.3.3 Express Efficiency Program Assessment

To assess the 1999 Express Efficiency Program, we conducted in-depth interviews with a sample of 209 customers who participated in the program. The customers were proportionally distributed among the service areas of the participating utilities, with 63 representing PG&E, 55 for SCE, 35 for SCG and 56 representing the SDG&E area. The project sites for the interviewed customers constituted at least 6.3 percent of the unique project sites involved in the 1999 program.

We did not conduct interviews with suppliers about the Express Efficiency Program for three reasons. First, the customer was generally the active party in the Express Efficiency Program—he or she received the rebate and had the incentivized equipment or measure installed. Suppliers were involved in the program as a service or product provider, but not as a direct program participant. Second, we interviewed EESPs and conducted focus groups with suppliers during the research stage of Phase 1, as well as for a prior study of PG&E's program, so information was already available on the role, perceptions, and behavior of suppliers. Third, suppliers' perceptions of the Express Program are fairly well known because the program has been in existence for many years. Although it was not a high priority within the many competing needs

for primary research on this study, the opinions of Express suppliers should continue to be obtained and studied as research on these programs and the small customer market continues.

The comprehensive Express Efficiency customer interviews collected the following types of information:

- Types of measures installed
- Reasons for participating in the program
- Awareness of and participation in other programs
- Sources of program information
- Decision-making processes
- Program experiences
- Experiences with third parties
- Program strengths and weaknesses.

The data collected from the Express Efficiency customer participants also permitted us to conduct a preliminary analysis of the program free-ridership.

1.4 REPORT CONTENTS

The remaining sections of this report are organized as follows:

- Section 2 summarizes the key findings from this study. It presents baseline market data, program participation data and results from interviews with program participants, a summary of program changes, and major conclusions and recommendations.
- Section 3 of this report presents a program model, or theory, that we developed for the 1999 statewide small/medium nonresidential programs. The theory is comprehensive in that it covers all the categories of programs conducted statewide, but it does not provide complete details on any specific program. The theory was used to help design our study approach and can provide a context for future market effects studies of these programs.
- Section 4 provides summary information on the SBSPC and Express Efficiency Programs. The compilation presents statistics on participation, market actors, and incentives.
- Section 5 presents detailed baseline information for small/medium customers.
- Section 6 presents baseline information for lighting and HVAC contractors and distributors.
- Section 7 presents our interview results for customers participating in the Express Efficiency Program.

- Section 8 presents similar information for both customers and EESPs that participated in the 1999 SBSPC Program.
- Section 9 provides a list of reference sources related to the study.
- The appendixes present the interview instruments we used and other supporting documentation.

2 FINDINGS SUMMARY AND RECOMMENDATIONS

This section summarizes the key findings from this study and provides our recommendations. It presents information based on interviews conducted with Express Efficiency and SBSPC Program participants, baseline customer and supplier interviews, and other sources. It also discusses program changes instituted since 1999.

The first subsection presents baseline data for the small/medium business market, including both end-user and supply-side information. The next subsection summarizes program participation statistics. The third subsection presents specific data for customers who participated in either the Express Efficiency or SBSPC Program and EESPs who participated in the SBSPC Program; comparisons are made in this subsection between the participants and the baseline population. The next subsection discusses program changes that were made since the 1999 programs were conducted. The final subsection presents overall conclusions and recommendations that can inform future program decision-making.

2.1 BASELINE MARKET INFORMATION

This subsection summarizes baseline information for the customers in the small/medium (<500-kW demand) nonresidential market and the suppliers that provide equipment and services to these customers. Baseline data for customers and contractors in California and an out-of-state (OOS) area are presented. Detailed information is presented in Sections 5 and 6 of this report.

2.1.1 Customer Baseline Information

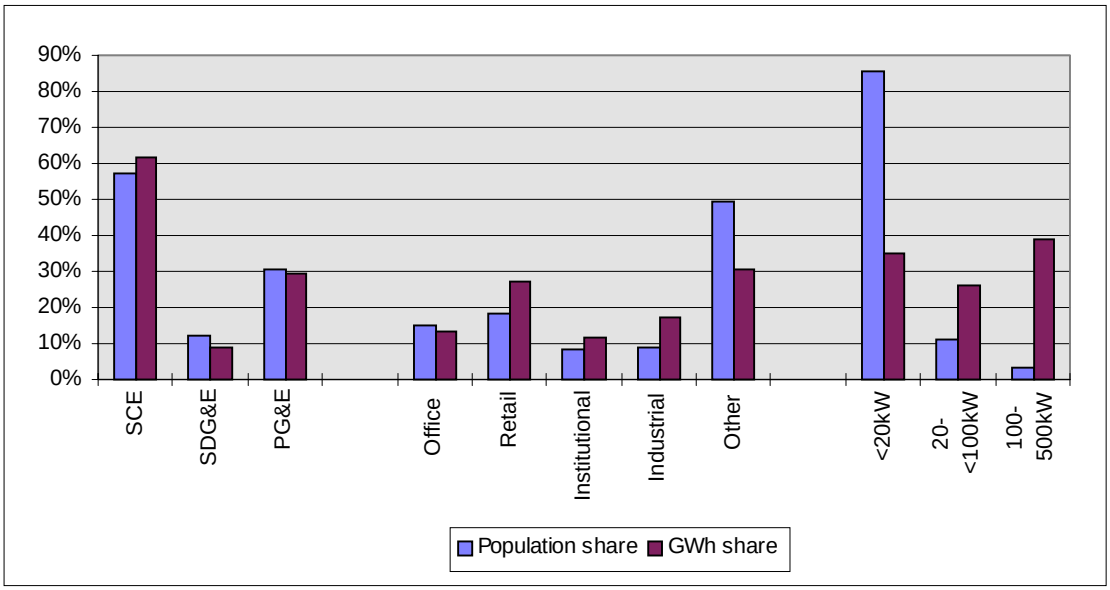
This subsection presents baseline information on small/medium nonresidential customers. It is based primarily on the interview data collected from a sample of California and OOS customers.

Firmographics

Figure 2-1 shows how the population of small/medium business customers of the three electric IOUs, Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), is distributed according to utility area, customer type, and customer size (kW demand). The distributions are shown by the number of customers (based on accounts) and electricity consumption. The biggest differences occur in the distributions by size (based on electric demand), where 85 percent of the customers are in the smallest category, but represent only about 35 percent of the consumption.

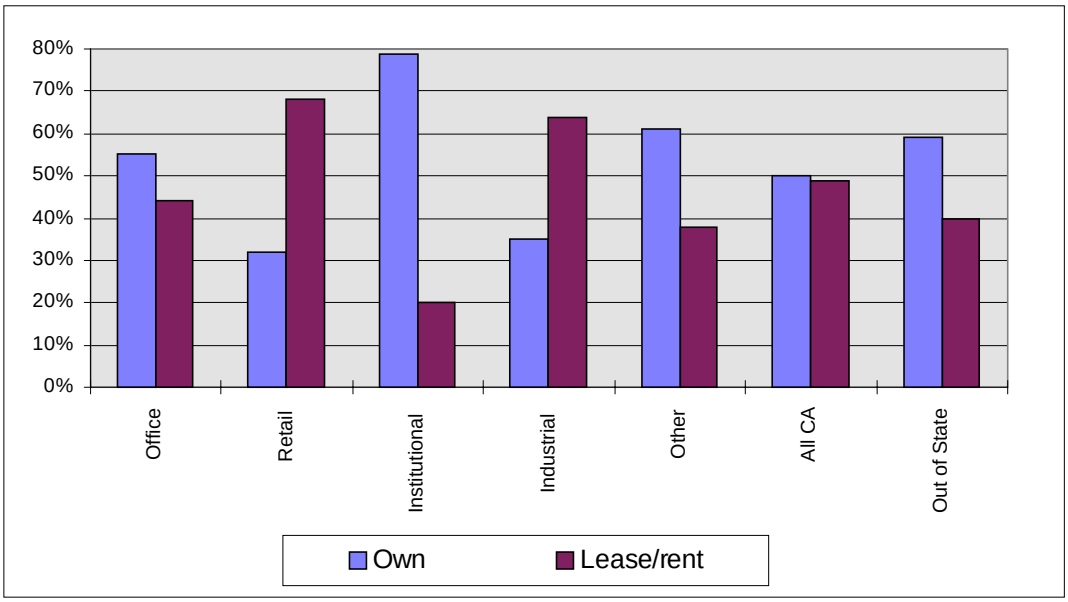
The distribution of small/medium customers in terms of floor area and number of employees is skewed toward smaller customers. The distributions in California and the OOS area are similar.

Figure 2-1
Small/Medium Business Customer Distribution



Half the California customers own their space and half rent/lease. As shown in Figure 2-2, the proportion owning their space ranges from 32 percent of retail customers to 79 percent of institutional customers and varies in size, from 40 percent for the smallest customers to 59 percent for the customers in the 100-to-500-kW category. Ownership in the OOS area (59 percent) is slightly higher than the California average.

Figure 2-2
Own or Rent Space (In CA)



Energy Costs and Efficiency

The median electricity bill for these customers in California is about $700 compared to about $400 for OOS customers (based on respondent self-reports of monthly bills). The estimated median bills are highest for California institutional customers at about $2,000 per month and lowest for other customers at about $600 per month. As would be expected, monthly bills are typically higher for larger customers. Of those customers who rent/lease, about 95 percent in California pay all or part of their electricity bill separate from the lease, but only about 85 percent in the OOS area do so.

Customers in California are slightly more likely than OOS customers to rate energy costs, as compared to the total costs of running their businesses, as being *somewhat* or *very important*. Institutional customers are most likely to consider energy costs to be very important (63 percent), and this is consistent with the fact that this group has the highest average bills. The results for the remaining customer types, however, are less correlated with the size of electricity bills. Industrial customers are the least likely to rate energy costs as very important.

The ratings of the importance of energy efficiency to their businesses are essentially equal between California and OOS customers (almost 80 percent say it's somewhat or very important). These ratings do not depend consistently on customer size. Customers deem their knowledge of energy efficiency to be moderate, and California and OOS ratings do not differ.

Energy-Efficient Equipment Attitudes and Perceptions

Lower operating cost is the most often mentioned advantage of energy-efficient lighting and cooling equipment. For efficient lighting equipment:

- *Longer useful life is mentioned much more often as an advantage by office and institutional customers.*
- *Improved lighting quality is mentioned most often by office, other, and retail customers.*
- *More flexibility in installation is most often noted as an advantage by institutional customers.*
- *Longer useful life is a more important benefit to larger customers.*

Overall attitudes toward energy-efficiency investments vary by customer type:

- *Customers in the office category generally have more positive attitudes and perceptions about energy-efficiency investments.*
- *Customers in the retail category tend to have more negative attitudes and perceptions.*
- *The results for institutional customers are the most mixed.*

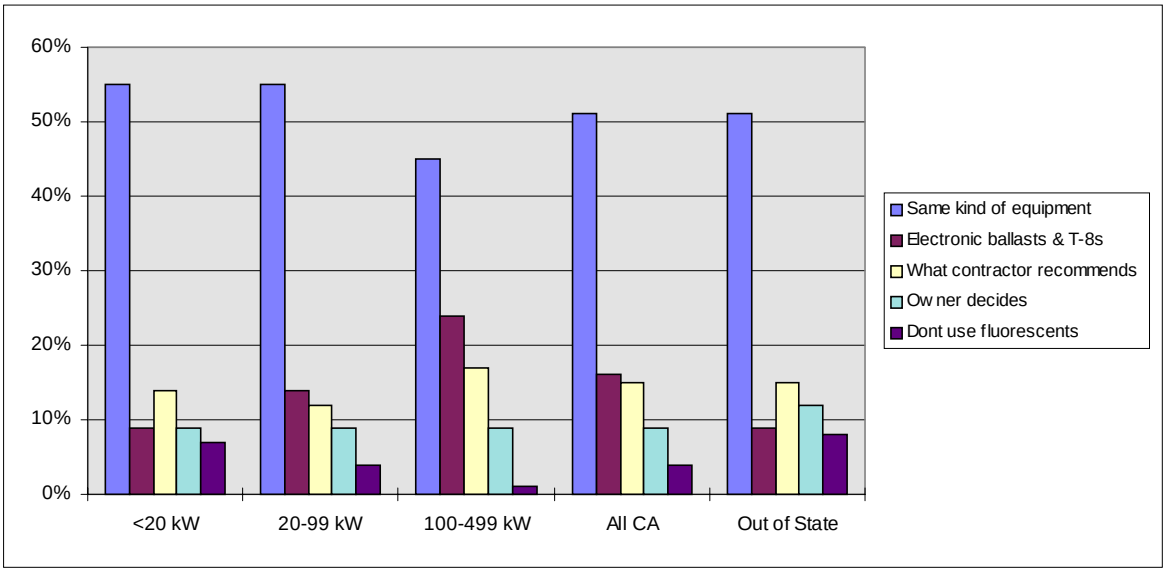
Larger customers are:

- *More likely to feel in control of energy-efficiency investments,*
- *More likely to believe that efficient equipment will perform at least as well as standard equipment,*
- *More likely to exchange energy-efficiency information with others, and*
- *Less likely to feel that lack of financing is an investment barrier.*

Equipment Changes

About 5 percent of customers make significant lighting changes annually and over half of them consider equipment of different efficiency levels. About 12 percent of California customers remodel each year. About one-third of the lighting changes are made as part of a remodel. Retail customers are the most likely to remodel. The smallest customers are the least likely to take either action. As shown in Figure 2-3, when asked with what they would replace a failed magnetic ballast, around half of customers said they would replace with another magnetic ballast, 16 percent said an electronic ballast, 15 percent said whatever their contractor recommends, and 8 percent said that the "owner" decides.

Figure 2-3
Replacement Decision Upon Failure of Magnetic Ballast



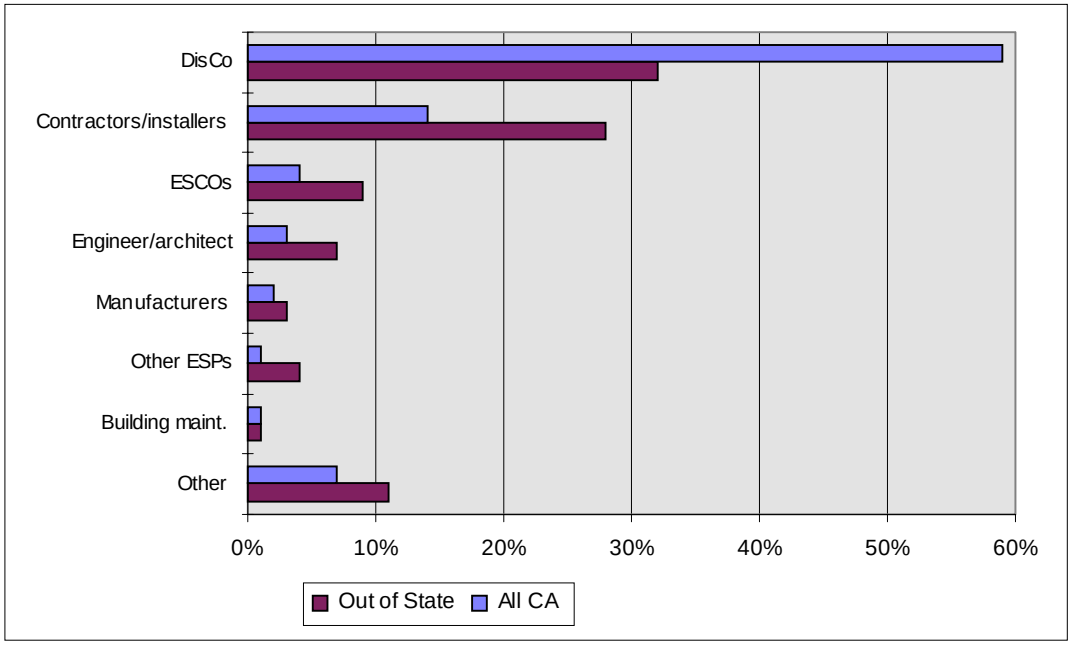
About 10 percent of customers per year report significant cooling system changes. Over half say they consider high-efficiency equipment and about 40 percent say that high-efficiency equipment was installed. About one-third of these changes occur as a part of a remodel. When asked with what level of efficiency they would replace their existing air conditioning units when they need replacement, 25 percent of those who ventured an opinion reported "standard efficiency," 32 percent "high efficiency," 32 percent "whatever contractor recommends," and 10 percent "building owner decides."

Energy-Efficiency Decisions

When customers opt to install efficient lighting or cooling equipment, the most common reason is reduced operating costs. When customers choose not to install efficient equipment, the reasons usually reported are economic or financial ones.

All customer groups indicate that they are most likely to call their utility before any other source for initial information about energy efficiency. As indicated in Figure 2-4, customers in California are twice as likely (59 v. 32 percent) as OOS customers to call their utility first. Institutional customers (16 percent) are much more likely than other customers to contact engineering/architectural firms first. Larger customers (9 percent) are more likely to contact ESCOs first than smaller customers.

Figure 2-4
Organization Likely to Call First for Energy-Efficiency Information



Although 80 percent of California customers use the Internet for business purposes, less than one-third of these use it to obtain energy information. Both shares are higher in California than in the OOS area.

As shown in Figure 2-5, only about one-third of California and OOS customers indicate that they have someone (internal or external) who is responsible for tracking energy usage and costs. The proportion varies with the importance of energy costs across customer types. Only about one-quarter of California customers report having any formal policies to select energy-efficiency equipment when making equipment purchases. Although this is well over the OOS percentage (15 percent), it is well below the percentage of the largest customers in the state who report such

a policy (61 percent).[1] Institutional customers and the larger customers are the most likely to have someone responsible for energy and to have a policy defined for making energy-efficient equipment decisions; industrial customers are the least likely to have a designated person or policy. About one-third of California customers apply some type of investment analysis to decisions about energy equipment; the proportion is slightly smaller for OOS customers. The use of investment analysis is highly correlated with size, as shown in Figure 2-6. Over half these customers in California use the payback period as the primary criterion.

Figure 2-5
Have Staff Assigned to Manage Energy Costs

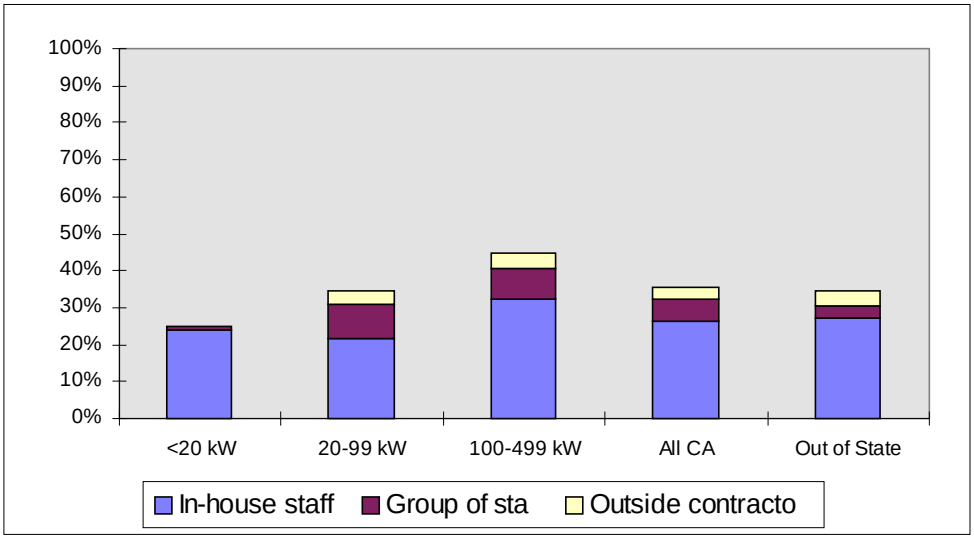
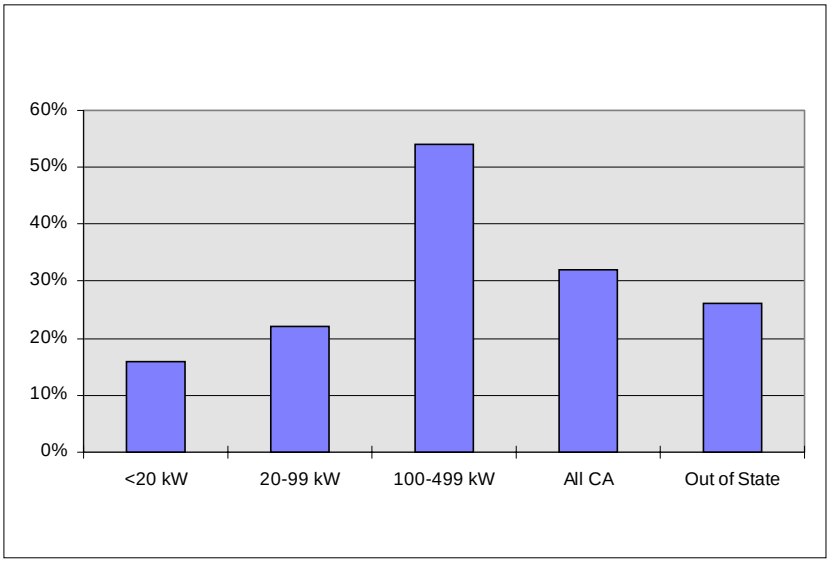


Figure 2-6
Use Formal Investment Analysis for Capital Investments



[1] See XENERGY, 1999. Evaluation of the 1998 Nonresidential Standard Performance Contract Program, Final Report, prepared for Southern California Edison and the California Advisory Board for Energy Efficiency, June.

Awareness of Energy-Efficiency Programs

About 80 percent of California small/medium customers are unaware of any specific or generic energy-efficiency programs. Office and institutional customers are most likely to be aware of some programs. There is negligible awareness of the SPC Programs, but about 11 percent of customers are aware of rebate programs. Of those California customers who are aware of some program(s), about 9 percent say they participated in a rebate program (including Express Efficiency) in 1999. No other program is mentioned by more than 4 percent of the knowledgeable customers.

2.1.2 Supply-Side Baseline Information

This subsection presents information on supply-side actors in the lighting and HVAC markets. The information is based primarily on our interviews of contractors and distributors for this study. It is organized by topical area, and information for the lighting and HVAC market actors is presented within each topic discussion.

General Market Description

Within California, the majority of commercial lighting products flow from manufacturers to distributors, from distributors to contractors, and then to end users (see Figure 2-7). Distributors also sell a significant fraction of fluorescent lamps, ballasts, and fixtures directly to end users. There are over 6,200 lighting contractor and 571 lighting distributor locations in California. Eighty-seven percent of the contractors and 71 percent of the distributors have fewer than 10 employees.

As shown in Figure 2-8, packaged A/C units flow primarily from manufacturers to distributors and then to contractors, who sell to end users, other contractors, and developers. There are almost 6,300 HVAC contractor and 232 HVAC distributor locations in California.

Firmographics

The following discussion presents fundamental information about the firmographics of companies involved in the supply side of the lighting and HVAC markets.

Lighting Market

Over 90 percent of California contractors who sell lighting equipment classify themselves as electrical contractors. The remainder classify themselves as energy service or lighting management companies. The majority of the distributors classify themselves as electrical equipment (41 percent) or lighting (41 percent) suppliers.

A large majority of California lighting contractors and distributors and OOS contractors have been in business over 10 years. Between one-quarter and one-third of contractors and distributors have been in business over 30 years. Contractors are relatively small businesses; over 80 percent of contractors have less than 10 full-time employees. However, a small number

Figure 2-7
Product Flows in the Commercial Lighting Market in California

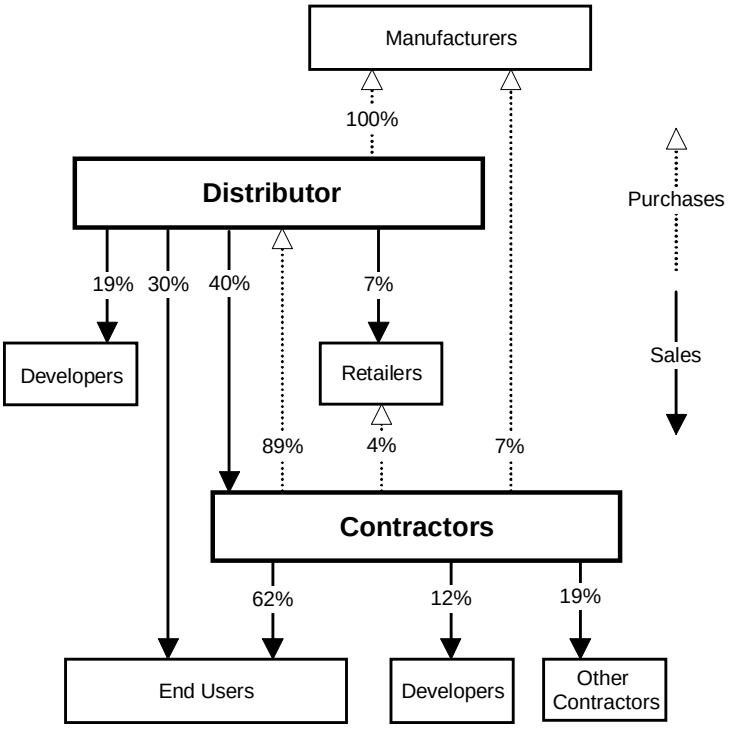
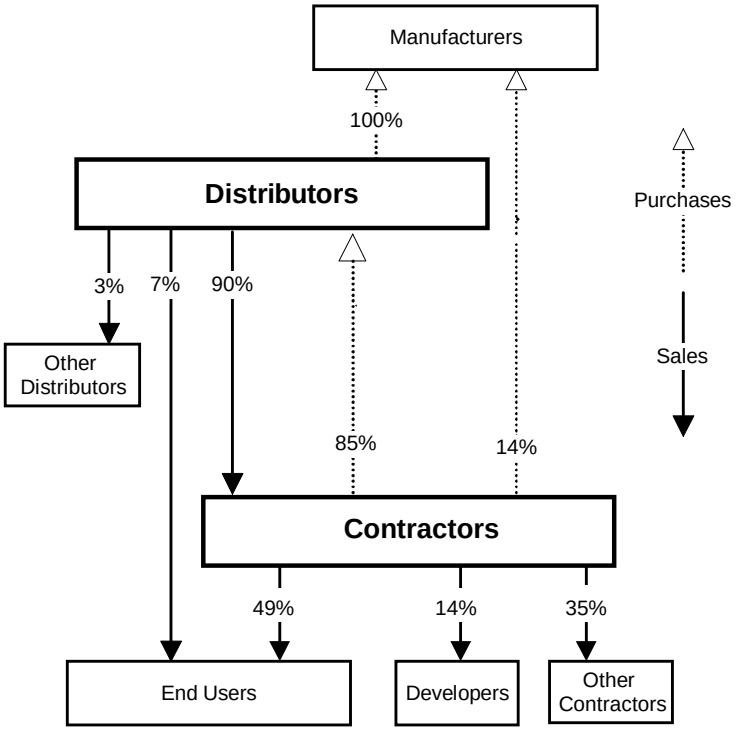


Figure 2-8
Product Flows in the Commercial Packaged A/C Units in California



of large contractors and distributors account for a significant share of the total market in terms of revenues.

Most lighting contractors had less than $5 million in sales for 1999. Nearly 90 percent of contractor sales are to the commercial or industrial sectors. California contractor projects are slightly more likely to be for new construction (53 percent) than retrofits or expansions (43 percent). California contractors are more likely than OOS contractors to report that they install advanced lighting technologies, such as dimming ballasts and occupancy controls, that are usually associated with higher efficiency.

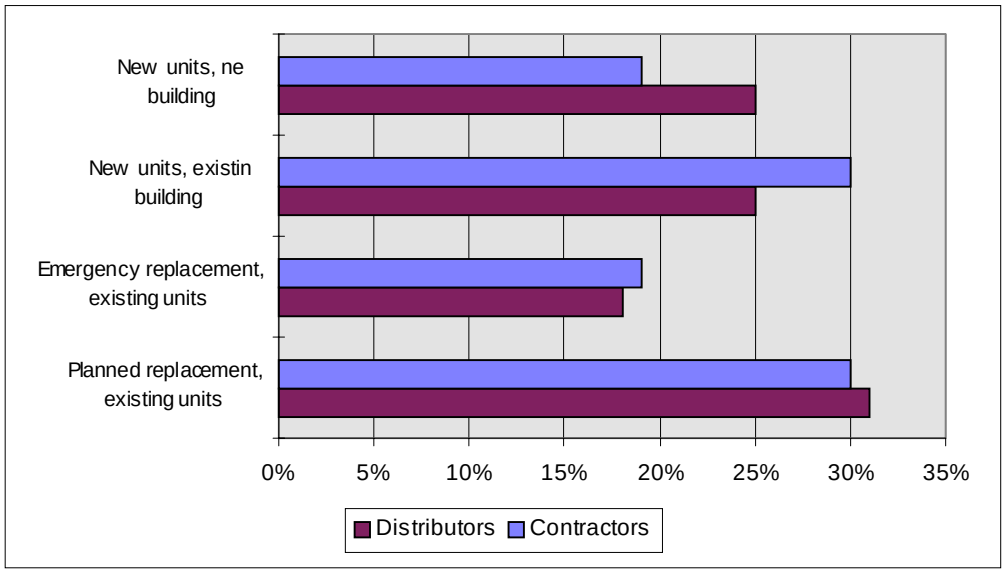
HVAC Market

Over 90 percent of California and OOS contractors who do HVAC projects classify themselves as HVAC contractors. A little over half the California distributors are manufacturer representatives, and about one-third are general industry suppliers.[2]

More than 75 percent of the California and OOS HVAC contractors and almost 90 percent of the California distributors have been in business at least 10 years. HVAC contractors are relatively small companies; over 80 percent of the firms have less than 10 employees.

Again, like lighting contractors, most HVAC contractors reported sales less than $5 million for 1999. Figure 2-9 indicates that most HVAC projects are retrofits; about one-third are planned replacements of existing units and about one-fifth are emergency replacements of existing units.

Figure 2-9
Breakdown of HVAC Projects by Market Event



[2] Note that we interviewed only 35 California distributors so the results presented here should not be treated as statistically reliable estimates for the population of California distributors.

High-Efficiency Products and Services

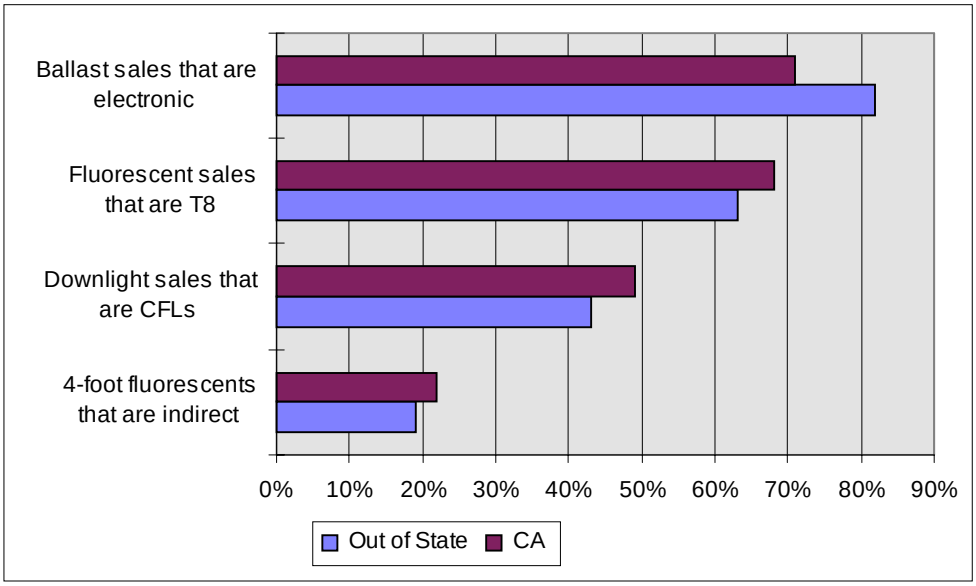
The following discussion presents information about the supply side for high-efficiency lighting and HVAC products and services.

Lighting Market

California contractors and distributors say that they recommend T8 and compact fluorescent lamps in about three-fourths of their jobs, and contractors are more likely to do so. California contractors are somewhat more likely to recommend high-efficiency lighting technologies than OOS contractors. Over 80 percent of the contractors and distributors indicate that, for competitive reasons, it is at least somewhat important to offer high-efficiency lighting equipment.

Contractors state that a substantial share of their sales are high-efficiency technologies. As shown in Figure 2-10, over two-thirds of fluorescent sales are reported to be T8s and half of downlight sales CFLs The shares for most high-efficiency technologies are higher for California contractors than for OOS contractors. Distributors report slightly lower efficient technology sales shares than the contractors.

Figure 2-10
Percent Sales of High-Efficiency Lighting Equipment by Contractors



Over 70 percent of the contractors, both in California and OOS, identify higher first cost as an obstacle to sales of high-efficiency lighting equipment. Only about half the distributors, however, mention cost. The major trends distributors expect in the lighting market are increased equipment efficiencies, more electronic devices, and more T8s and T5s.

Baseline levels of awareness of and participation in California utility efficiency programs are much higher among lighting contractors and distributors than among customers. About 20

percent of California contractors are aware of the Express Efficiency, SBSPC, or Large NSPC Programs, and over 60 percent are aware of utility audit programs. Even larger proportions of distributors are aware of these programs. The primary source of information about these programs cited by both contractors and distributors is the utility; colleagues are the second most common source. Although 65 percent of California contractors and 85 percent of distributors say they use the Internet for business purposes, only 15 percent of the contractors and 13 percent of the distributors report having looked at a utility's energy-efficiency section of its web site.

Between one-third and two-thirds of those California contractors and distributors who are aware of specific programs say they have used them to increase their sales. About 20 percent of contractors and 40 percent of distributors who are aware of programs indicate that they have had a substantial effect on their sales. About two-thirds of the California contractors and half the distributors say the programs have had at least a moderate effect on their opinion of the quality and performance of high-efficiency equipment. California contractors and distributors recommend improved information, promotion, and financing/rebates to enhance the utility efficiency programs.

HVAC Market

California HVAC contractors say that they recommend or specify high-efficiency units in 66 percent of their jobs, compared to only 40 percent of OOS contractors. California distributors say that they do so for 54 percent of their sales. About 70 percent of California and OOS HVAC contractors say that for competitive reasons it is at least somewhat important to offer high-efficiency equipment.

About a third of sales are estimated to be high-efficiency units. As illustrated in Figure 2-11, the shares are slightly higher for California contractors than OOS contractors. Distributors report slightly lower high-efficiency shares than contractors. The smaller the unit, the more likely distributors are to stock high-efficiency models—86 percent stock high-efficiency units smaller than 6 tons, but only 23 percent stock high-efficiency, 20-ton units.

Over 60 percent of contractors and distributors say that it is somewhat or much more difficult to sell high-efficiency packaged units than standard efficiency units. Cost is cited most often as an obstacle to selling higher efficiency units. Most contractors typically expect few changes in the packaged A/C market over the next three years; 30 percent of California contractors, however, anticipate increases in energy efficiency.

Baseline levels of awareness of California utility programs by HVAC contractors are comparable to the levels for lighting contractors. About 60 percent are familiar with the utility business energy audits. Awareness of the SPC Programs, however, is lower among HVAC contractors (12 percent for SBSPC and 7 percent for LNSPC) (See Figure 2-12).

Figure 2-11
Self-Reported Sales of High Efficiency HVAC Units

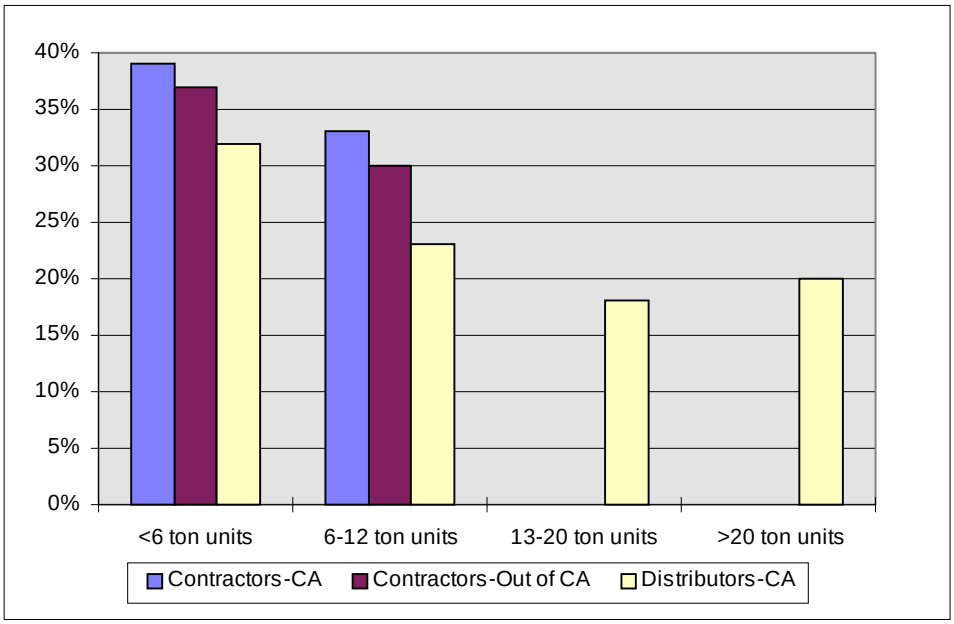
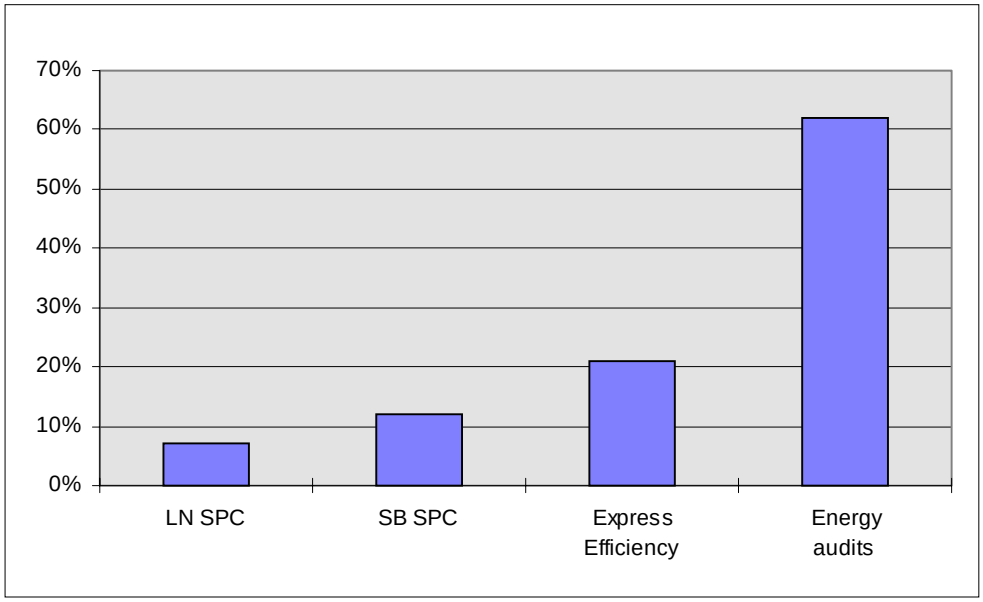
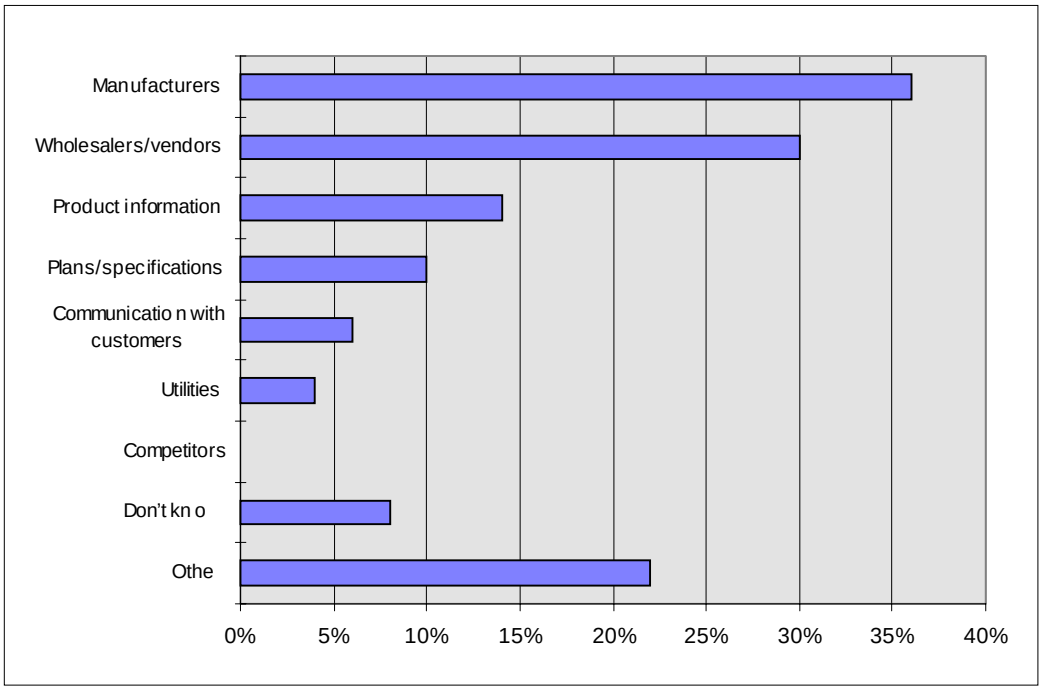


Figure 2-12
HVAC Contractor Awareness of California Utility Programs



For about half the California contractors, the primary source of program information is the utility; a trade organization is the first source for about 20 percent. Although 86 percent of California HVAC contractors say they use the Internet for business, only 13 percent have looked at a utility's energy-efficiency section of its web site. As shown in Figure 2-13, contractors in California report that the most common types of information they seek on the Internet are manufacturer and wholesaler/vendor information.

Figure 2-13
Types of Information Sought on the Internet by HVAC Contractors



Between 20 percent and 50 percent of California contractors aware of various utility efficiency programs say they have used them to increase sales. Less than 20 percent, however, say the programs have had a substantial effect on sales of high-efficiency products. Only about one-third say the programs have had even a moderate effect on their opinion of the quality and performance of high-efficiency HVAC equipment. California contractors identify improved rebates/financing, promotion, and education as the best ways to improve the utility programs.

OOS HVAC contractors indicate fairly high levels of awareness of utility efficiency programs. Over half say they are aware of audit and information programs. Of those aware of audit, rebate, or information programs, over half say they have used these programs to improve product and service sales.

2.2 PROGRAM PARTICIPATION STATISTICS AND KEY FINDINGS

This subsection presents the primary findings from our analysis of the Express Efficiency and SBSPC Program participant data. It presents summary statistics first, followed by information on specific topics covered by our participant interviews. Highlights of the program participant findings are presented by topical area. Findings for the Express Efficiency Program are usually presented first, followed by information for SBSPC participating customers and EESPs. Section 7 presents detailed information on the Express Efficiency Program participants and Section 8 presents details on the SBSPC participants.

2.2.1 Participation Statistics

Table 2-1 summarizes participation statistics for the Express Efficiency and SBSPC Programs. Detailed data are presented in Section 4. About 25 times as many projects were conducted under the Express Efficiency Program than through the SBSPC Program.[3] The incentive levels indicate that the average Express Efficiency Program project was considerably smaller than the average SBSPC project. A larger value of Express Efficiency incentives was distributed in PG&E's area than in any other area; for the SBSPC, the biggest fraction of the incentives went to customers in the SCE area. Lighting dominated the Express Efficiency rebates. As intended by the incentive structure, the majority of the SBSPC incentives went for non-lighting measures, with almost half going to "other" measures such as VSDs and process motors.

Table 2-1
Overall Program Statistics

Characteristic	Express Efficiency	SBSPC
Total customer participants	3,297 (unique sites)	133
Incentives paid	$7.6M	$1.7M
Distribution of incentives by utility	PG&E = 60% SCE = 17% SDG&E = 23% SCG = 7%	PG&E = 41% SCE = 45% SDG&E = 14% SCG = N/A
Distribution of incentives by end use	Lighting = 64% HVAC/Refrig. = 26% Other = 10% (*Lighting is 90% of kWh savings)*	Lighting = 22% HVAC/Refrig. = 33% Other = 45%
Distribution of incentives by customer type	Industrial = 2% Institutional = 8% Office = 9% Other = 42% Retail = 9% Unknown = 30%	N/A
Distribution of incentives by customer size	100-500 kW = 39% 20-99 kW = 17% <20 kW = 25% Unclass. = 19%	N/A

Consistent with their relatively low level of program awareness and their low rating of the importance of energy costs, the smallest share of the Express Efficiency incentives went to industrial customers. The largest share went to customers in the other category; this is despite the fact that electricity bills are the smallest for this group, although they may be a significant

[3] An exact comparison was not possible because of how different sites or applications are counted for a single customer.

share of operating expenses. The office, retail, and institutional shares were all about equal. The incentive shares were distributed about the same as for the population of customers by type, but the industrial customers were underrepresented. Based on energy use, retail and industrial customers were more underrepresented. Based on size measured by customer demand, the largest customers were slightly overrepresented in the program.

The information presented above is based on our analysis of data sets received from each of the utilities from December 1999 to March 2000. As such, neither those data sets nor summaries presented in this section represent final "official" records of 1999 participation (particularly from a regulatory point of view).

2.2.2 Participant Characteristics and Measures Implemented

This subsection presents additional details on participant characteristics and the measures they implemented.

Express Efficiency Program

As noted above, the share of *Express Efficiency Program customer participants* in the largest demand group (100 to 500 kW) was a little larger than the population share. When examined using floor area as a measure of customer size, however, the largest customers are significantly overrepresented, and the smallest customers are very underrepresented in the Express Efficiency Program, as shown by Figure 2-14.[4] Although customers smaller than 5,000 sq. ft. comprise the *largest* group in the population (weighted based on energy use), they are the *smallest* group of program participants.

As noted earlier, lighting measures were most likely to be installed and HVAC measures were the second most likely to be installed under this program. About half the participants had undertaken facility renovation or remodeling projects within the prior three years, which is an annual rate a little higher than that for the general population. Participants indicated that lighting and HVAC replacements or installations were included in well over half the remodels, which appeared to be two to three times the rate for the baseline customers. Consequently, this market event appeared to be a major opportunity for equipment upgrades under the Express Efficiency Program.

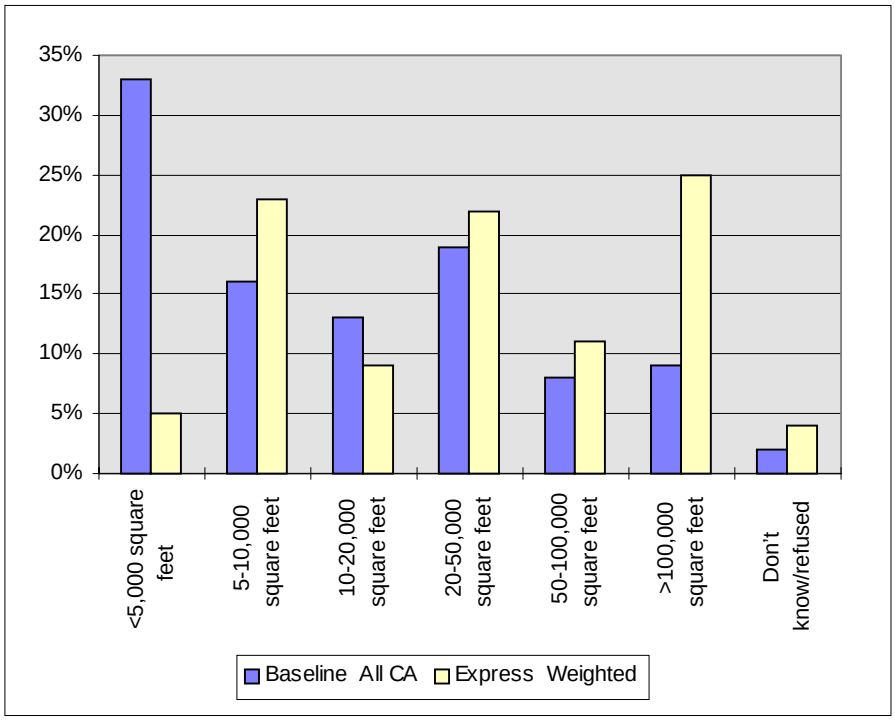
Participation in the Express Efficiency Program was relatively low statewide. Only about 0.5 percent of eligible customers participated.

SBSPC Program

A significant proportion of the incentives to *SBSPC customer* participants were received by chains that were upgrading multiple sites. All the customers we interviewed were responsible for their own utility bills, even those who were leasing their space, and this was similar to the

[4] This is true when customer size is measured in terms of number of employees also.

Figure 2-14
Distribution of Population and Express Efficiency Participants by Floor Area



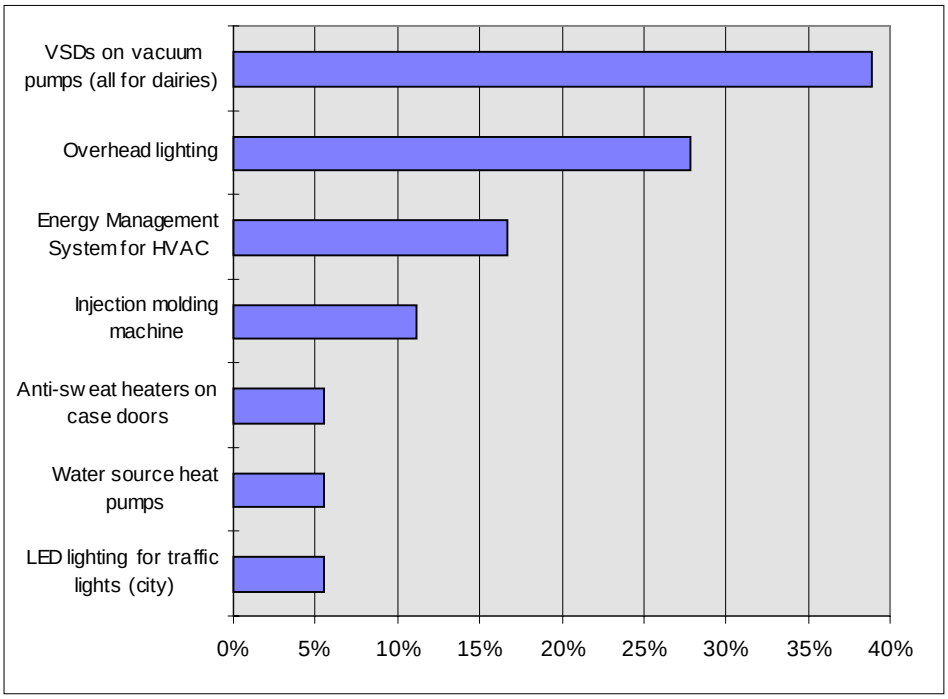
population statistics. Dairies stood out as a unique group among the *SBSPC customer* participants—over half the PG&E and SCE participants were dairies.

The *SBSPC Program EESP* participants were a diverse group. Although about one-third were ESCOs, nearly as many were specific equipment contractors. The size of those we interviewed ranged from between $70,000 and $17 million in annual sales. On the average, about two-thirds of their business was with the small customers targeted by the program. Most of the EESPs we interviewed had submitted multiple project applications, with an average of eight per EESP. Across the population of participants, most EESPs had participated in a single utility's SBSPC Program, but about one-fourth had worked in two or more utility areas.

As indicated earlier, unlike the Express Efficiency Program the SBSPC Program led to a diversity of energy-efficiency measure installations, with lighting comprising a relatively small share (See Figure 2-15).

The participation rates for both customers and supply-side actors were very low for the SBSPC. Only 0.01 percent of the eligible customers participated in the SBSPC, and about 40 EESPs (out of tens of thousands of contractors) participated. The SBSPC expenditures were only 17 percent of the amount budgeted for the program.

Figure 2-15
Measures Installed by SBSPC Participants Interviewed



2.2.3 Reasons for Participating

Customers and EESPs provided some information about their reasons for participating in the utility programs.

Express Efficiency Program

As indicated in Figure 2-16, over half the *Express Efficiency customer* participants said that they participated in the program because they wanted to save money on their electric bills. This is consistent with the fact that the primary benefit the baseline customers attribute to efficiency measures is their lower operating costs. About 20 percent said they participated to receive a rebate, acquire the latest technology, or improve performance. In the PG&E area, a much larger proportion than elsewhere (over one-fourth) said they participated to acquire the latest technology. Statewide, three-fourths of the participants said they had used the program to replace fully functional equipment. About half the Express Efficiency customer participants had participated in utility programs in the past three years. Those receiving the largest Express Efficiency rebates were more likely to have participated previously.

SBSPC Program

As illustrated in Figure 2-17, an even larger share (75 percent) of *SBSPC customer* participants stated that reducing energy costs was their primary reason for participating. The second most common reason was obtaining a rebate. The decision to install specific high-efficiency equipment under the program was motivated primarily by the program incentive. However, the

services provided by the EESP were also important—83 percent of the customers said that EESP services were at least somewhat significant in their decision

Figure 2-16
Reasons for Participation in the Express Efficiency Program

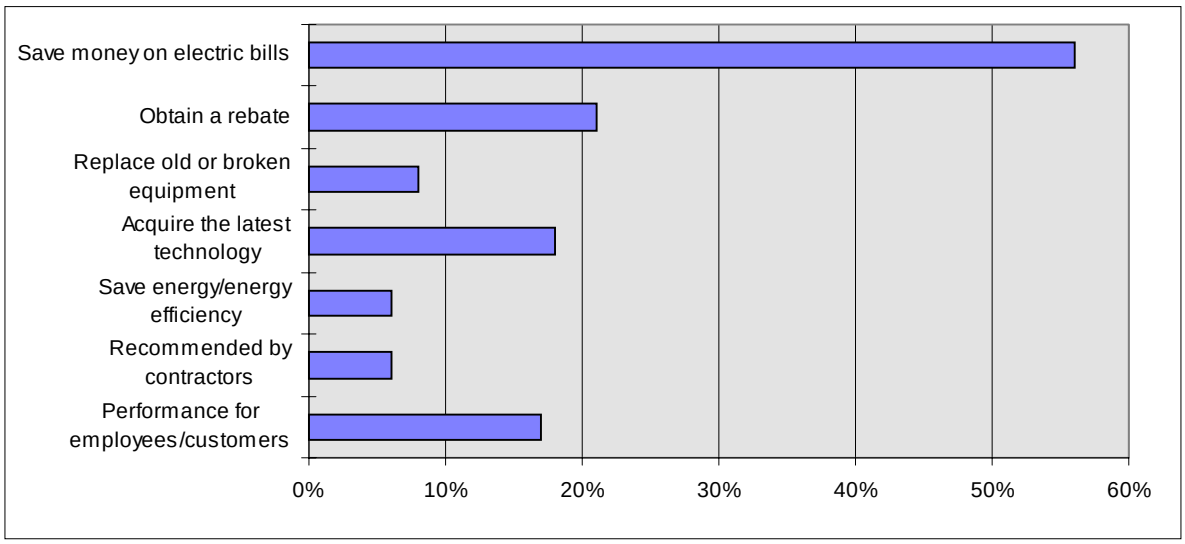
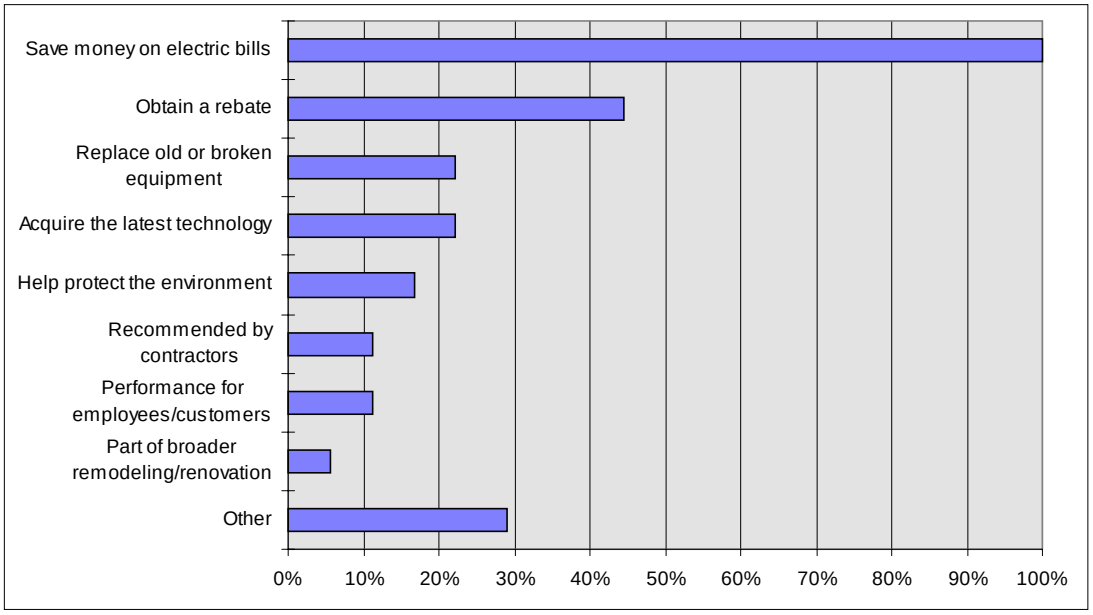


Figure 2-17
Reasons for Participation in the SBSPC Program



The *SBSPC EESP* participants were not asked specifically why they had participated in the program. When asked about future participation, however, all indicated that they would participate because they felt the program was good for their revenues. As noted earlier, about

three-fourths of the contractors interviewed in the baseline study indicated that it was at least somewhat important for them to offer efficiency products and services to maintain their competitive position.

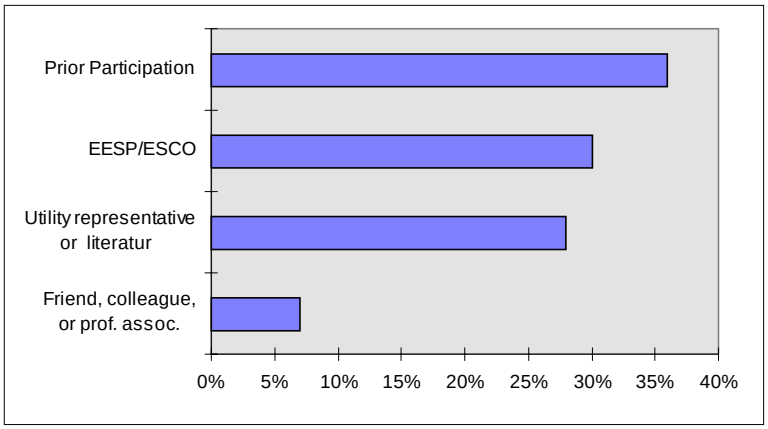
2.2.4 Program Awareness and Knowledge

The participants provided information about how they became aware of the programs.

Express Efficiency program

As illustrated in Figure 2-18, the *Express Efficiency customer* participants indicated that the most common sources of information about the program were suppliers, utility account representatives, and their prior participation in the program (or similar rebate program) in previous years. The customers receiving the largest rebates were more likely to have participated because of prior program participation.

Figure 2-18
Source of Initial Information about Express Program



SBSPC Program

As indicated in Figure 2-19, *SBSPC customer* participants were most likely to have heard about the program through utility sources (33 percent) or product or service providers (23 percent). About 20 percent heard about the program through professional associates or friends. *SBSPC EESP* participants were not asked where they heard about the program. All those we interviewed indicated that they felt quite knowledgeable about the program.

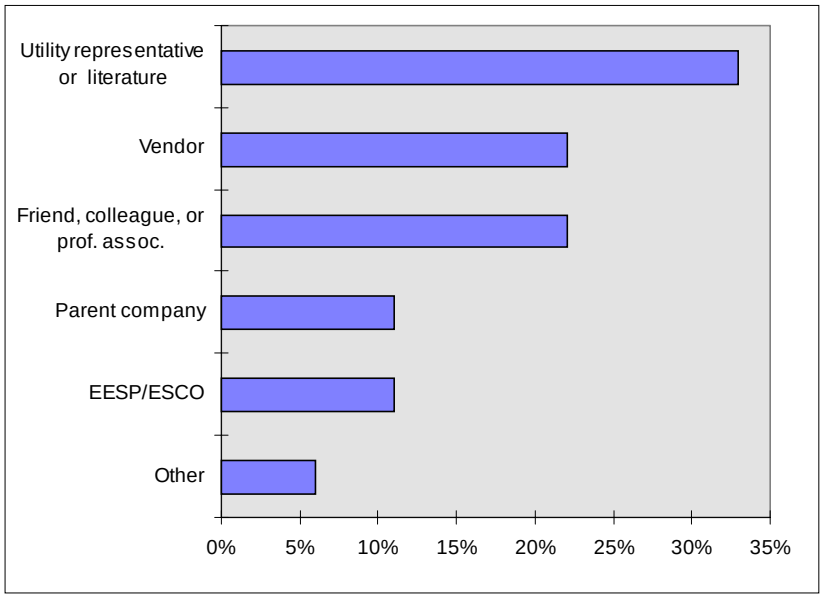
2.2.5 Program Strengths and Weaknesses

The customers and EESPs provided their observations about the strengths and weaknesses of the two programs.

Express Efficiency Program

Virtually all the *Express Efficiency customer* participants were somewhat or very satisfied with the program. Over 90 percent were satisfied with their interactions with the utility. The most

Figure 2-19
Source of Initial Information about SBSPC Program



common areas in which customers were satisfied were the overall process, project management, consistency with expectations, and a good payback on their investment. Just under 20 percent were dissatisfied with unexpected or hidden costs associated with the program. Only about 3 percent of the customers indicated that they had had negative experiences working with the utility in the program. Customers were almost universally satisfied with their experiences with product and service providers. Although most were satisfied with the equipment installed through the program, about 20 percent were not.

SBSPC Program

Most *SBSPC customer* participants were satisfied with their program experiences also. Customers generally had little contact with the utility under this program, but they generally gave the utility good marks. The incentive was mentioned most often as the major benefit of the program, allowing customers to install equipment they would have been unable to otherwise. Dissatisfaction with the program was usually related to how long the program steps took (almost half mentioned that the amount of time required was a problem), the quantity of paperwork, or program delays and inadequate responsiveness. Generally, the EESPs insulated customers from the paperwork and M&V requirements, but half the customers commented on the M&V requirements, and most felt that they were excessive. Although only 1 customer (of the 18 interviewed) mentioned it, it's worth pointing out that he complained that M&V requirements differed across utility areas, and there was no way to combine the data from sites across the utility areas to verify energy savings. One customer noted that the M&V was useful because it demonstrated the energy savings.

SBSPC EESP participants were satisfied with the program in general. About 80 percent noted that the incentives were a strength of the program. EESPs felt that the incentives were beneficial

because they allowed customers to install measures they probably would not have installed otherwise and several felt that the incentive reduced customer risk and increased customer confidence in the measures. EESPs focused on excessive paperwork, excessive M&V requirements, and lack of advertising as program weaknesses. Nearly 70 percent felt that M&V requirements were too stringent; about one-third noted that they were inconsistent and another third felt that they were too inflexible. Three-fourths felt that advertising was inadequate.

The EESPs indicated that their costs associated with participating in the SBSPC consumed a sizable share of the incentives. They estimated, on the average, that about 20 percent of the incentive amount was used to meet M&V requirements and another 20 percent was required to complete the paperwork.

The large number of SBSPC projects with dairies in the PG&E and SCE areas also illustrated noteworthy market changes. One third party initiated steps to recruit several dairy equipment suppliers, who became active promoters of VSDs to dairies. Consequently, dairies accounted for the single largest group of participants. It appeared that participation increased dramatically among the dairies through observation and communication, either from one dairy to another or by way of EESPs.

2.2.6 Customer Experiences with Third-Party Providers

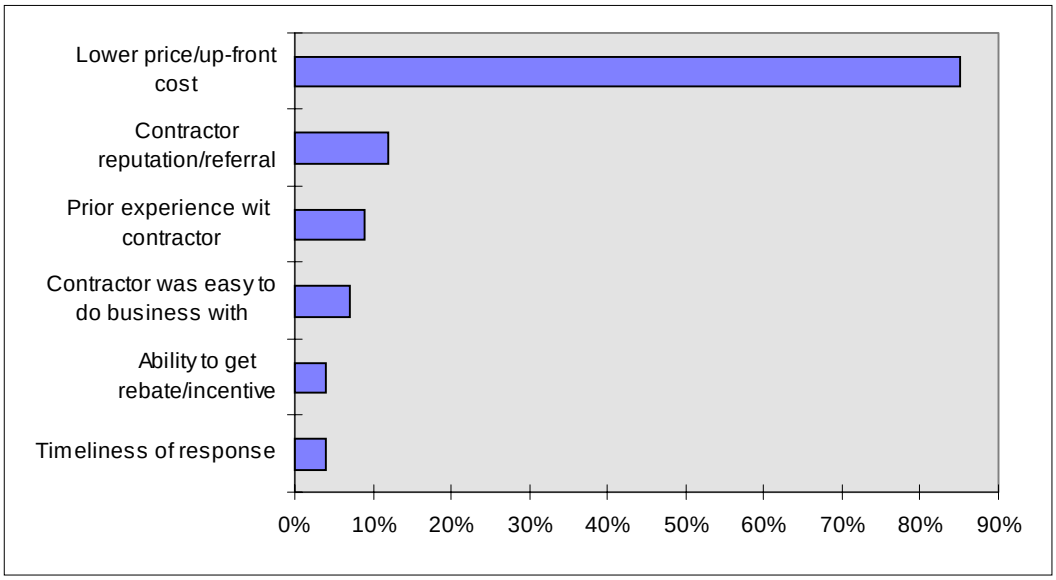
Customers in both programs worked with a range of third parties. They provided feedback on their experiences.

Express Efficiency Program

About 80 percent of the *Express Efficiency customer* participants used a third party to install equipment under the program, usually a general or specialty contractor. Customers were less likely to use a third party on smaller projects. Well over 90 percent of the customers reported that they were satisfied with their provider. About three-fourths of those who used outside providers said that the provider was influential in the decision to participate in the program; the third party was more likely to influence the decision to participate for the smaller projects.

About three-fourths of the *Express Efficiency customer* participants using outside providers obtained two or more bids for the job. Multiple bids were more common for the larger projects. Consistent with the information from the baseline customers, lower first cost was the major deciding factor among the bids; the efficiency level offered was rarely a deciding factor (see Figure 2-20). However, nearly two-thirds of all customers who used outside providers did review different efficiency levels for the equipment installed; this was higher than for the baseline customers, of which about half considered different efficiency levels. Almost all customers said that the EESP was influential in the efficiency level selection, and this contrasts with baseline customers who say that the contractor has little influence on the equipment that they select.

Figure 2-20
Reasons for Selecting Winning Contract From Multiple Bids for Express Efficiency



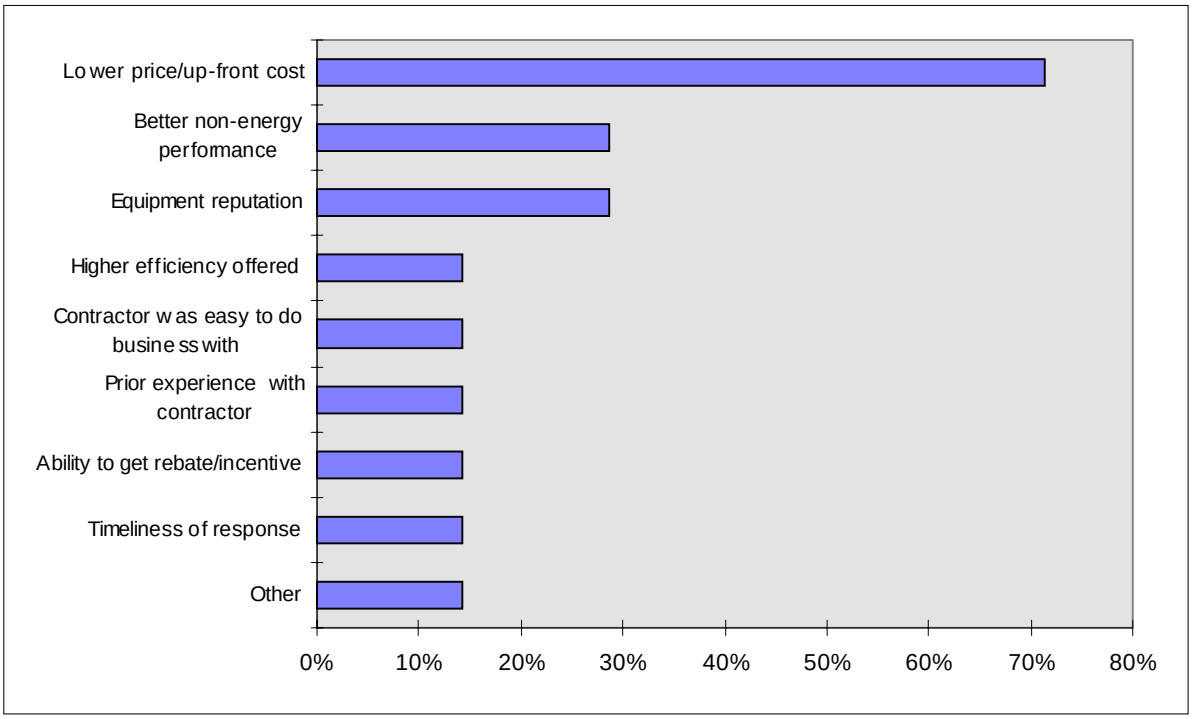
SBSPC Program

SBSPC customer participants generally rated their experience with EESPs as good or excellent. EESPs were effective in helping customers understand the economic benefits of participating and making the decision to participate. About half the customers said that they were receiving other services from the EESP. Half had worked with the SBSPC EESP in the past, and two-thirds said they expected to use the contractor in similar future projects. In contrast to information provided by the baseline sample of customers, the relationship that customers participating in the SBSPC develop with EESPs appears to be a more trusting one in which customers rely heavily on the contractor.

The *SBSPC customer* participants were most likely to describe their SBSPC contract arrangement as a fee-for-service contract. About 40 percent had heard the term "energy performance contracting" prior to the program. One-third had been approached by a company offering a performance contract earlier, but only one had participated in one. All the customers said that they would receive (or had received) either all or part of the utility SBSPC incentive that went to the provider. Customers who were familiar with performance contracting prior to the program were more likely to receive the full incentive.

About 40 percent of the *SBSPC customer* participants had obtained multiple bids for the work conducted under the project. Consistent with the Express Efficiency Program and baseline customer groups, lower up-front price was the primary criterion used to select among the bids (see Figure 2-21).

Figure 2-21
Reasons for Selecting Winning Contract from Multiple Bids for SBSPC



2.2.7 Customer Energy-Efficiency Attitudes and Perceptions

The data from *Express Efficiency customers* provided some insights into their attitudes toward energy efficiency and the effects of the program.[5] Eighty-one percent of participants said that energy efficiency was somewhat or very important to their decision-makers. Somewhat surprisingly, this was essentially the same as the proportion of respondents in the California baseline group who rated energy efficiency to be at least somewhat important.

Participating small/medium customers had major concerns that bill savings might be less than estimated. Two other areas of significant, but lesser, concern were uncertainties about the information provided by non-utility firms and that energy efficiency usually fell below other priorities within their company. These three concerns are also ranked among the highest by the baseline customers; however, none are considered to be very significant issues.

About two-thirds of these customers indicated that they actively advocated energy-efficient practices and over 80 percent said that they were somewhat or very knowledgeable about energy-efficient products. We could not compare these results directly with those for customers in the baseline group, but they appeared to be more positive than the results for the general population.

[5] Comparable data were not collected from the SBSPC customer participants because 1) it would have caused the interview length to exceed acceptable limits, 2) the priority for the SBSPC assessment was to assess process issues and free ridership estimates, and 3) the sample size was too small to provide statistically reliable estimates.

Programs such as Express Efficiency appear to be influential in shaping customer attitudes and practices. About half the participants indicated that the program had increased their overall confidence in energy efficiency and over two-thirds said that it was very important in influencing their consideration of energy efficiency in the future. The rebate component of the program by itself had significant effects on customer attitudes and perceptions. Nearly three-fourths said that the rebate was very important in overcoming potential cost barriers, and about half indicated that it had increased their confidence in the energy-efficient equipment they had installed.

2.2.8 Program-Related Decisions

Customers provided information about the role of the programs in their decision to install efficient equipment.

Express Efficiency Program

The data from *Express Efficiency customers* suggested that the program played an important role in the decision by many customers to install the equipment that they did under the program. Only about one-fourth said that they had plans to install the equipment before hearing of the program (note that about three-fourths said that they had replaced fully functional equipment).

SBSPC Program

Based on the interview data, the program and EESPs influenced *SBSPC customer* participants in their decisions about installing equipment. Over 90 percent of the customers had learned about the program before making a decision to install the equipment. EESPs were instrumental in encouraging customers to make the changes, but nearly 30 percent of the customers said that they had originated the idea of installing the equipment and made the decision themselves. Customers were most likely to have heard about the program from an EESP/vendor or utility. As noted earlier, the incentive and EESP services were both significant factors in the customer decision to install equipment under the program. Similar to the results for the Express Efficiency Program, only about one-fourth of the SBSPC customer participants said that they were likely to have installed equally efficient equipment within a year.

2.2.9 Suggestions for Improving the SBSPC

Both *SBSPC customer* participants and *SBSPC EESP* participants provided suggestions on improving the program. Both groups emphasized the need to 1) simplify and increase consistency in the process, 2) reduce the time required to complete the process, and 3) increase advertising. Customers also noted that they could benefit from access to more literature or materials that could be used to convince their decision-makers to participate. These findings are similar to those from the baseline customer and contractor interviews in which the main recommendations to improve utility programs included increased promotion and education/information (as well as better rebates/financing).

Some of the specific suggestions offered to address these areas included the following:

- Standardize the M&V calculations
- Combine the BPA and DPA steps
- Allow pooling of project data across sites in different utility areas
- Develop ways to help offset start-up costs (e.g., by loaning required equipment)
- Increase the limit on incentives per customer
- Provide customers with more information on how much they contribute to efficiency program funding to encourage more program involvement
- Publish lists of service providers
- Provide examples of successful projects.

As noted in Section 2.3, a number of these changes were planned for PY2000.

2.2.10 Free-Ridership Rates of the Programs

A series of questions posed to the program customer participants helped estimate free-ridership rates.

Express Efficiency Program

The free-ridership analysis of the *Express Efficiency customer* participant data indicated that the statewide free-ridership rate was about 34 percent (on a weighted basis). Thus, about one-third of the energy savings under the program were estimated to be savings that would have occurred in the absence of the program.

SBSPC Program

The comparable estimate for the *SBSPC customer* participants was very similar—38 percent free ridership (on a weighted basis).[6]

2.3 RECENT SPC PROGRAM MODIFICATIONS

The Phase I report for this study provided early indications about areas in which the 1999 SBSPC could have been improved. That report, previous reports on the SPC, and other information sources provided feedback to the utilities for consideration in the design of the 2000 program. This subsection highlights recent programmatic changes that have been proposed or undertaken to overcome some of the problems identified in the 1999 program.

[6] We note that the estimate for the SBSPC Program, however, was based on only 18 participating customers (but they did represent 25% of the incentives).

2.3.1 Proposed Changes to SBSPC Program for PY2000

To address recognized weaknesses in the 1999 SBSPC Program, the three utilities proposed several modifications for the PY2000 SBSPC Program. The modifications focused on simplifying and streamlining the application process and M&V requirements and increasing the number and size of eligible projects. Table 2-2 summarizes the changes excerpted from materials handed out at a workshop sponsored by the utilities in April, 2000 on the proposed changes to the SPC programs.

Table 2-2
Proposed Modifications to SBSPC from PY1999 to PY2000

Program Details	PY 1999 Requirements	PY 2000 Proposed Changes
Minimum project size	20,000 kWh or 2,000 therms per year in annual savings	10,000 kWh or 2,000 therms per year in annual savings
Financial incentive cap/site	$40,000	None
Payment structure	40% (Installation Payment) 60% (1st Yr. Performance Payment)	60% (Installation Payment) 40% (1st. Yr. Performance Payment)
Basic Project (BPA) and Detailed Project Application (DPA)	BPA and DPA forms required	Project Application form (combines information on the BPA/DPA forms)
BPA submittal	Required	Optional
Application Fee	Waived in PY99 ($100)	Not required
Security Deposit	2 ½ % of incentive	Not required

In addition to the changes shown in the table, customers would have the choice of using calculated savings levels for common measures, such as lighting and VSDs or performing more detailed M&V to receive additional incentives potentially from further demonstrated savings. In response to difficulties with the Excel spreadsheets used in PY99, the PY2000 forms can be completed manually or electronically using forms created in Visual Basic, which only requires a personal computer.

2.3.2 FasTrac Performance Contracting Program

To "test the feasibility of using performance contracting for smaller energy-efficiency projects not suited for the LNSPC Program," SDG&E developed the FasTrac Performance Contracting Program. This program preserves the essential features of the LNSPC Program while offering more streamlined and simplified application, M&V, and funds disbursement procedures. The process consists of the following steps:

- Completed application form

- Detailed project description
- Site inspection
- Customer affidavit
- FasTrac program agreement
- Installation
- Post-installation inspection
- First payment
- Performance period (9 months)
- Retention analysis
- Final payment.

Customers must work through an independent sponsor, such as an ESCO, contractor, or manufacturer's representative, and are not allowed to self-sponsor under the program. The M&V requirements use stipulated savings parameters based on standard Wattage tables provided, with calculated savings and a retention analysis. Currently, only lighting and HVAC measures are eligible under the program, but additional measures may be eligible in the future. Table 2-3 presents the incentive levels offered through the program.

Table 2-3
SDG&E FasTrac Incentive Levels

Measures/Technologies	Incentive Rates
Lighting	5.0¢ per kWh
Air-conditioning & refrigeration	16.5¢ per kWh
Motors/other	8.0¢ per kWh
Gas	27.0¢ per kWh

Each customer is eligible for up to $25,000 of incentive funds. However, a project receiving FasTrac funds is not eligible to receive incentive funds from any other SDG&E energy-efficiency program. The project sponsor receives two payments: the first is based on 50 percent of the energy savings and is made within 30 days after the installation has been inspected and approved by SDG&E. The retention analysis serves as the basis for the second incentive payment amount, which may be adjusted to reflect deficiencies in actual savings compared to estimated savings.

2.4 CONCLUSIONS AND RECOMMENDATIONS

Based on this study of the 1999 programs, we offer several strategic recommendations as input to the on-going planning process. We offer these more as strategic guidelines rather than detailed, conclusive recommendations. We note that the small/medium market has only recently been broken out as a separate programmatic area and, as such, policy goals are still evolving for this market. Although some recommendations apply to a specific program, many are overarching suggestions that are built on basic fundamentals about how to address the overall small/medium market. We offer these as concepts to consider in the on-going program planning process.

It is important to note that the utilities made modifications to the programs in their PY2000 plans and many reflected the findings from our Phase I study. We have no information at this time to assess the effects of these changes, but we acknowledge the efforts of the utilities to make rapid program changes in the interest of increasing impacts and effectiveness.

2.4.1 Develop and Convey a Simple, Mass Market Message with Appropriate Targeting

As noted earlier, the small/medium nonresidential market is comprised of about 750,000 businesses. It is unlikely that this group of customers can be reached cost-effectively without a mass marketing strategy. Most mass marketing strategies emphasize very simple messages, consisting of a single product name and two to five words that convey a message the sponsor wants the target audience to associate with the product. There are key advantages to utilizing a mass marketing strategy. An effective mass marketing campaign is likely to increase program awareness and program participation inquiries. If reinforced by trade ally messages that build off and are consistent with the mass market program message, the combined effect may lead to increases in program participation and the penetration of efficient products.

Awareness and participation would be likely to increase if the portfolio of relevant interventions is presented under one umbrella or "brand name" so that suppliers and customers, in particular, would be less confused by what appear to be similar or overlapping programs. Specifics and actual delivery of the marketing message should be targeted to identifiably unique customer segments. Specific recommendations include the following:

- ***Consider establishing a single "brand name" for a range of programs.*** The programs covered would include at a minimum all those relevant to small nonresidential customers. Because many mass media considerably overlap the residential and nonresidential markets, and because many contractors service both residential and small commercial customers, the possibility of integrating the residential programs with the small and even large nonresidential programs should be considered. The advantage of this approach is that PGC funds could be combined across markets to create awareness and intent across program elements. The overall approach could be designed from the participants' perspective like a series of rooms. All customers would enter the main door at the "brand name" level. Beyond that, they would be directed to select appropriate doors depending

on their specific characteristics and needs. Several utilities have used this approach successfully in the past.

- ***Implement an integrated mass marketing strategy.*** The recommendation provided most frequently by customers and contractors alike was to increase marketing and education about the programs. If the approach above is pursued, an intensive statewide marketing strategy promoting the single brand name should be designed and implemented. Pilot testing would likely be necessary. Recent mass marketing campaigns, such as that conducted by PG&E to increase awareness of the SmarterEnergy web site and Energy Star® brand, also should be assessed to determine how effective they are and how they can be improved.
- ***Identify and characterize key market segments and conduct targeted marketing.*** The utilities have already conducted some market segmentation analyses and the information in this report can be used to identify and characterize unique segments within the small nonresidential market. The overall market message should be tailored in format and delivery mechanism to target hard to reach and under-served market segments. The tailored marketing messages also should address non-energy benefits that are relevant to the segments. As an example, the customers with the smallest electricity demand and floor area of less than 5,000 sq. ft. are very underrepresented in the Express Efficiency Program. Smaller customers are less confident about the performance of energy-efficient equipment, less likely to receive efficiency information from their peers, more likely to have financing barriers, and more likely to rely on their utility for efficiency information. The data gathered for this study could be analyzed in more detail to identify basic facts like these that could be used to tailor approaches for reaching the more under-served customers.
- ***Enhance use of the Internet for delivering program information.*** Usage of the Internet for business purposes is high and increasing, but only a small minority of customers and providers use it for energy and efficiency information, and the percent is lower for use of utility efficiency web sites. Methods should be explored aimed at effectively delivering energy-efficiency information to both customers and providers.

2.4.2 Minimize the Actual and Perceived Hassle of Program Participation

The small nonresidential market is encumbered with costs associated with energy-efficiency investments that can be very significant relative to the savings they produce. These costs are well recognized but difficult to alleviate. Although current programs attempt to ameliorate these costs, the perceptions of a range of market actors is that, at least in the case of the SBSPC, the program itself often introduces other costs that act as barriers to program participation. We offer the following recommendations as steps to help alleviate these two categories of impediments:

- ***Programs must significantly reduce participants' net hassle and transaction costs.*** The extent to which programs in the small/medium nonresidential market minimize versus increase the net costs of delivering high-efficiency solutions to end users should be viewed as virtually a litmus test of their likelihood of success. All of the research

conducted on this market to date indicates that interventions must minimize hassle costs. This applies to interventions directed at both end users and supply-side actors (particularly small contractors who serve small customers).

- ***Consider consolidating the Express Efficiency and SBSPC offerings.*** Based on this research and 1999 participation levels,[7] we are concerned about the viability and usefulness of overlap and competition between the Express Efficiency and SBSPC Programs. Given that creating market effects in the small/medium market is an important goal but a formidable challenge, we believe success may require a clearer, more consolidated message to the market in the form of a single, well-funded approach. Consideration should be given to creating a single program, perhaps even a hybrid, that combines the best of both the Express Efficiency and SBSPC Programs.[8]
- ***Simplify the SBSPC program application process.*** First, potential suppliers need to be educated that the process and paperwork may not be as formidable as they think. Second, efforts should be made to simplify and focus the supporting material so that it provides easily accessible answers to the most important questions. Third, the actual application materials should be simplified and shortened as much as is feasible. As mentioned earlier, changes proposed for PY2000 may address this issue.
- ***Simplify and clarify the M&V requirements under the SBSPC Program.*** Many providers see value in using M&V as a means to validate energy savings, but most feel that current requirements are burdensome and unnecessary for well-proven technologies. Deemed savings should be considered for certain lighting and other measures. Ways should be explored to reduce contractor risk for customer changes over which the contractor has no control. For example, an "insurance" fund might be established that would pay out if uncontrollable factors caused the contractor to be underpaid. Other steps that could be used to simplify the monitoring and reporting requirements should be explored. Changes presented in workshops in April 2000 for PY2000 may alleviate some of these problems.

2.4.3 Improve Efforts to Help Customers Move from Intent to Action

Although energy-efficiency awareness and interest are relatively high among smaller customers, the momentum to proceed from awareness to measure implementation can fade in this market if the path is not an easy one. In some cases, an opportunity can be identified through an audit; in other cases, an opportunity is based on an urgent need to replace burned-out equipment. The best

[7] As shown earlier, there were only approximately 3,300 Express Efficiency and 130 SBSPC Program participants statewide. By comparison, there were close to 6,000 PG&E Express participants under 500 kW in 1994, 4,200 in 1997, and 1,800 in 1998. Also recall that the total population of electric customers under 500 kW for these same IOUs is roughly ¾ of a million firms.

[8] An unresolved question currently is whether the performance contracting (and associated M&V) element of the SBSPC is viable for the small/medium customer market. Even if it is not, some elements of the SPC objectives and mechanisms may be worth considering and incorporating into a hybrid program (e.g., requiring verification of installation and some type of vendor follow-up and post-installation communication with end users to reinforce the benefits associated with the project).

way to facilitate energy-efficiency improvements is likely to be different under these alternative situations. We suggest the following ways to make this process work better:

- ***Approaches should be tailored to the type of event that can lead to an efficiency upgrade:***

  ⇒ **Replace-on-Burnout/Emergency Replacement**. Customers who require an emergency replacement are unlikely to dedicate time and effort to researching efficiency options, so this type of event may depend substantially on contractors who have ready access to and knowledge of high-efficiency products. Current upstream Express Efficiency Programs are potentially an effective approach to address these situations (though contractors should be aware of the distributor program and perceive that its benefits are at least partially passed through to them and their customers). The use of a simple program brand, possibly the same as or co-branded with a technology brand such as Energy Star®, may also increase the likelihood of efficient product purchases during emergency replacement.

  ⇒ **Elective retrofits, remodels, and expansions**. These market events take more time and therefore provide an opportunity for more comprehensive types of interventions such as audits, design assistance and tools, service referrals or trade-ally selection guidelines, financial incentives, quality assurance assistance, or complete turnkey services. The data for this study indicate that a large share of remodels still do not include efficiency upgrades.

- ***The audit process should be leveraged more to lead to efficiency improvements and aid end users in finding and selecting trade allies.*** Impediments to translating audits into energy-efficiency improvements should be identified and alleviated. Creative approaches or linkages may be required to increase the likelihood of implementation after an audit. A crucial need is ways to link "warm lead" customers with qualified suppliers; trade allies or independent organizations may be able to provide assistance. As noted earlier, utilities could provide contractor information to customers to reduce the search effort required, but only if current regulatory and legal hurdles are reduced. The conversion of audits into installations should be monitored and analyzed to determine what makes the conversion more likely.

- ***Consider the use of third-party product labeling and provider certification.*** Both product labeling and provider certification could potentially reduce the information, hassle, and asymmetric information costs faced by small nonresidential customers. Establishing statewide mechanisms could take a substantial amount of time, but some related efforts are underway. The Energy Star® Program and label could provide a starting point for some products. Consideration also should be given to investigating the feasibility of an *energy-equivalent* of the ValueStar® label used for contractors.[9] A

[9] ValueStar is a privately-funded business certification that is based on customer satisfaction scores obtained from independent surveys. Businesses pay to be rated for certification and provide their client lists for ValueStar to survey. Certification requires a minimum satisfaction score and is not guaranteed (according to ValueStar, half of the companies that apply do score high enough to be certified). For information on ValueStar, see www.valuestar.com.

similar efficiency-based certification is being investigated by the Alliance to Save Energy and Center for Resource Solutions that would focus on retail energy service providers and be similar to the Green-E label.[10] Any effort in this regard should be coordinated with residential program efforts. Initiatives should build off of existing national and related initiatives as appropriate.

- ***Focus more on how to leverage the role that service providers (contractors, EESPs, ESCOs, etc.) can play.*** Data collected for this study show that most providers have been in business for 10 years or more, believe that offering energy-efficient equipment is important to their business, and recommend efficient products on a regular basis. Almost half have used commissioning to enhance their business. Although SBSPC participation was small in 1999, information from interviewees suggests that participating contractors are starting to make significant and innovative changes in how they do business. The success of efforts to improve the efficiency of small/medium customers will probably depend directly on how well these programs facilitate the involvement of contractors (e.g., removing barriers to program participation and equipping them with convincing information to provide to customers) and leverage their knowledge of and involvement in this market.
- ***Expand the role of commissioning.*** Commissioning can help overcome customer concerns about the performance of high-efficiency equipment and can be a differentiating offering for contractors to provide. The SBSPC provides incentives based on performance but does not specifically promote commissioning. There are likely to be benefits to contractors and customers alike if commissioning is recommended or incentivized in both the Express Efficiency and SBSPC Programs.

2.4.4 Establish Clear High-level Goals and Policies

It is important for all parties to have a clear, common understanding of what goals the nonresidential programs are trying to achieve. Specific programs should have objectives that contribute to the overall goal of the program. To a large extent, it is necessary to define the goal and objectives clearly as the basis for fulfilling the preceding recommendations. We suggest the following steps:

- ***Assess the small nonresidential market to determine how its unique characteristics affect the feasibility of and best approaches for transforming the market.***

  ⇒ As a starting point, business models of various types of service providers should be developed and analyzed to determine where actions and leverage are needed to make this market attractive. This analysis should focus also on the underlying cost

[10] See Prindle, W.R., and Brown, K., *Evaluating Unregulated Energy Efficiency Programs in Competitive Energy Services Markets*, proceedings of the 1999 Energy Program Evaluation Conference, Denver, Colorado, August 18-20, 1999, p. 467.

structures of contractor and EESP businesses to better understand the likelihood of whether self-sustaining, efficiency-based business models are viable.[11]

⇒ On the customer side, bottom-up analyses of the economic potential of efficiency opportunities are needed. Further analyses of what types of interventions are likely to be most successful are also needed once the policy goals for this market are more firmly established.

- ***Establish strategic goals and tactical objectives along with a realistic time horizon.*** These should reflect what is learned about the supply and demand sides of the market. Medium- and long-term goals should be developed and used to design the program elements. The tactical objectives should be used to monitor performance and help identify necessary program changes. *The budgets for these programs should be reexamined to determine whether they are sufficient to achieve the strategic goals and tactical objectives established.* An explicit time frame should be established for meeting medium- and long-term goals for this market.
- ***Provide increased program certainty.*** Although considerable uncertainty exists about the long-term future of the framework in which these programs operate, there would be advantages to adding as much certainty to the programs as possible within these external constraints. Participation by both suppliers and customers suffers when program continuity is uncertain, and this creates a vicious cycle by making the programs appear to be less successful and, therefore, less worthy of a long-term commitment.

[11] A similar research project was proposed as part of the Large Nonresidential Customers Area MA&E plan for 2000.

3 PROGRAM THEORY

This section discusses the program theory that we developed for this study. Because previous studies by XENERGY and Quantum have developed theories for the same programs or programs related to those included in this study, we have drawn upon prior work and tried to minimize the amount of repetition here. The reader is referred to prior reports for more detailed information.[1]

Two elements of the theory presented here represent the unique emphases of this study. First, our study covers multiple programs so the theory is comprehensive in terms of the types of interventions it encompasses. Second, there was a desire to identify any differences related to customer size across the small and medium commercial/industrial customers targeted by the programs and to reflect these differences in the program theory.

3.1 INTRODUCTION AND BACKGROUND

Development of a program theory was an integral part of the study design phase. Development of a program theory is an essential step under the theory-based evaluation (TBE) approach that we applied here. The first lesson of TBE is that an evaluation must be fully informed by the causal theory that underlies the program intervention; Bickman and Peterson note, "Program theory is essential for deciding what to measure in a program…With a good sense of program theory, the evaluator can move to observing program process and operation, rather than focusing on simple (and frequently uninterpretable) outcomes."[2]

A program theory, or model, provides a framework for understanding the hypothesized mechanisms through which a program is anticipated to influence, and ultimately transform, the market. The model provides a basis for structuring data collection and analyzing the data to determine whether the hypothesized cause-effect relations expected under the program in fact exist and whether they are working as expected. The model also provides the foundation for determining which processes are not working as anticipated and merit further attention and, possibly, revisions.

We developed the basic elements of the program theory by reviewing utility program planning documents and submittals. In conjunction with information collected for prior studies, these documents provided a starting point for describing the programs, their interventions, and their expected effects on the market.

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1 XENERGY, Inc. 1999. 1998 Express Efficiency Market Effects Study (Small/Medium Commercial Focus). Prepared for Pacific Gas and Electric Company and Quantum Consulting. 1999. 1998 Business Energy Management Services (BEMS) Market Effects Study (Small/Medium Commercial Focus). Prepared for Pacific Gas and Electric Company.

2 Bickman, Leonard and Keith Peterson, "Using Program Theory to Describe and Measure Program Quality," New *Directions for Program Evaluation*, No. 47, Fall 1990, p. 63.

As in prior market transformation studies, we developed a fuller description of the program theory by building upon the framework established by the *Scoping Study*,[3] combined with diffusion of innovation theory (DOIT) and its communications implications. These steps provided insights into the cause-effect relationships engendered by the programs. To identify probable market barriers, we started with the generic barriers defined in the *Scoping Study.* Factors from DOIT related to diffusion and communications were examined and included alongside anticipated market barriers in developing the program theory and in selecting indicators of market transformation (MT) for assessment.[4]

3.2 MARKET OVERVIEW AND PROGRAM ROLE

This subsection presents a description of how the programs were related to this market, based primarily on information provided by the utilities and prior studies.

3.2.1 Utility Program Information

In addition to distilling information from prior market effects studies and program theories, we reviewed recent utility filings to develop a comprehensive view of utilities' perspective on the small customer market addressed by the programs studied here. We also used this information to help characterize the role of the programs in this market.

Pacific Gas and Electric's (PG&E's) 2000/2001 program filings refer back to the 1999 programs and provide a valuable context for the statewide efforts of the utilities. In describing its 1999 nonresidential programs, PG&E noted that they,

> *"…utilized a push-pull strategy to overcome market inertia and increased the flow of energy-efficient products and services in a marketplace characterized by fragmented decision-making. In particular:*
>
> - *For the downstream market, energy decisions are often complex with competing drivers at the owner/CEO/CFO level, at the facility manager level, and at the building operator level. The Standard Performance Contract (SPC) program served as the primary incentive vehicle. Other program elements help to create the market pull by promoting downstream energy efficiency awareness; guiding purchase decisions; and creating easy access to designers, contractors, and energy service providers; and*

[3] Eto, Joseph, Ralph Prahl, and Jeff Schlegel. 1996. *A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs*, Earnest Orlando Lawrence Berkeley National Laboratory, LBNL-39058 UC-1322, prepared for The California Demand-Side Measurement Advisory Committee, Berkeley, CA.

[4] For more information on this approach and its implications see Pacific Gas and Electric. 1999. *1998 Express Program Market Effects Study (Small/Medium Commercial Focus)*, PG&E Study ID: 420 MS-f. Prepared by XENERGY, Inc., Oakland, California.

- *For the midstream market, coordination and decision-making between designers, engineers, and contractors tend to be minimal, preventing optimum energy-efficient design and implementation. The program's information exchange and interaction infrastructure was enhanced to increase communication among these participants. Strategies implemented to help raise energy efficiency awareness, reduce perceptions of risk, and minimize market participants' transaction costs, had the effect of "pull" upon downstream market participants and "push" from upstream for energy-efficient products; and*
- *For the up and upper-mid stream markets, manufacturers, distributors, and vendors collectively bring new products and technology to the marketplace based on profitability and market demand. As a result, customer access to energy-efficient products is often hindered by the lack of product availability. The program's market-push strategies combined education with incentives to increase product availability and influence vendor stocking practices, offered energy efficiency services such as performance testing, and leveraged regional and national collaborative efforts on product labeling and certification."*[5]

With regard to smaller commercial customers, the PG&E document notes: "Express Efficiency has specifically targeted the underserved small commercial market with its selection of measures, marketing and special promotions. Small Business SPC is reserved for medium and small customers. Small- and medium-sized business will continue to be targeted with direct mail, phone, on-line, or on-site audit services."[6] This document indicates that the objectives of targeting small commercial customers include "…promoting relationships between EESPs and customers, facilitated by providing fixed payments for annual energy savings and equipment rebates…"[7] and, further, that as "…EESPs and customers enter into private agreements…, comprehensive energy solutions can be provided in many cases."[8] Information programs, including audits, are intended to complement the other programs by raising "…small commercial, industrial, and agricultural customer awareness of cost-effective energy-efficient retrofits, operations and maintenance measures, and other Customer Energy Efficiency programs"[9] because these customers "currently face barriers such as energy efficiency awareness, a lack of experience and lack of resources to assess energy efficiency opportunities."[10]

SCE's PY2000/2001 program filings note similar market barriers and program objectives for the small commercial customer programs. SCE stresses that, "Compared with larger nonresidential

[5] Pacific Gas and Electric Company. September 1999. *2000/2001 Energy Efficiency Programs Application Attachments*, Attachment 5. San Francisco, California.

[6] *Ibid.*, p. 5-10.

[7] *Ibid.*, p. 5-21.

[8] *Ibid.*, p.5-22.

[9] *Ibid.*, p.5-23.

[10] *Ibid.*, p.5-25.

users, capital is less accessible [to small commercial customers] and more expensive, efficiency information and expertise is more scarce, transaction costs are higher, and aversion to perceived risks of energy-efficiency investment is more acute."[11] The utility views its programs as transforming the market through several avenues: 1) the programs provide information to customers so that they can quantify the benefits of energy efficiency; 2) program incentives allow customers to take advantage of efficiency opportunities; 3) customers' experiences lead to positive experiences of the benefits of efficiency products and services; 4) these experiences lead to permanent changes in customers' acceptance and adoption; and 5) the utilities' upstream programs increase the availability of efficient products and services.[12]

The SCE filings expand on the role of the SBSPC defined by PG&E. These filings note that the primary objective of the Small Business SPC is "…to significantly contribute to the creation of a self-sustaining market for energy efficiency products and services, by encouraging and stimulating sustainable business relationships between EESPs and customers that emphasize a comprehensive whole building/facility approach to energy efficiency retrofits utilizing savings measurement protocols to assure/quantify system performance."[13] This objective stresses the importance of measurement and verification (M&V) in providing verification of energy savings, but it does not necessarily prescribe the performance contracting approach. The same document states that secondary objectives do include increasing "…awareness and adoption of performance contracting models …[among] the smaller nonresidential end-user [market];"[14] thus, increased use of performance contracting would be an indicator of program success, although not the sole or primary one.

SCE's materials also stress the role of the SBSPC in redirecting small customers directly to service providers, rather than their utilities, for energy-efficiency products and services. Customers are anticipated to increase their confidence in EESPs, their confidence in efficiency measures, their awareness and knowledge of the benefits of non-lighting measures, the focus of procurement practices on energy efficiency, and knowledge and awareness of performance contracting.[15] Increased customer demand is anticipated to support existing EESPs, encourage new entrants, and lead to greater competition among service providers, cost reductions, improved marketing and sales practices, and product and service innovation.[16]

The points highlighted by San Diego Gas and Electric's (SDG&E's) program filings are consistent with those of the other two utilities cited above.

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[11] Southern California Edison. September 27, 1999. *2000/01 Proposed Program Plans*, Program Summaries, Attachment D, Nonresidential. Los Angeles, California, p. D-6.

[12] *Ibid.*

[13] *Ibid.* p. D-10.

[14] *Ibid.* p. D-11.

[15] *Ibid.* p. D-12.

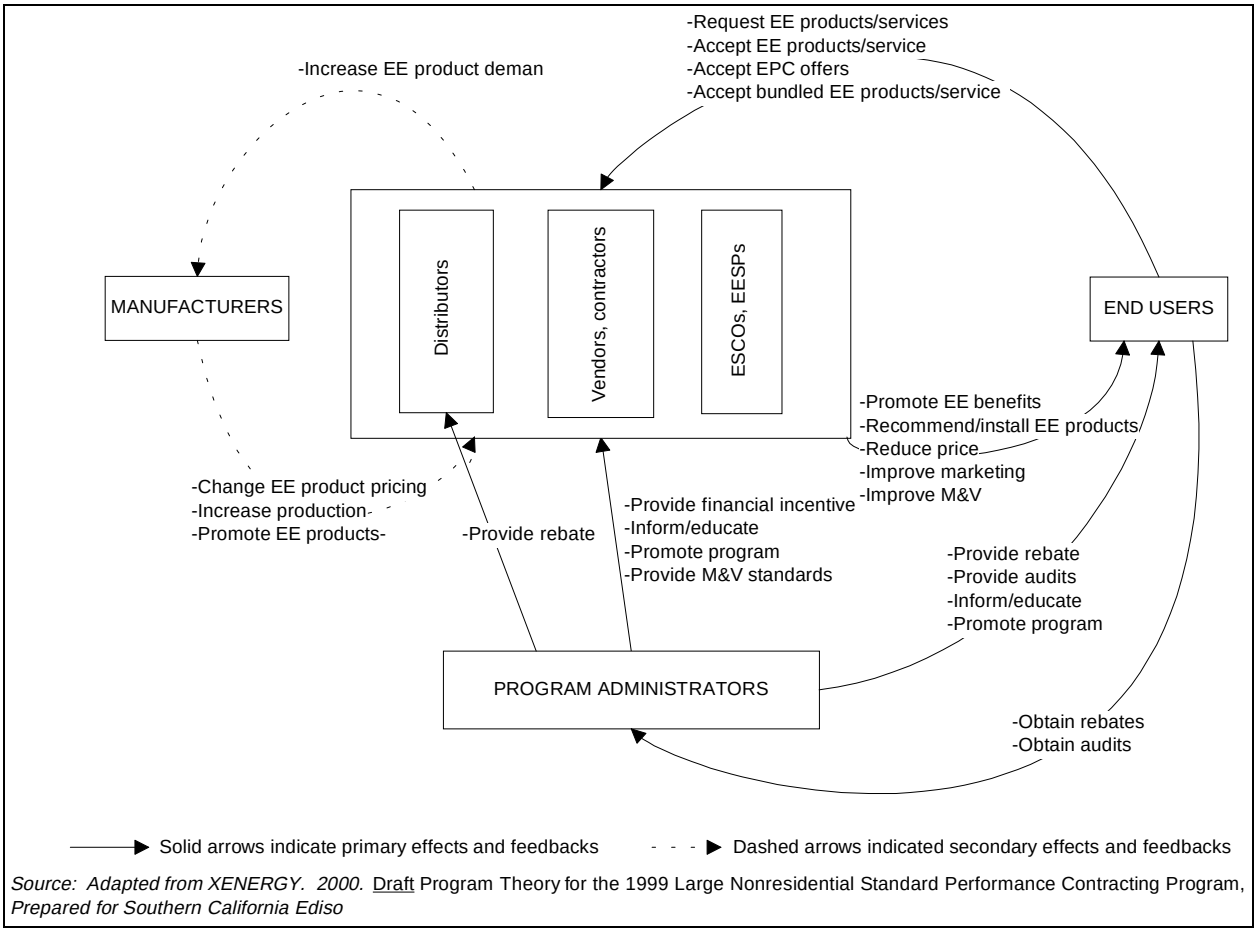
[16] *Ibid.*

3.2.2 Market and Program Role

Using the utility filings and other sources noted earlier, we developed an initial overview of the small customer market and programs. Figure 3-1 illustrates the market addressed by the suite of programs included in this study and the probable relationships between the programs and market actors. The program interventions are shown as solid arrows from the Program Administrators to the market actors. The interventions include the following:

- Distributor rebates (for HVAC and motors only) through the upstream *Express Efficiency* Program
- Rebates, audits, information and education, and promotion directed at end users through the *Express Efficiency* Program, *audit* programs, and *informational* programs
- Financial incentives, information and education, promotion, and M&V standards directed at service and product providers through the *SBSPC* Program and *informational* programs.

Figure 3-1
Role of Programs in Small/Medium Commercial Market



Source: Adapted from XENERGY. 2000. Draft Program Theory for the 1999 Large Nonresidential Standard Performance Contracting Program, *Prepared for Southern California Ediso*

The product and service providers are expected to be influenced by the programs to take the following actions in their interactions with end users:

- Promote energy-efficiency benefits
- Recommend efficient services and products and install efficient products
- Reduce the price of efficient products and services
- Improve marketing of efficient products and services
- Improve M&V practices.

In response to the direct and indirect program effects, end users are anticipated to respond in several ways, including the following:

- Request energy-efficient products and services from contractors, vendors, and service providers
- Accept offers proffered by suppliers
- Accept performance contract offers
- Accept offers of bundled services and products
- Apply for and obtain program rebates and audits.

Indirect effects involving product manufactures are also likely to result from these programs. Dashed lines are used in the figure to indicate that these are secondary effects or relationships. They include the following:

- Increased demand for efficient products from product and service providers
- Increased production and promotion of efficient products
- Changes in efficient product pricing.

It is important to note that, in the short term, the increase in demand for efficient products could lead to product price increases, rather than the desired decreases. Program planners anticipate, however, that competitive forces in the market and efforts to increase supply would lead to lower prices in a relatively short time.

It is also worth pointing out that Figure 3-1 shows no direct linkages between end users and producers. Such linkages are not displayed because the relatively small customers affected by these programs would be less likely than large customers to work directly with manufacturers to acquire products. Consequently, the effects of small customers on producers are much more likely to be indirect through vendors and service providers.

3.3 PROGRAM THEORY AND HYPOTHESES

Based on the preceding information, we have constructed a model, or theory, to delineate how the activities in the 1999 programs were expected to affect the small/medium commercial market. This model is shown in Figure 3-2. The cause-effect relationships shown in the model, in turn, can be expressed as hypotheses.

3.3.1 Program Theory

Probably the first thing to note is that the model includes numerous potential causal relationships and their interactions are complex. To a large extent this is due to the fact that there were many interventions targeting existing facilities in the small nonresidential sector in 1999. The interventions are shown at the top of the figure and include:

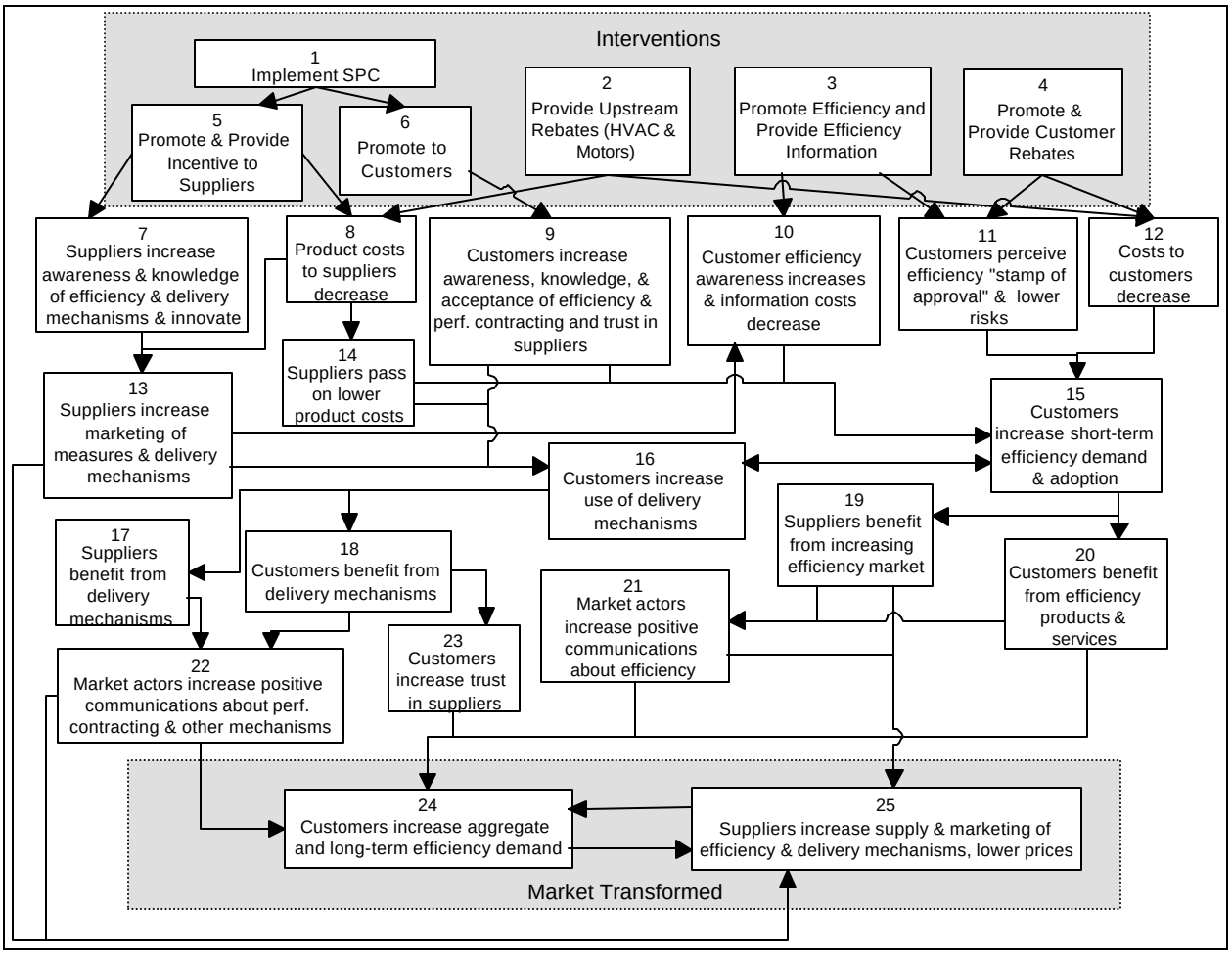
- Small Business SPC
- Upstream rebates to HVAC and motor distributors
- Information dissemination, technical assistance, and audits
- Express Efficiency rebates.

The figure also emphasizes the fact that once the initial market interventions occur there are many opportunities for subsequent cross-effects among interventions. From the program-design perspective, this is probably advantageous. From the evaluation perspective, however, these cross-effects make it difficult to distinguish how specific interventions contribute to downstream market effects.

Two major cause-effect pathways should be noted. The first is the interventions at the upper right. These are the traditional information, technical assistance, and rebate program interventions, which are directed primarily at customers. Their major objective is to increase market implementation of efficiency products and services and, thereby, to increase market experience with and positive perceptions of such products and services, leading ultimately to continuing market demand and adoption.

The second pathway is on the left and is initiated by implementation of the SBSPC. While, as for the first pathway, the ultimate goal of the SBSPC is to increase penetration of efficiency products and services, this intervention emphasizes the creation of a viable, sustainable market. It has the explicit objective of accelerating business interactions between suppliers and customers to provide the foundation for a market that could function without active utility involvement. Unlike the Large Nonresidential SPC, customers cannot apply directly to participate in the program, so the pathway on the left relies almost totally on motivating the product/service providers, or suppliers.

Figure 3-2
Overall Program Theory, Small-Medium Customer Programs



Although performance contracting is at the core of the SBSPC, the performance contract for the SBSPC is between the utility and the service provider. Providers and customers are free to establish performance contracts for the services provided; however, that is not a requirement of the program. Consequently, Figure 3-2 refers in most cases to "delivery mechanisms," rather than "performance contracts," to capture several purposes of the program including promoting:

- Performance contracting
- Comprehensive retrofits
- Use of M&V to verify energy savings
- Innovative products, services, and arrangements between suppliers and customers.

3.3.2 Hypotheses and Potential Indicators

For a market effects study, the next step would be the development of a comprehensive set of hypotheses based on the cause-effect relationships identified in the program theory. Next, indicators would be defined that would be assessed as metrics of the anticipated market effects.

The current study, however, focuses on developing baseline information and a process evaluation of the programs, rather than analyzing market effects. Nevertheless, hypotheses and potential indicators have proven to be useful in the past to guide the data collection and analysis process for baseline and process evaluations studies. In addition, program hypotheses and market effects indicators developed now can be constructive inputs into future market effects studies. Consequently, we developed an initial set of hypotheses and potential indicators for this suite of programs.

We used the program theory shown in Figure 3-2 and two prior studies to compile a set of hypotheses covering the effects of all interventions in these programs. The 1998 Express Efficiency market effects study helped us develop the hypotheses and indicators related to the rebate element of the 1999 programs.[17] The evaluation of the 1998 Nonresidential SPC provided useful insights into the hypotheses that applied to the SBSPC.[18]

Table 3-1 presents hypotheses related to effects of these programs on energy-efficiency product and service suppliers. The effects include both those caused directly by program interventions and the secondary effects that would be expected farther down the causal chain toward market transformation. The initial group of hypotheses in the table comprises the causal chain linked to the SPC. The subsequent hypotheses involve primarily the other interventions shown at the top of Figure 3-2. As the figure demonstrates, however, there are several key cross-links between the two causal chains.

The important features of some of the major supply side hypotheses shown in Table 3-1 are discussed below. The discussions highlight where differences might exist due to customer size.

[17] Pacific Gas and Electric Company. June 30,1999. *1998 Express Program Market Effects Study (Small/Medium Commercial Focus)*, PG&E Study ID: 420 MS-f, prepared by XENERGY, Inc.

[18] XENERGY. 1999. *Evaluation of the 1998 Nonresidential Standard Performance Contract Program*. Prepared for Southern California Edison and the California Board for Energy Efficiency.

Table 3-1
Supply-Side Hypotheses and Potential Indicators

Hypotheses	Potential Indicators
S1. SPC promotion and incentives increase 1) supplier awareness/ knowledge of efficiency and delivery mechanisms and 2) innovation [5-7]	• Increased supplier awareness and knowledge of efficiency options and benefits • Increased supplier awareness and knowledge of performance contracting and other delivery mechanisms • Emergence of innovative contracting and delivery mechanisms
S2. SPC incentives reduce product/service costs to suppliers [5-8]	• SPC incentives exceed participation costs
S3. Increased knowledge/awareness and lower costs due to SPC lead suppliers to increase efficiency marketing and expand delivery mechanisms [7-13]	• Increased marketing of efficiency products/services by SPC participants • New suppliers enter market or existing suppliers increase focus on EE
S4. Near-term increases in efficiency marketing and expanded delivery mechanisms lead to long-term supplier changes [13-25]	• Long-term expansion of suppliers occurs • Suppliers change fundamental business and marketing practices
S5. Upstream rebates reduce supplier efficient product costs [2-8]	• Suppliers are able to purchase HVAC and motor equipment at lower prices
S6. Lower supplier costs are passed along to customers in SPC [8-14]	• Product/service costs to customers decline under SPC
S7. Increased customer participation in SPC projects leads to supplier benefits [16-17]	• Suppliers perceive business benefits of performance contracting • Suppliers expand positive relations with customers
S8. Suppliers participating in SPC communicate benefits of performance contracting and other mechanisms [17-22]	• Suppliers inform other suppliers about SPC benefits • Suppliers inform customers about SPC benefits
S9. Increased short-term customer demand for efficient products/services leads to supplier benefits [15-19]	• Suppliers perceive increasing market for efficiency • Increased profits from efficiency products/services
S10. Supplier benefits from increased efficiency market lead to increased positive communications [19-21]	• Suppliers inform other suppliers about efficiency benefits • Suppliers inform customers about efficiency benefits
S11. Supplier benefits from increased efficiency market lead to increased supply, marketing, competition and lower prices [19-25]	• Increased long-term supply of efficiency products/services • Increased long-term marketing of efficiency products/services • New suppliers enter market • Prices to customers decline over long term
S12. Supplier communications about SPC and efficiency increase demand [21-24;22-24]	• Increased long-term customer demand for efficiency due to supplier promotion/marketing • Increased long-term customer demand for performance contracting and other mechanisms due to supplier promotion/ marketing
S13. Supplier communications about SPC and efficiency increase supply [21-25;22-25]	• Increased long-term supply of efficiency products/services due to supplier communications • Increased suppliers offering performance contracting and other mechanisms over long term due to supplier communications
Note: Numbers shown in brackets refer to the boxes shown in Figure 3-2.	

Hypothesis S2: The SPC is intended to provide an adequate financial incentive to make supplier participation economically attractive. It is possible, however, that the costs and risks of participating in the program could exceed the amount of the incentive. For several reasons, this is more likely in cases where suppliers conduct SPC projects with smaller including 1) the costs of signing up customers may not vary much with their size, 2) the customers may pose higher risks because of larger business uncertainties, and 3) the proportion of small customers that are good efficiency retrofit prospects may be lower.

Hypothesis S4: If changes in business practices do occur and are successful, increased efficiency marketing and use of performance contracting and other mechanisms are likely to motivate other suppliers to replicate these practices or encourage new suppliers to enter the market. If successful strategies are developed to reach smaller customers, they will be replicated by the participating suppliers and picked up by nonparticipants. Because changes in supplier marketing strategies and delivery mechanisms, including the use of performance contracting, are not cost free, suppliers that invest in these changes in the short run are unlikely to drop them quickly.

Hypothesis S5: This hypothesis is linked to the upstream component of the Express Efficiency Program. To the extent that distributors pass along the upstream rebates to equipment contractors and suppliers, the product (HVAC and motor) costs should decline.

Hypothesis S6: The validity of this hypothesis depends on the extent to which suppliers participating in the SPC share the program incentives with customers and pass along any product discounts they receive. The proportion of pass-through might vary by customer size.

Hypothesis S10: Suppliers may be more likely to communicate about efficiency to customers who are considered to be better prospects or more profitable clients.

Hypotheses S11 and S13: Suppliers that provide energy-efficient products and services would be expected to continue to do so and expand their business if it provides them sufficient benefits. Either through active communication by participating suppliers or through observation by nonparticipants, nonparticipants will seek to replicate the success of suppliers providing energy-efficient products and services and those participating in the SPC. If certain customer market segments are more profitable, existing suppliers and new entrants are likely to concentrate on these segments.

Table 3-2 presents hypotheses and indicators related to effects on customers. The presentation of the hypotheses is organized as in the preceding table. Because the number of interventions directed at customers is larger than those directly affecting suppliers, there are several more customer hypotheses.

Table 3-2
Customer Hypotheses and Potential Indicators

Hypotheses	Potential Indicators
C1. SPC promotion increases customer awareness, knowledge, and acceptance of efficiency and performance contracting and increases trust in suppliers [6-9]	• Increased customer efficiency knowledge and awareness • Increased customer performance contracting knowledge • Increased trust in SPC suppliers
C2. Increased customer awareness, acceptance, and trust through SPC leads to increased use of suppliers [9-16]	• Reduced customer barriers to SPC projects • Increased customer willingness to participate in SPC projects
C3. Supplier cost reductions through SPC lead customers to increase use of suppliers [14-16]	• Increased customer perceptions of favorable economics of SPC projects
C4. Increased supplier marketing leads customers to increase use of suppliers [13-16]	• Increased customer awareness of supplier promotions and increase in receptivity to offers
C5. Increased customer awareness & knowledge of efficiency through SPC leads to increased efficiency demand [9-15]	• Increased efficiency measures installed through SPC projects
C6. Increased use of suppliers leads to customer benefits [16-18]	• Increased customer perceptions of ease of contracting for efficient products/services • Increased customer perceptions that efficient products/services can be implemented with minimum hassle by using supplier
C7. Customers participating in SPC communicate benefits to other actors [18-22]	• Increased customer positive communications to peers about SPC • Increased customer positive communications to suppliers about SPC
C8. Customers participating in SPC increase trust in suppliers [18-23]	• Increased customer positive perceptions and trust of suppliers in SPC
C9. Increased customer trust leads to increased overall demand [23-24]	• Increased long-term use of suppliers by customers in SPC projects • Increased long-term use of suppliers by non-participant customers based on positive information about suppliers
C10. Customer communications about SPC and efficiency increase overall demand [21-24;22-24]	• Increased and expanded customer long-term demand for efficient products/services, performance contracting, etc. due to positive communications about SPC
C11. Customer communications about SPC and efficiency increase supply [21-25;22-25]	• Increased long-term supply due to positive customer communications to suppliers about SPC
C12. Upstream rebates reduce direct costs of customer purchases [2-12]	• Decreased customer cost differences between standard and high efficiency HVAC/motors due to upstream rebates
C13. Promotion, audits, and information increase customer efficiency awareness and decrease information costs [3-10]	• Increased customer awareness/knowledge about efficiency due to audits and other information
C14. Supplier marketing induced by SPC increases customer efficiency awareness and decreases information costs [13-10]	• Increased customer awareness/knowledge about efficiency due to SPC supplier marketing
C15. Increased awareness and knowledge increases customer efficiency demand [10-15]	• Increased customer efficiency demand due to improved awareness/ knowledge
C16. Lower costs through SPC increase customer efficiency demand [14-15]	• Increased customer efficiency demand due to reduced costs through SPC projects

Table 3-2 (cont.)

Hypotheses	Potential Indicators
C17. Promotion, audits, and information increase customer confidence in efficiency [3-11]	• Increased customer confidence in performance of efficient products/ services due to audits and other information
C18. Express Efficiency increases customer confidence in efficiency [4-11]	• Increased customer confidence in performance of efficient products due to "halo" effect of rebate and program promotion
C19. Express Efficiency rebates reduce customer efficiency costs [4-12]	• Decreased customer cost premium for efficient products due to rebates
C20. Increased customer confidence and lower costs from Express Efficiency increase demand [11-15;12-15]	• Increased customer demand for efficient products due to rebates and information
C21. Increased customer efficiency demand increases use of performance contracting and other mechanisms [15-16]	• Increased customer requests for SPC projects due to higher efficiency demand • Increased customer response to SPC proposals due to higher efficiency demand
C22. Increased customer use of performance contracts and other mechanisms increases efficiency adoption [16-15]	• Increased demand by customers in SPC projects for efficient products/ services
C23. Increased customer adoption of efficiency leads to customer benefits [15-20]	• Increased positive perceptions of efficient products/services by implementing customers
C24. Customer benefits from increased efficiency lead to increased positive communications [20-21]	• Increased customer positive communications to peers about efficiency • Increased customer positive communications to suppliers about efficiency
C25. Customer benefits from increased efficiency increase total demand [20-24]	• Increased long-term demand for efficient products/services by experienced customers
C26. Customer communications about efficiency increase demand [21-24]	• Increased and expanded customer long-term demand for efficient products/services due to positive communications about efficiency
C27. Customer communications about efficiency increase supply [21-25]	• Increased long-term supply due to positive customer communications to suppliers about efficiency
Note: Numbers shown in brackets refer to the boxes shown in Figure 3-2.	

Important features or considerations of several key customer hypotheses are discussed below. In particular, we point out effects that are likely to be influenced by customer size.

Hypothesis C1: SPC Administrator (utility) promotion of the program is likely to increase customer awareness and knowledge of energy-efficient products and services as well as performance contracting. In addition, it is likely to have a positive influence on customer perceptions of suppliers who offer services under the SPC. This could be especially valuable to smaller customers who are less familiar with energy efficiency, performance contracting, and possible suppliers.

Hypothesis C3: Customer responses to suppliers offering SPC projects will depend, in part, on the extent to which suppliers pass through the SPC incentive. The amount of pass-through might depend on customer characteristics such as size. If pass-through is less for smaller customers, the negative effect may be compounded because smaller customers are more likely to lease their space and have less incentive to upgrade equipment.

Hypothesis C4: Customers also will be influenced by supplier marketing under the SPC, and the marketing strategy might differ by customer characteristics such as size. Unlike the Large SPC, however, customers cannot participate directly in the Small Business SPC so their only option for participating is through a supplier.

Hypothesis C6: If the experience is successful, customer use of suppliers under the SPC may overcome some barriers that have impeded their use in the past and may demonstrate the value of having a supplier handle the details of efficiency upgrades. This is probably more likely to occur with customers who don't have in-house expertise and capabilities, such as small customers.

Hypothesis C7: Communication among customers probably occurs less frequently with smaller customers.

Hypothesis C8: Once customers have worked with suppliers successfully, particularly under the aegis of the SPC Program, their trust level and confidence may increase.

Hypothesis C10: As with hypothesis C7, communications are probably more limited among smaller customers than larger customers.

Hypothesis C13: These methods to provide information are probably most beneficial to smaller customers, but delivery to small customers is challenging. It may be difficult to differentiate the effects of information programs and supplier marketing (hypothesis C14).

Hypothesis C14: If supplier marketing to some segments under the SPC is limited, then their awareness is less likely to increase. It may be difficult to differentiate the effects of information programs (hypothesis C13) and supplier marketing

Hypothesis C18: Utility promotion and rebates may have a "halo" effect and reduce the perceived risk of efficient products. This may be especially important to smaller customers or those with little in-house expertise or experience.

Hypothesis C19: The value of direct rebates may be highest to smaller customers who have a limited financial time horizon.

Hypothesis C24: As noted earlier, communications among smaller customers may be relatively limited.

3.4 CONSIDERATIONS FOR FURTHER REFINEMENT OF PROGRAM THEORY IN FUTURE STUDIES–TRUST AND INTERMEDIATION THEORY

As part of the iterative learning process, the theory-based approach calls for drawing eclectically on all available sources of knowledge. As such, we have recently identified advances in economic and social science knowledge that are likely to be useful in further refining and improving the program theory presented in this section. Recent advances in the economic theory

of intermediation (Spulber 1999) and the related theory of trust (Lazaric and Lorenz 1998) will be useful to incorporate into the next phase of research on the small/medium market interventions.

By way of contrast to fundamental neoclassical economic theory, the economic theory of intermediation explicitly incorporates the costs of carrying out transactions that are reflected in the customer barriers to implementation of energy efficiency. According to this intermediation theory, the total economic costs of any product or service include both the cost of supplying the good and the costs associated with carrying out exchange transactions in the market. For economically advantageous exchange to occur, the value of the good to the customer must exceed the sum of these two costs.

Spulber (1999) defines an intermediary as an economic agent who purchases from suppliers for resale to buyers or who helps buyers and sellers meet and transact. Many kinds of firms carry out intermediary functions, including financial, wholesale, and retail intermediaries. Under this theory, intermediated exchange will occur if and only if intermediation lowers the transaction costs to the customers.

From this perspective, EESPs are intermediaries who not only compete against each other but also against direct exchange. In order to compete against direct exchange, EESPs must reduce total transaction costs. This includes reducing the critical customer barriers associated with energy-efficiency goods.

For example, if customers do not have the expertise to readily ascertain energy efficiency quality, they will be less well-informed than direct sellers of these goods. This creates the possibility that such sellers will behave opportunistically (i.e. what Eto, et al. 1997 refers to as the “asymmetric information and opportunism” barrier). Under these conditions, in accordance with Ackerloffs (1970) well-known market for lemons, the market will select adversely against cost-effective energy efficiency.

Intermediation theory clarifies how information asymmetries about product quality create a role for intermediaries. Because of unobservable product quality, intermediaries can earn returns by investing in technology and expertise needed to test, evaluate, assure, and certify product quality. In so doing, they can address and mitigate the problem of opportunism and resulting adverse selection (the market for lemons condition). They are able to earn returns by performing this function partially because they can realize economies of scale by dealing with a greater number of buyers and sellers. Also because they have a long-term time horizon (oriented to future customers) intermediaries have greater incentive to learn from experience, invest in expertise, innovate in transactions (e.g., the kinds of contracts used), and earn returns from building a reputation for truthfulness.

It is further important to note that, once established, a good reputation is a valuable asset that an intermediary can use to reduce marketing and other transaction costs to a broad range of

prospective customers. Advances in the economic theory of trust provide five major findings relevant to the nonresidential programs:

1. Contracts between business organizations are typically incomplete and allow a wide range of opportunistic to trusting behavior.
2. Trust-based behavior depends on repeated interaction and reciprocated experience between the parties involved.
3. Reputation must be differentiated from trust. A good reputation can be built by a single agent and is valuable because it encourages customers to initiate trust requiring trading relationships. But it does not guarantee that a trust relationship will develop. And, its development and maintenance depends on compliance being easily observed by the entire community concerned.
4. Institutions can encourage agents to risk renouncing opportunistic behavior and thereby promote, but not guarantee, trust-based behavior.
5. Contractual strategies vary with the circumstances, including modification of circumstances by factors identified above. Different strategies and contract forms have different effects on performance (Williamson 1996, Coriat and Guennif 1998).

In sum, intermediation theory highlights the crucial importance of EESPs building good reputations. Trust theory reminds us that a good reputation does not guarantee trust. Trust is built between EESPs and their customers by repeated interactions and reciprocated experiences; its continuance is dependent upon the behavior being easily observed by all.

4 PROGRAM PARTICIPANT INFORMATION

This section discusses the overall population of participants in both the 1999 Express Efficiency and 1999 SBSPC Programs. Each section first presents the final utility-endorsed participation statistics at an aggregate level. The remainder of each section presents disaggregated data based on our analysis of data sets received from each of the utilities between December 1999 and March 2000. We received the last set of Express Efficiency Program data in January and the last set of SBSPC data in March 2000. The statistics presented in this section are based on these datasets. These datasets are used to qualitatively explore trends in participation; they should not be used as, or confused with, official participation figures reported by the utilities to the California Public Utilities Commission through the various regulatory filing processes.

The first subsection presents participation data for the Express Efficiency Program and the second presents data for the SBSPC Program.

4.1 EXPRESS EFFICIENCY PROGRAM PARTICIPATION BY SEGMENT

This subsection provides an overview of participation statistics for the 1999 Express Efficiency Program. Participation is analyzed across utility, business type, and technology installed. For each of these segments, we have characterized participation in terms of the number of unique sites participating, the number of applications rebated, the amount of dollars rebated, and the amount of ex-ante kWh energy saved.

4.1.1 Participation by Business Type

Table 4-1 characterizes participation in the terms described above by utility and statewide in terms of business type. Because the data presented in Table 4-1 were obtained from each of the four investor-owned utilities (IOUs) in January 2000, some of the statistics slightly underreport the eventual program participation. Nevertheless, the percentages shown by category are sufficiently accurate for qualitative assessment.

Based on the January data, 3,740 applications had been received statewide, corresponding to 3,297 unique customer sites. Over half these applications were submitted within PG&E's service territory; about one-fourth were submitted in SDG&E's service territory. As of January 2000, nearly $7.6 million had been paid in rebates, and almost 132 GWh of electricity had been saved. Applications within PG&E's service territory comprised over 60 percent of all rebates paid and energy saved. SDG&E represented just under a quarter of the electricity savings and rebates paid. SCE's applications comprised only 8 percent of the rebates, but 17 percent of the energy savings, resulting in the lowest ratio of rebate amount per kWh saved. SCG's program comprised 7 percent of the overall rebates, but contributed only natural gas savings and no kWh savings.

Statewide, retail, office, and institutional customer groups each contributed close to 10 percent of the rebate amounts and energy savings. Industrial customers contributed between two and three percent of the statewide rebate amounts and energy savings. "Other" commercial business types contributed 42 percent of the statewide rebate values and 56 percent of the energy savings.

Table 4-1
Participation Data by Utility and Business Type
for the 1999 Express Efficiency Program*

		Customers		Rebate		Energy Savings	
Utility	Busines Type	Unique Sites	Applications	Dollars	Pct of Program	kWh	Pct of Program
PG&E	Industrial	86	91	107,103	1%	2,874,812	2%
	Institutional	120	207	380,597	5%	7,920,306	6%
	Office	264	289	373,621	5%	9,305,965	7%
	Other	837	955	2,189,673	29%	44,872,714	34%
	Retail	295	309	364,695	5%	10,019,084	8%
	Unknown	110	109	1,285,341	17%	4,839,454	4%
	TOTAL	1,712	1,960	4,701,030	62%	79,832,335	61%
SCE	Industrial	8	9	31,590	0%	1,128,287	1%
	Institutional	16	17	57,598	1%	1,332,994	1%
	Office	42	45	103,114	1%	2,913,152	2%
	Other	113	150	213,972	3%	10,999,191	8%
	Retail	51	62	71,342	1%	3,076,003	2%
	Unknown	215	269	132,872	2%	3,592,458	3%
	TOTAL	445	552	610,488	8%	23,042,085	17%
SCG	TOTAL	310	327	517,598	7%	n/a	n/a
SDG&E	Industrial	16	16	18,431	0%	139,224	0%
	Institutional	55	56	143,111	2%	2,425,371	2%
	Office	111	120	188,639	2%	1,915,168	1%
	Other	268	298	821,499	11%	17,466,498	13%
	Retail	198	212	249,974	3%	2,373,132	2%
	Unknown	182	199	348,328	5%	4,676,756	4%
	TOTAL	830	901	1,769,982	23%	28,996,149	22%
STATEWIDE	Industrial	110	116	157,124	2%	4,142,323	3%
	Institutional	191	280	581,306	8%	11,678,671	9%
	Office	417	454	665,374	9%	14,134,285	11%
	Other	1,218	1,403	3,225,144	42%	73,338,403	56%
	Retail	544	583	686,011	9%	15,468,219	12%
	Unknown	817	904	2,284,139	30%	13,108,668	10%
	TOTAL	3,297	3,740	7,599,098	100%	131,870,569	100%

* Results based on January 2000 Program Tracking System extracts from each utility. Natural gas savings data for SCG were not available so none of the natural gas energy savings are reported in this table.

The statewide statistics presented above were fairly consistent with the statistics within each utility area. The only modest difference was in the somewhat larger share of SDG&E rebate dollars and energy savings attributable to the "other" customer category.

4.1.2 Participation by Business Size

In Figure 4-1, we compare the distribution of Express participants with the distribution of customers in the target population. The share of *Express Efficiency Program customer participants* in the largest demand group (100 to 500 kW) was a little larger than the population share. When examined using floor area as a measure of customer size, however, the largest customers are significantly overrepresented and the smallest customers are very underrepresented in the Express Efficiency Program, as shown by Figure 4-1.[1] Although customers smaller than 5,000 sq. ft. comprise the *largest* group in the population (weighted based on energy use), they are the *smallest* group of program participants.

Figure 4-1
Distribution of Population and Express Efficiency Participants by Floor Area

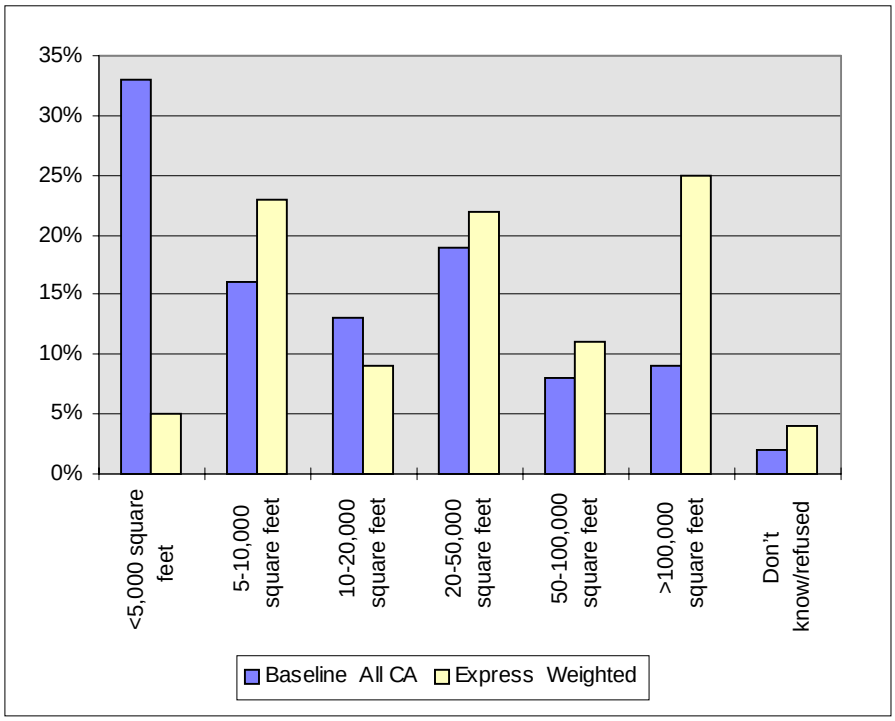


Table 4-2 presents the breakdown of 1999 Express Efficiency Program participants by utility and size of business. As before, these data also were obtained in early January 2000 and may not be completely consistent with the final results. Information on the business size of participants was not available from SCG.

[1] This is true when customer size is measured in terms of number of employees also.

We broke down the small/medium customer category (demand <500kW) into three groups. Approximately 38 percent of the unique sites were classified as "small" firms (<20 kW), which represented 25 percent of the rebates statewide. Another 21 percent of the unique sites across the state were classified as "medium" in size (20 to 99 kW) accounting for 17 percent of the rebates. The 19 percent that were "large" in size (100 to 499 kW) received 39 percent of the rebates statewide. Twenty-two percent of the sites were unable to be classified, including 9 percent of the total sites that were located in the SCG service territory. In addition, 40 percent of the sites in the SCE territory and 17 percent of the sites in SDG&E territory were unclassified.

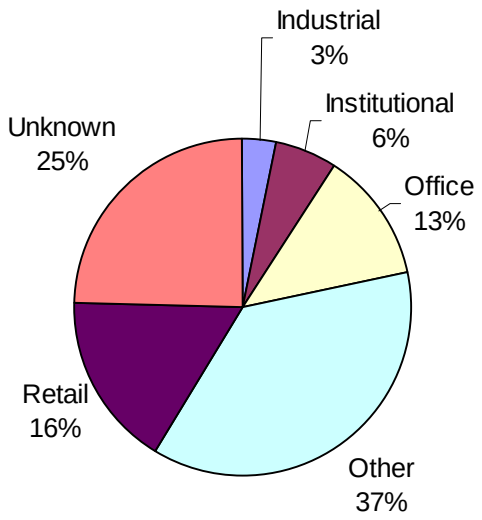
Over half of the sites that could be classified in the SCE service territory were medium in size. Most sites in the PG&E (53 percent of classified) and SDG&E (48 percent of classified) service territories, on the other hand, were most likely to be classified as small.

Table 4-2
Participation Data by Utility and Business Size
for the 1999 Express Efficiency Program

		Customers		Rebate		Energy Savings	
Utility	Size	Unique Sites	Applications	Dollars	Pct of Program	kWh	Pct of Program
PGE	Large	396	512	2237546	29%	34135639	26%
	Medium	358	392	633431	8%	14145716	11%
	Small	864	960	1470846	19%	29261960	22%
	Unclassified	94	96	359207	5%	2289020	2%
	TOTAL	1,712	1,960	4,701,030	62%	79,832,335	61%
SCE	Large	49	64	118,854	2%	4,521,639	3%
	Medium	148	201	133,165	2%	5,349,012	4%
	Small	70	88	34,865	0%	1,380,699	1%
	Unclassified	178	199	323,604	4%	11,790,735	9%
	TOTAL	445	552	610,488	8%	23,042,085	17%
SCG	Unclassified	310	327	517,598	7%	-	0%
SDG&E	Large	169	185	584,806	8%	10,733,003	8%
	Medium	194	222	506,228	7%	8,606,635	7%
	Small	330	347	409,329	5%	4,790,643	4%
	Unclassified	137	147	269,619	4%	4,865,867	4%
	TOTAL	830	901	1,769,982	23%	28,996,148	22%
STATEWIDE	Large	614	761	2,941,206	39%	49,390,281	37%
	Medium	700	815	1,272,824	17%	28,101,363	21%
	Small	1,264	1,395	1,915,040	25%	35,433,302	27%
	Unclassified	719	769	1,470,028	19%	18,945,622	14%
	TOTAL	3,297	3,740	7,599,098	100%	131,870,568	100%

In Figure 4-2, we present the breakdown of Express participation by business type. As shown in the figure, the largest shares of participants were in the "Other" and "Unknown" categories ("unknown" refers to account records for which we did not receive SIC or building type codes). Office and retail accounted for 13 percent and 16 percent of participants, respectively.

Figure 4-2
Express Participation by Business Type



4.1.3 Participation by Technology

Table 4-3 characterizes Express Efficiency Program participation by utility and technology with respect to the number of unique sites participating, the number of applications rebated, the amount of dollars rebated, and the amount of ex-ante kWh energy saved. As before, the data presented in Table 4-3 were obtained from each of the four IOUs in early January 2000.

As shown in Figure 4-3, lighting was by far the most common end use rebated under the 1999 Express Efficiency Program. Statewide, lighting measures accounted for 70 percent of the sites, 81 percent of the applications, 64 percent of the rebate amounts, and 91 percent of the kWh energy savings. Lighting was the most common end use retrofit for all of the utilities, except for SCG, which did not offer lighting measures.

As shown in Figure 4-4, compact fluorescents (CFLs) were the most frequently installed lighting measure, followed by T-8 and T-5 lamps with electronic ballasts. Statewide, CFLs contributed 35 percent of rebates and 65 percent of the kWh energy savings. T-8 and T-5 lamps with electronic ballasts (these measures are referred to as T-8s in the remainder of this discussion) contributed 24 percent and 28 percent of rebates and energy savings, respectively, statewide. Other lighting measures contributed only 4 percent and 7 percent of rebates and energy savings, respectively.

Figure 4-3
Distribution of Express Savings by End Use

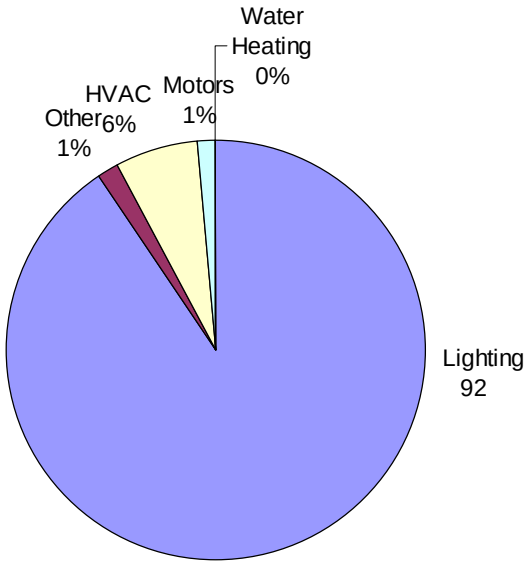


Figure 4-4
Breakdown of Express Lighting Savings by Technology

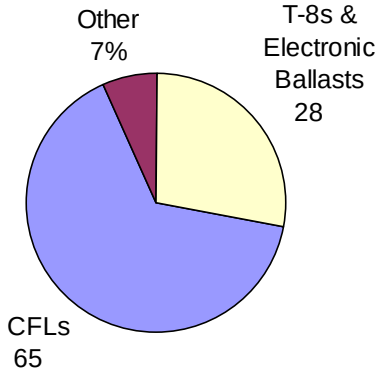


Table 4-3
Participation Data by Utility and Technology
for the 1999 Express Efficiency Program

Utility	Technology	Customers		Rebate		Energy Savings	
		Unique Sites	Applications	Dollars	Pct of Program	kWh	Pct of Program
PG&E	Ceiling Insulation	12	11	5,027	0%	-	0%
	HVAC-A/Cs	144	144	1,375,999	18%	5,467,196	4%
	HVAC-Bonus	n/a	43	8,600	0%	-	0%
	HVAC-Other	346	368	435,518	6%	2,798,716	2%
	Lighting-Bonus	n/a	425	85,000	1%	-	0%
	Lighting-CFL	727	811	1,354,501	18%	43,858,668	33%
	Lighting-Other	270	315	146,036	2%	5,453,886	4%
	Lighting-T-8/T-5 & Elec Bal	510	594	989,833	13%	18,713,614	14%
	Motors	58	58	259,345	3%	1,824,458	1%
	Refrigeration	77	78	39,378	1%	1,715,797	1%
	Water Heating	6	6	1,793	0%	-	0%
	TOTALS	2,150	2,385	4,701,030	62%	79,832,335	61%
SCE	HVAC-Other	21	22	10,889	0%	121,094	0%
	Lighting-CFL	210	221	232,282	3%	10,474,755	8%
	Lighting-Other	59	61	17,967	0%	930,226	1%
	Lighting-T-8/T-5 & Elec Bal	164	176	339,705	4%	11,286,430	9%
	Refrigeration	9	9	9,645	0%	229,580	0%
	Unknown	170	170	-	0%	-	0%
	TOTALS	633	659	610,488	8%	23,042,085	17%
SCG	Ceiling Insulation	27	27	50,218	1%	-	0%
	Water Heating	289	305	467,380	6%	-	0%
	TOTALS	316	332	517,598	7%	-	0%
SDG&E	HVAC-Other	32	36	48,405	1%	129,977	0%
	Lighting-CFL	466	496	1,066,773	14%	23,614,930	18%
	Lighting-Other	167	171	161,690	2%	1,984,447	2%
	Lighting-T-8/T-5 & Elec Bal	264	283	491,152	6%	3,255,542	2%
	Refrigeration	2	2	140	0%	11,252	0%
	Water Heating	4	4	1,823	0%	-	0%
	TOTALS	935	992	1,769,983	23%	28,996,148	22%
STATEWIDE	Ceiling Insulation	39	38	55,245	1%	-	0%
	HVAC-A/Cs	144	144	1,375,999	18%	5,467,196	4%
	HVAC-Bonus	n/a	43	8,600	0%	-	0%
	HVAC-Other	399	426	494,812	7%	3,049,787	2%
	Lighting-Bonus	n/a	425	85,000	1%	-	0%
	Lighting-CFL	1,403	1,528	2,653,556	35%	77,948,353	59%
	Lighting-Other	496	547	325,693	4%	8,368,559	6%
	Lighting-T-8/T-5 & Elec Bal	938	1,053	1,820,690	24%	33,255,586	25%
	Motors	58	58	259,345	3%	1,824,458	1%
	Refrigeration	88	89	49,163	1%	1,956,629	1%
	Water Heating	299	315	470,996	6%	-	0%
	Unknown	170	170	-	0%	-	0%
	TOTALS	4,034	4,368	7,599,099	100%	131,870,568	100%

* Results based on January 2000 Program Tracking System extracts from each utility.

Based on these data, each of the three utilities offering lighting measures exhibited different distributions between rebates paid for CFLs and T-8s. Furthermore, each utility paid different average amounts of rebates per kWh saved (as discussed below). PG&E paid 37 percent more in rebates for CFLs than T-8s and received 134 percent more energy savings for CFLs than T-8s.

SCE paid 32 percent less in rebates for CFLs than T-8s and received 7 percent less energy savings for CFLs than T-8s. SDG&E paid 117 percent more in rebates for CFLs than T-8s and received over six times more energy savings for CFLs than T-8s.

In terms of rebate dollars paid per kWh saved, PG&E paid 3 cents/kWh for CFLs and 5 cents/kWh for T-8s, on average. SCE paid an average of only 2 cents/kWh for CFLs and 3 cents/kWh for T-8s. SDG&E paid an average of 4.5 cents/kWh for CFLs and 15 cents/kWh for T-8s, which was significantly higher than for the other two IOUs. There are at least three factors that might have contributed to the differences in rebates paid per kWh savings across utilities. First, the distribution of measures within a technology differs by utility. For example, hardwired CFLs were more common than screw-in CFLs for some utilities, and longer T-8s were more common than shorter T-8s for certain utilities. Second, the ex ante energy savings per unit for a given measure varies across utility, either because of a different distribution by business type or different operating assumptions for the same business type. Finally, each utility offered different types of summer sale bonuses, which may have been bundled with the measure-specific rebate. For example, PG&E's bonuses were listed as separate items in their tracking systems, but it appeared that SDG&E may have bundled their bonuses with the measure rebate, explaining the higher rebate paid per kWh saved.

The next most common end use was HVAC, which accounted for 13 percent of the sites, 14 percent of the applications, 25 percent of the rebates, and only 6 percent of the kWh energy savings statewide. HVAC measures were installed primarily within PG&E's service territory, most of which were targeted to CAC distributors through the upstream portion of the program.[2] PG&E also had an upstream motors program component that contributed 3 percent of the rebates and another 1 percent of energy savings.

Water heating and ceiling insulation were the only measures installed under the SCG program. Both were installed also under the PG&E program, and water heating was installed under the SDG&E program. Water heating measures contributed 6 percent of rebates and ceiling insulation contributed 1 percent.

Although refrigeration measures were offered by all the utilities except SCG, they comprised the smallest amount of rebates (1 percent). Refrigeration measures produced only 1 percent of the energy savings.

PG&E's participant tracking system also separately tracked bonuses paid to contractors as part of their summer sale. Bonuses paid for lighting and HVAC measures are listed explicitly in Table 4-3. A total of $85,000 was paid in lighting bonuses, and another $8,600 was paid in HVAC bonuses.

[2] SDG&E also had an upstream Program for HVAC equipment, but it was not reported as part of the Express Efficiency Program.

4.2 1999 Small Business Standard Performance Contract Program Participation Statistics

This subsection summarizes the SBSPC data for customer and EESP participants provided by the three electric IOUs in March 2000. The reader should note that in some cases numbers do not match exactly (although they are within a few percent) when the data are presented broken out in different categories. These slight differences are due to factors such as differences in reporting across the utilities and the 10 percent reserved incentive amount allocated by the utilities that is not always reported in the incentive values.

As shown in the Table 4-4, there were approximately 181 total applications, 133 unique customers, and 37 unique energy-efficiency service providers. The total reserved funds were $1,702,263, of which SCE accounted for approximately half. The approximate total available budget for SBSPC incentives was close to $10 million dollars, so it appears the actual reserved funds for 1999 ended up being under 20 percent of the amount budgeted. *Note that the final official participation figures for 1999 might differ from those reported here because the utility records had not been finalized when we received the data in March.* In addition, the multi-year nature of the SBSPC causes the program tracking data to change over time.

Table 4-4
Basic Program Data Summary for SBSPC as of March 2000, Electric Utilities

Utility	Applications	Total Incentives	Customers	EESPs
SCE	91	$768,510	56	20
SDG&E	20	$234,834	21	8
PG&E	70	$698,919	62	19
Total (unique customers and EESPs)	181	$1,702,263	133	37

Note: Customer and EESP totals are for unique entities. "Unique customers" takes into account similar individual customers, for example, franchise outlets, where the decisions made by individual owners are heavily influenced by information and/or policies from the parent company.

4.2.1 EESP Participants

As shown in Table 4-5, the top 10 EESPs accounted for two-thirds of the reserved funds for 1999. One firm captured 18 percent of the incentives. Only one other firm received over 10 percent of the total incentives.

4.2.2 Customer Participants

In Table 4-6 we present a summary of the reserved 1999 SBSPC incentives for the top 10 customers and 2 remaining groups. The top 10 customers accounted for 40 percent of the incentives, while the next 38 customers accounted for 34 percent of funds, and the final 85 customers accounted for 26 percent.

Table 4-5
Incentives Accounted for by Top 10 EESPs

Sponsor Name	Total Incentives	% of Statewide Incentives	Cumulative % of Statewide Incentives	Service Territories
EESP 1	$299,979	18%	18%	SCE/PG&E
EESP 2	$194,555	11%	29%	SDG&E/SCE
EESP 3	$127,119	7%	37%	PG&E
EESP 4	$99,214.	6%	42%	ALL
EESP 5	$94,683.	6%	48%	PG&E
EESP 6	$83,348.	5%	53%	SCE/SDG&E
EESP 7	$65,971.	4%	57%	SCE
EESP 8	$59,760.	4%	60%	SCE
EESP 9	$59,396.	3%	64%	SDG&E
EESP 10	$48,600.	3%	67%	PG&E
Remaining EESPs	$569,637	33%	33%	ALL
Total	$1,702,263	100%	100%	ALL

Table 4-6
Distribution of Incentives Among Top 10 and Remaining Customers

Customer Name	Apx. No. of Sites	Total Incentives	% of Statewide Incentives	Cumulative % of Statewide Incentives	Utility
Customer 1	42	$132,727	8%	8%	PG&E
Customer 2	93	$127,119	7%	15%	PG&E
Customer 3	41	$94,531	6%	21%	ALL
Customer 4	1	$68,112	4%	28%	PG&E
Customer 5	21	$62,302	4%	29%	SCE
Customer 6	2	$61,287	3%	32%	SCE/PG&E
Customer 7	1	$48,600	4%	35%	PG&E
Customer 8	3	$32,310	2%	37%	SDG&E
Customer 9	1	$29,782	2%	39%	SCE
Customer 10	2	$26,916	2%	40%	PG&E
Total Top 10	207	$683,686.00	42.00%	40%	ALL
NEXT 38 CUSTOMERS	59	$581,633	34%	74%	ALL
REMAINING 85 CUSTOMERS	109	$436,947	26%	100%	ALL
Total	375	$1,702,266	100%	100%	ALL

4.2.3 End Uses

Table 4-7 shows the distribution of incentives by end use. Note that participation incentives are not shown in the table. Most of PG&E's incentives went for non-lighting and non-HVAC projects. SCE's incentives were well distributed across all three categories. Most of SDG&E's incentives went toward HVAC/refrigeration end uses.

Table 4-7
Incentives by End Use

	PG&E		SCE		SDG&E		All	
End Use	# of Measures	Incentives	# of Measures	Incentives	# of Measures	Incentives	# of Measures	Incentives
Lighting	3	$12,301	90	$270,514	27	$95,215	120	$378,031
HVAC/Refrig.	172	$223,749	58	$215,997	10	$109,913	240	$549,658
Other	69	$462,862	39	$280,889	4	$16,206	112	$759,957
All	244	$698,912	187	$767,400	41	$221,334	472	$1,687,646

4.2.4 Measures

A summary of the measures that received incentives through PG&E and SCE is provided in Table 4-8. (SDG&E did not provide data at this level of detail.) PG&E provided the most incentives for VSD projects. SCE provided the most incentives for process motor projects, followed by fluorescent lighting equipment.

Table 4-8
Incentives by Measure

		PG&E		SCE	
MEASCODE	Measure Description	Number of Measures	Incentives	Number of Measures	Incentives
1	Fluorescent Equipment	2	$8,940	77	$210,114
2	HID Equipment	1	$3,361	3	$19,218
4	Lighting Controls	-	-	10	$41,182
5	Chillers	3	$29,195	1	$4,577
6	Packaged Units	28	$92,482	8	$33,029
7	Evaporative Cooling	1	$8,320	-	-
8	Variable Speed Drives (HVAC)	-	-	16	$49,242
9	Other Space Cooling	-	-	5	$29,782
10	Space Cooling Controls	44	$55,912	2	$2,358
12	Refrigeration Equipment	4	$8,208	26	$97,009
13	Refrigeration Controls	92	$29,632	-	-
14	Motors (Process)	-	-	34	$225,511
15	VSD	51	$407,190	-	-
17	Process Other	-	-	5	$55,378
20	Controls Other	6	$16,091	-	-
21	Controls Multiple End Use	7	$28,007	-	-
22	Gas Process	5	$11,574	-	-
All	All	244	$698,912	187	$767,400

5 CUSTOMER BASELINE

This section presents the results of interviews conducted with small/medium commercial and industrial customers distributed throughout California and in a comparison area outside the state. This information provides a baseline description of the customers targeted by the 1999 state-level small/medium nonresidential programs.

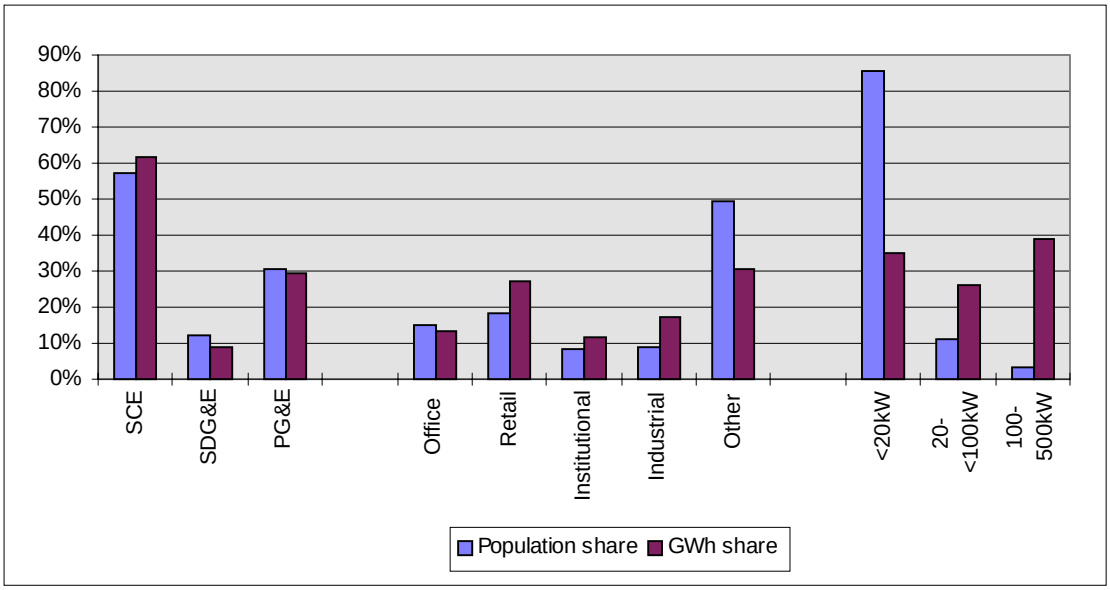
5.1 CUSTOMER DISTRIBUTION, DATA COLLECTION, AND DATA PRESENTATION

Customer data were collected through telephone interviews conducted with in-state and out-of-state (OOS) customers in the small/medium size category. To develop the sample design, we used customer statistics provided by the utilities.

5.1.1 Customer Segment Statistics

Figure 5-1 shows the distribution of small/medium business customers of the three electric IOUs, Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E), according to utility area, customer type, and customer size (kW demand). The distributions are shown by the number of customers (based on accounts) and electricity consumption. As discussed below, the biggest differences occur in the distributions by size (based on electric demand), where 85 percent of the customers are in the smallest size category but represent only about 35 percent of the consumption.

Figure 5-1
Small/Medium Business Customer Distribution



Key data that we used to develop our sample design and customer samples were based on customer statistics. Small/medium customers are distributed among the three California electric utilities, as shown in Table 5-1. A little over half are located in the SCE service territory; about 30 percent are in PG&E's area; and 13 percent are in the SDG&E area. As suggested by the energy consumption data, consumption of SCE's customers is higher than average and SDG&E's customers' consumption is lower than average.

Table 5-1
Distribution of California Small/Medium
Customers by Electric IOU

Utility	Number of Accounts	Statewide Share	GWh	GWh share
SCE	557,754	57.0%	33,522	61.5%
SDG&E	122,468	12.5%	4,934	9.1%
PG&E	298,120	30.5%	16,012	29.4%

Based on prior studies, five customer segments were defined for data collection and analysis purposes—office, retail, institutional, industrial, and other. Table 5-2 shows that the number of accounts is largest in the "other" category and smallest in the institutional group; the other category contains about six times as many accounts as the institutional category. The distribution is similar based on electricity consumption, but the differences are considerably less. Based on consumption, the other group is only about three times as large as the institutional category.

Table 5-2
Distribution of California Small/Medium
Customers by Type

Customer Type	Number of Accounts	Statewide Share	GWh	GWh share
Office	147,191	15.0%	7,161	13.1%
Retail	180,665	18.5%	14,727	27.0%
Institutional	79,689	8.1%	6,352	11.7%
Industrial	86,994	8.9%	9,490	17.4%
Other	483,803	49.5%	16,737	30.7%

As shown in Table 5-3, in terms of the number of customer accounts, the largest customer segment is in the smallest size category, <20kW demand. The largest customers (100 to 500kW) in the overall small/medium category comprise only about 3 percent of the total utility accounts. Although the number of customers varies substantially across the size categories, electricity consumption is fairly similar across the groups.

Table 5-3
Distribution of California Small/Medium Customers by Size

Size Category by Electric Demand	Number of Accounts	Statewide Share of Accounts	GWh	GWh share
<20kW	838,167	85.7%	19,036	34.9%
20-<100kW	106,853	10.9%	14,122	25.9%
100-500kW	33,322	3.4%	21,309	39.1%

Table 5-4 shows how customers (by accounts) are distributed jointly across type and size. The distribution of office customers by size is almost exactly the same as the statewide average. Retail customers have a larger share in the midsize range than the average. Both institutional and industrial customers have over twice as large a proportion in the largest size category. The share of other customers in the smallest size category is higher than the statewide average, and the shares in the two larger size categories are correspondingly less.

Table 5-4
Distribution of California Small/Medium Customer Accounts, Type v. Size

Customer Type	Size, Peak Demand			Grand Total
	< 20 kW	20 - < 100 kW	100 - < 500 kW	
Office	127,514	15,181	4,496	147,191
Row %	86.6%	10.3%	3.1%	
Column %	15.2%	14.2%	13.5%	15.0%
Retail	139,114	35,073	6,478	180,665
Row %	77.0%	19.4%	3.6%	
Column %	16.6%	32.8%	19.4%	18.5%
Institutional	64,138	9,748	5,803	79,689
Row %	80.5%	12.2%	7.3%	
Column %	7.7%	9.1%	17.4%	8.1%
Industrial	67,780	12,807	6407	86,994
Row %	77.9%	14.7%	7.4%	
Column %	8.1%	12.0%	19.2%	8.9%
Other	43,9621	34,044	10,138	483,803
Row %	90.9%	7.0%	2.1%	
Column %	52.5%	31.9%	30.4%	49.5%
Grand Total	83,8167	106,853	33,322	97,8342
	85.7%	10.9%	3.4%	100.0%

Table 5-5 shows how electricity consumption is distributed across customer groups based on customer type and size categories. As with the distribution by number of accounts, the office category is distributed by size close to the overall state average. Retail customers have a larger share in the midsize category and a smaller share in the smallest category, relative to the average. Institutional and industrial customers have a bigger share in the largest size category, relative to

the average and a smaller share in the midsize category. The other customer category has a smaller proportion in the largest size category.

Table 5-5
Distribution of California Small/Medium Customer Electricity Consumption by GWh/yr., Type v. Size

Customer Type	Size, Peak Demand			Grand Total
	< 20 kW	20 - < 100 kW	100 - < 500 kW	
Office	2138	2037	2985	7161
Row %	29.9%	28.4%	41.7%	
Column %	11.2%	14.4%	14.0%	13.1%
Retail	4230	5349	5148	14727
Row %	28.7%	36.3%	35.0%	
Column %	22.2%	37.9%	24.2%	27.0%
Institutional	2087	1295	2970	6352
Row %	32.9%	20.4%	46.8%	
Column %	11.0%	9.2%	13.9%	11.7%
Industrial	3532	1530	4428	9490
Row %	37.2%	16.1%	46.7%	
Column %	18.6%	10.8%	20.8%	17.4%
Other	7048	3911	5778	16737
Row %	42.1%	23.4%	34.5%	
Column %	37.0%	27.7%	27.1%	30.7%
Grand Total	19036	14122	21309	54467
	34.9%	25.9%	39.1%	100.0%

5.1.2 Sample Design and Actual Sample

To ensure that we collected data from an adequate number of California customers in each size category, we used a sample design that allocated customer interviews uniformly to cells defined by customer size and type. This design distributed 405 interviews among 15 strata (3 size categories by 5 customer types), or 27 customers per stratum. To ensure that the customers in the SDG&E area were not overrepresented, we adjusted the number in each stratum based on the approximate distribution of customers by utility area. Table 5-6 shows the sample design and actual allocation of interviews by stratum for each utility and the total number of interviews. We conducted 403 interviews that were distributed very similarly to the sample design, but with slightly more SCE and slightly fewer SDG&E customers than planned.

Table 5-6
Customer Interview Sample Design and Actual Allocation

	Sample Design		Actual Distribution	
Utility Area	Allocation by Stratum	Total Interviews	Allocation by Stratum	Total Interviews
SCE	14	210	15.2	228
SDG&E	3	45	2	30
PG&E	10	150	9.7	145
Grand Total	27	405	26.9	403

We planned to interview 200 OOS customers and allocated our sample approximately equally among the same 15 size and type strata used for the in-state sample. When we conducted the interviews, the actual number of completed interviews ranged between 12 and 15 for all strata except one, for which we completed only 7 interviews.

The results reported in this section were weighted based on energy consumption. Each California customer stratum was weighted based on its total electricity consumption and the consumption represented by the number of customers in the stratum interviewed. This adjusted for the fact that different proportions of customers in each of the strata were interviewed. This weighting also provided results that were linked to possible effects on total electricity consumption. OOS customer data were weighted based on the California energy consumption for all customers in each of the 15 strata. This adjusted these results to be more comparable to the California data in terms of energy consumption.

5.1.3 Interview Instrument

We developed an interview instrument to obtain data through telephone interviews with California and OOS customers. The instrument is presented in Appendix A. It was designed to obtain information on the following topics:

- Customer facility and respondent characteristics
- Attitudes toward and awareness of energy costs and energy efficiency
- Changes in lighting, HVAC, and industrial process equipment
- Use of vendors to provide energy-efficient equipment and services
- Reasons for installing energy-efficient equipment
- Satisfaction with energy-efficient equipment
- Sources of information about energy efficiency
- Energy-efficiency decision-making
- Participation in energy-efficiency programs.

5.1.4 Presentation of Data

We analyzed customer results by California utility area, California customer type and size categories, all California customer groups combined (weighted as described earlier), and OOS location. Note that several questions applied to only a small share of customers; thus, care should be used in interpreting these results**.**

In this section, the customer baseline results are reported in tables, and the text discusses highlights from the tabular information. In most cases, results are presented in a table comparing the data for California to data for OOS customers. In many cases, the tables include results for either different customer types or customer size categories, depending on whichever disaggregation displays the most useful information about differences across segments. Results are discussed for both disaggregations when they provide useful information. For survey question responses where the sample sizes are very small (approximately 30 or less), the results usually are not presented in a table because the small sample sizes minimize the statistical significance of any observed differences. In some of the small sample size cases, no results are presented at all because the samples are too small to provide any meaningful conclusions.

As noted earlier, ***the results in this section have been weighted based on electric energy consumption***. This is an effective and logical weighting strategy for reporting data potentially related to program effects that could influence electricity consumption. It may distort some firmographics data, however, which are usually reported based on numbers of customers.

5.2 FACILITY AND RESPONDENT CHARACTERISTICS

This subsection summarizes the characteristics of customers and their facilities.

5.2.1 Basic Firmographics

Table 5-7 shows the distribution of the number of employees by customer type. Statewide, the distribution is similar between California and OOS small/medium customers, and the median number of employees in both groups is approximately 17. Institutional customers in California are larger than the average, with a median number of employees around 40, and customers in the "other" category are the smallest, with a median of about 12 employees. California customers are somewhat more likely to have 50 or more employees than the OOS customers.

In general, the number of employees varies as expected with customer electricity demand:

- *The number of employees generally increases with customer demand.*
- *The median number of employees for small customers (<20 kW) is about six.*
- *The median number of employees for medium customers (20 to <100 kW) is about 14.*
- *The median number of employees for large customers (100 to 500 kW) is about 45.*

Table 5-7
Number of Employees at Location

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
1 to 5	27%	26%	13%	22%	29%	25%	33%
6 to 10	9%	12%	10%	14%	18%	14%	12%
11 to 20	14%	16%	9%	15%	19%	16%	14%
21 to 50	27%	25%	27%	25%	10%	21%	20%
51 to 100	6%	13%	15%	13%	8%	11%	15%
Over 100	11%	8%	24%	10%	11%	12%	5%
Don't know/refused	7%	0%	2%	0%	4%	2%	1%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*
Note: Data are weighted based on electricity consumption.							

Table 5-8 shows that the distribution of facility floor area follows patterns somewhat different from those for the number of employees. Overall, the California and OOS distributions are similar; but smaller facilities are more common in the OOS area; and very large facilities are twice as common in California (9 percent). Overall, California customers tend to be a little larger (median floor area is about 10,000 sq. ft. in California, compared to about 8,000 sq. ft. OOS).

As is the case based on employees, institutional facilities in California are typically the largest customers in terms of floor area (median floor area approximately 30,000 sq. ft.). Unlike the results based on number of employees, the smallest customers are in the retail category; the median floor area of retail customers is less than 5,000 sq. ft. These results suggest that a significant segment of retail customers has a high ratio of employees to floor area and uses a relatively large amount of energy (since these data are energy weighted).

Table 5-8
Floor Area of Facility

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Less than 5,000 ft^2	30%	54%	17%	32%	22%	33%	41%
5,000 - 9,999 ft^2	10%	13%	10%	16%	24%	16%	20%
10,000 - 19,999 ft^2	19%	10%	10%	13%	13%	13%	13%
20,000 - 49,999 ft^2	22%	17%	34%	16%	14%	19%	14%
50,000 - 99,999 ft^2	9%	1%	13%	12%	10%	8%	5%
100,000 ft^2 or more	8%	3%	16%	9%	13%	9%	4%
Don't know/refused	3%	1%	0%	3%	4%	2%	3%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*
Note: Data are weighted based on electricity consumption.							

In general, facility floor area varies as expected with customer electricity demand:

- *The floor area generally increases with customer demand.*
- *The median floor area for small customers (<20 kW) is about 4,500 sq. ft.*
- *The median floor area for medium customers (20 to <100 kW) is about 8,500 sq. ft.*
- *The median floor area for large customers (100 to 500 kW) is about 35,000 sq. ft.*
- *There is one exception to these relationships—there is a relatively large proportion of customers in spaces <5,000 sq. ft. with high electricity demand (100 to 500 kW).*

For both California and OOS customers, the largest fraction is firms that are the only location for the company, as shown in Table 5-9. Customers in the SDG&E area, however, are more likely to be a branch office of a larger firm.

Table 5-9
Type of Location

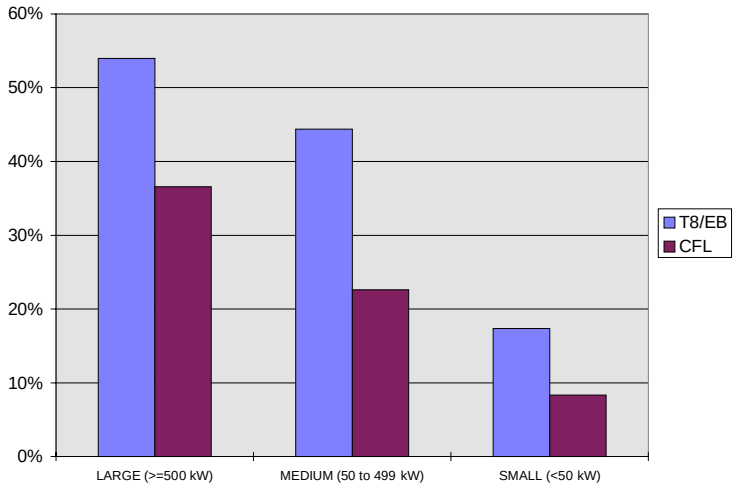
Response	PG&E	SCE	SDG&E	All CA	Out of State
Firm's only location	54%	43%	26%	44%	52%
Branch office of a larger firm	27%	39%	55%	38%	23%
Franchise location of larger firm	5%	5%	4%	4%	12%
Headquarters of a multi-location firm	11%	11%	13%	11%	11%
None of the above	1%	2%	3%	2%	1%
Don't know/refused	1%	1%	0%	1%	1%
# Respondents	*145*	*228*	*30*	*403*	*200*

5.2.2 Lighting and Industrial Process Equipment

To assess current levels of high-efficiency lighting, we analyzed data from PG&E's latest commercial end use survey, which includes close to 1,000 detailed, on-site surveys that together form a representative picture of the entire commercial market. Our analysis of the saturation levels of key efficiency technologies in the customer segment of <500 kW demand confirm that saturation levels are considerably lower than those for larger customers for virtually all measures Figure 5-2 shows that the saturation level for interior 4-foot T8/electronic ballast fixtures and compact fluorescent lamps (CFLs) is about ***three times as high*** for the large customers as it is for the small customers.

On our telephone-based baseline survey for this study, we also asked industrial customers to identify the types of systems or equipment at their facility. This information is probably more reliable than the lighting equipment data because of the importance of this equipment in facility production. Table 5-10 shows that almost 90 percent of California industrial customers (excluding those who refused or did not know) report that they have compressed air systems. Of those replying, about three-fourths of California customers report that they have electric

Figure 5-2
Saturation of T8 Lamps/Electronic Ballasts By Customer Size, PG&E Territory



Source: XENERGY analysis of PG&E's 1996/1997Commercial End Use Survey data

motors/drives. Both proportions are substantially higher than for the OOS customers (adjusted for non-responses). We note, however, that the statistics for the OOS customers are based on a small sample, and one-third of the respondents either refused to answer or did not know the information.

Table 5-10 indicates that larger customers are more likely to know the types of equipment in their facility. Adjusting for non-responses, compressed air systems are more likely to be present in facilities with demand >20 kW. Electric motors/drives, however, are more common in smaller facilities. Interestingly, process water treatment equipment is considerably more common in the smallest facilities.

Table 5-10
Systems or Equipment at Facility, Industrial Customers

Response	<20 kW	20-99 kW	100-499 kW	All CA	Out of State
Compressed air	57%	79%	87%	74%	49%
Non-HVAC electric motors and drives	60%	56%	67%	63%	34%
Industrial boilers	6%	16%	13%	11%	0%
Industrial refrigeration	6%	7%	7%	6%	5%
Process water treatment	12%	6%	5%	8%	1%
Refuse	6%	4%	0%	3%	7%
Don't know	26%	11%	5%	14%	27%
# Respondents	*26*	*31*	*30*	*87*	*36*

5.2.3 Space Ownership and Tenure

About half the California customers lease and about half own their space, as shown in Table 5-11. OOS customers are slightly more likely to own their space. Within California, the proportions vary considerably across customer type. Only about one-third of retail and industrial customers own their space. Ownership is highest at 79 percent among institutional customers.

Ownership varies as expected with customer electricity demand:

- *Ownership increases from 40 percent for the smallest customers (<20 kW) to 59 percent for the largest customers (100 to 500 kW).*

Table 5-11
Business Owns or Leases Space

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Own	55%	32%	79%	35%	61%	50%	59%
Lease/rent	44%	68%	20%	64%	38%	49%	40%
Don't know/refused	1%	0%	1%	1%	1%	1%	1%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

Based on the data in Table 5-12, the median length of time that customers have been in their current space is about 10 years both in California and the OOS area. The table shows that institutional customers are more likely to have been in their space a relatively long time, with a median of about 27 years. The distribution for industrial customers is somewhat bimodal, with customers in their current space either about 10 years or less or 30 or more years.

The length of time in the current space shows no strong relationship to customer size:

- *Midsize customers are slightly more likely to have been in their current space a shorter-than-average time.*

For those customers leasing/renting their space, we inquired how much time they have left on their current lease. The median length of time left for both California and OOS customers is about 5 years.

5.2.4 Respondent Titles

In our interviews, we asked to speak with the person most knowledgeable about decisions involving energy-using equipment. The two most common job titles of the people interviewed are facilities manager or owner or president. The titles, however, vary considerably both in California and OOS. Only 1 percent of the respondents in both groups have the job title of energy manager.

Table 5-12
Years in Current Space

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
0 to 5	28%	32%	14%	25%	27%	27%	29%
6 to 10	28%	30%	10%	32%	10%	22%	23%
11 to 20	22%	21%	16%	18%	31%	23%	19%
21 to 30	13%	10%	13%	4%	9%	10%	12%
31 to 40	1%	1%	25%	11%	10%	8%	6%
Over 40	8%	4%	23%	9%	13%	10%	10%
Don't know/refused	0%	1%	0%	1%	0%	<1%	1%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

5.3 ENERGY COSTS AND EFFICIENCY AWARENESS AND ATTITUDES

This subsection presents information about the costs of energy and its relationship to energy efficiency. It also presents information on energy-efficiency awareness and attitudes.

5.3.1 Energy Costs

As shown in Table 5-13, average monthly electricity bills for California customers are higher than those for OOS customers. In fact, the median bill in California is about $700, compared to a median amount of about $400 for OOS customers (not including responses of customers who did not know or not provide a response). This is probably due, in part, to higher electricity prices in California, but also attributable to the larger size of California facilities and possibly the types of facilities or businesses.

Monthly bills vary considerably across the customer types. We estimated median electric bills by customer type based on the data shown in the table, but the large number of respondents who either refused to provide or did not know the amount of their bills made the accuracy of the estimates somewhat uncertain.

- *Excluding the non-responses, the estimated median bills are highest for institutional customers at about $2,000 per month.*
- *The median for office and industrial customers is about $1,000 per month.*
- *The median amount for retail customers is about $800 and about $600 for "other" customers.*

The monthly electric bills generally vary with customer size (peak demand) as expected:

- *Monthly bills are typically higher for larger customers.*[1]

[1] Note that 10% of customers in the smallest size category report bills of $10,000, which would be larger than possible with current electricity prices and the customer demand category. We believe these values are miss-report because some

Table 5-13
Average Monthly Electric Bill

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
$1-$100	10%	4%	2%	11%	10%	8%	19%
$101-$250	4%	12%	3%	12%	5%	8%	12%
$251-$500	8%	4%	2%	9%	12%	8%	10%
$501-$1,000	10%	14%	8%	3%	10%	10%	9%
$1,001-2,500	4%	9%	7%	13%	7%	8%	5%
$2,501-5,000	10%	5%	4%	2%	6%	5%	7%
$5,001-$10,000	10%	4%	8%	9%	3%	6%	4%
Over $10,000	12%	11%	6%	13%	6%	9%	5%
Don't know/refused	32%	36%	62%	28%	41%	39%	28%
h# Respondents	*73*	*72*	*77*	*87*	*85*	*394*	*186*

For those customers who rent/lease their space, customers in California are substantially more likely to pay their bill separately, rather than as part of their rent/lease payment. As shown in Table 5-14, California customers are about 20 percent more likely to pay their full bill separately. Over 90 percent of retail, industrial, and "other" customers pay their full bill separately from their lease payment. About three-fourths of the office and institutional customers pay their entire bill separately.

The proportion who pay their bill separately varies some with customer size:

- *Larger customers are less likely to pay their bill separately when they lease/rent their space, but almost 90 percent of the California customers in the largest size category pay their entire bill.*

Table 5-14
Who Pays Electricity Bill for Rent/Lease Customers

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Pay all of bill	77%	98%	77%	93%	99%	93%	76%
Pay portion of bill	10%	0%	7%	3%	0%	2%	6%
Pay none of bill	11%	2%	16%	0%	1%	3%	16%
Don't know/refused	2%	0%	0%	4%	0%	1%	3%
# Respondents	*33*	*48*	*18*	*57*	*31*	*187*	*83*

These results and the average monthly electricity bills (see Table 5-13) suggest that California customers probably are more sensitive to electricity costs than customers in the OOS area. Table 5-15 shows that this is the case; 84 percent of California customers rate energy costs as

customers estimated bills for sites with multiple meters that are in the <20 kW category, and some customers may have estimated annual bills rather than monthly.

somewhat or very important, whereas only 71 percent of OOS customers do so. The results by customer type show that institutional customers are most likely to consider energy costs to be very important, and this is consistent with the fact that this group has the highest average bills. The results for the remaining customer types, however, are less correlated with the size of electricity bills. Retail customers are the second most likely to rate energy costs as very important, but their median bills are the second smallest. This is probably related to the proportion of total operating costs that electricity bills comprise or some other factors. Industrial customers are the least likely to rate energy costs as very important even though their median electric bills are relatively high. This result also may be related to the relative role that energy costs play in overall industrial sector business costs.

Their is no clear relationship between the relative importance of energy costs and customer size:

- *The smallest customers are more likely than larger customers to say that energy costs are not important.*

Table 5-15
Relative Importance of Energy Costs

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Very important	42%	48%	63%	36%	40%	45%	40%
Somewhat important	36%	39%	28%	42%	41%	39%	31%
Not very important	17%	11%	9%	17%	13%	13%	19%
Not at all important	4%	1%	0%	5%	6%	3%	8%
Don't know/refused	0%	0%	0%	0%	0%	0%	2%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

5.3.2 Awareness and Knowledge about Energy Efficiency

Because energy efficiency offers a way to reduce energy costs, one would expect that California customers might view energy efficiency as being relatively important. Although Table 5-16 shows that a large share, 78 percent, of California customers do rate energy efficiency as somewhat or very important, these results are almost identical to the results for OOS customers, so there is no clear difference in customer perceptions about the importance of energy efficiency. The importance of energy efficiency, however, is clearly correlated with the importance of energy costs across customer types (e.g., industrial customers are more likely to rate both costs and efficiency to be very important), but the variation in the importance of energy efficiency is less dramatic.

There is no clear relationship between the importance of energy efficiency and customer size.

Table 5-16
Importance of Energy Efficiency

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Very important	34%	35%	37%	25%	34%	33%	35%
Somewhat important	38%	46%	48%	46%	47%	45%	44%
Not very important	17%	14%	11%	21%	17%	16%	14%
Not at all important	9%	2%	1%	8%	3%	4%	6%
Don't know/refused	2%	3%	2%	0%	0%	1%	1%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

Similarly, it seemed likely that because of higher electricity bills and numerous energy-efficiency programs, California customers would consider themselves to be relatively knowledgeable about energy-efficiency products. The data in Table 5-17, however, do not support this expectation; both California and OOS customers rate their knowledge as modest. Institutional customers rate their knowledge level the highest, and retail customers rate their knowledge the lowest. The high rating for institutional customers is consistent with the high rating they give to the importance of energy costs (see Table 5-15).

There is no consistent relationship between customer size and self-rated knowledge of energy efficiency. The largest customers, however, do rate their knowledge level the highest.

Table 5-17
Mean Rating of End-User Knowledge of Energy-Efficiency Products
(1= not knowledgeable at all, 10=fully knowledgeable)

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Knowledge of energy-efficiency products	4.4	4.1	5.7	4.5	4.5	4.5	4.3
# Respondents	*74*	*73*	*80*	*89*	*86*	*402*	*196*

Table 5-18 summarizes the advantages that customers associate with energy-efficient lighting. The major advantage cited by California and OOS customers is lower operating costs. Longer useful life and better lighting quality are also identified as advantages, but by less than 15 percent of the customers overall.

The following are notable differences across customer types:

- *Office and institutional customers are considerably more likely to mention longer useful life as an advantage.*
- *Improved lighting quality is mentioned most often by office, "other," and retail customers.*

- *More flexibility in installation is most often noted as an advantage by institutional customers.*
- *About one-third of California and OOS customers mention either no advantages or say that they do not know of any advantages.*

The only difference related to size is the following:

- *The share who mention longer useful life as an advantage increases directly with customer size.*

Table 5-18
Advantages of Energy-Efficient Lighting

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Lower operating cost	52%	54%	64%	49%	58%	55%	48%
Longer useful life	21%	5%	25%	8%	6%	10%	11%
Less hum	5%	2%	0%	0%	5%	3%	6%
New equipment looks better	1%	5%	0%	7%	1%	3%	1%
Better light / brighter light	18%	13%	5%	7%	17%	13%	12%
Less decay of lighting levels over time	1%	0%	1%	0%	0%	<1%	4%
Better light promotes worker productivity	6%	1%	2%	1%	2%	2%	5%
More flexibility in installation	2%	3%	14%	5%	1%	4%	4%
Easier maintenance	6%	0%	7%	1%	1%	2%	4%
None	9%	9%	10%	11%	11%	10%	10%
Saves energy / earth-friendly	9%	2%	11%	6%	1%	4%	3%
Fluorescents less hot	1%	3%	0%	0%	0%	1%	1%
No PCBs/less hazardous	0%	0%	4%	0%	0%	1%	0%
Other	0%	3%	1%	1%	0%	1%	1%
Refuse	0%	2%	1%	2%	0%	1%	0%
Don't know	18%	23%	11%	30%	23%	22%	22%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

Also, Table 5-19 shows that the energy-efficient cooling equipment advantage mentioned most often by California and OOS customers is lower operating cost.

- *Other advantages are mentioned much less often than for efficient lighting.*
- *Again, about one-third either mention no advantages or don't know.*
- *The only difference by size is that lower operating costs are mentioned more often by larger customers.*

Table 5-19
Advantages of Energy-Efficient Cooling

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Lower operating costs	43%	50%	63%	40%	51%	49%	51%
Longer useful life	4%	3%	8%	2%	0%	3%	7%
More comfortable working environment	3%	3%	4%	3%	7%	4%	9%
Better cooling promotes worker productivity	13%	10%	<1%	10%	3%	7%	4%
More flexibility in installation	0%	0%	2%	0%	1%	<1%	3%
Easier maintenance	8%	0%	0%	1%	2%	2%	4%
None	8%	15%	10%	10%	10%	11%	10%
Less freon / hazardous materials	1%	0%	1%	0%	2%	1%	0%
Other	0%	0%	2%	2%	1%	1%	3%
Refuse	0%	1%	0%	2%	2%	1%	1%
Don't know	28%	25%	11%	30%	23%	24%	24%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

5.3.3 Attitudes and Beliefs about Energy-Efficiency Investments

Table 5-20 summarizes, by type, customer attitudes and beliefs regarding energy-efficiency investments. There are no clear patterns or statistically significant differences observed when the attitudes and beliefs of California customers overall and OOS customers are compared.[2] Overall, California customers generally rate energy-efficiency investments as posing slightly more uncertainty, being more of a hassle, and raising more financing difficulties. On the plus side, California customers are a little more confident that efficient equipment will perform at least as well as standard equipment. California customers also are slightly more likely to communicate with others about energy efficiency.

There are some differences worth noting across customer types:

- *Customers in the office category are:*
  - ⇒ *Least likely to think that energy savings will* not *meet their expectations*
  - ⇒ *Least likely to indicate that energy-efficiency investments fall below other priorities*
  - ⇒ *Least likely to indicate that financing is a barrier to energy-efficiency investments.*

[2] Note that these findings are very consistent with those for the PG&E area reported in *1998 Express Program Market Effects Study*, PG&E Study ID: 420 MS-f, prepared by XENERGY and Quantum Consulting, June 30, 1999.

- *Retail category customers, however, tend to have more negative attitudes and perceptions. Retail customers are:*
  - ⇒ *Most likely to be uncertain about energy-efficiency information*
  - ⇒ *Most likely to say that efficiency investments fall below other priorities*
  - ⇒ *Most likely to believe that selecting a contractor can be a hassle.*
- *The results for institutional customers are the most mixed. On the negative side, institutional customers are:*
  - ⇒ *Most likely to believe that actual savings will be less than estimated*
  - ⇒ *Most likely to feel that they're not in control of energy-efficiency decisions*
  - ⇒ *Most likely to rate financing as a barrier.*
- *On the positive side, institutional customers are:*
  - ⇒ *Least likely to feel that it is a hassle to make an informed energy-efficiency decision or select a contractor*
  - ⇒ *Most likely to note that there are non-cost benefits of energy-efficiency investments*
  - ⇒ *Most likely to believe that energy-efficiency investments are easy to use and understand*
  - ⇒ *Most likely to advocate efficiency investments to others and to hear about such investments from others.*
- *Only a few of the results for industrial customers differ from the overall averages. Industrial customers are:*
  - ⇒ *Least likely to believe that actual savings will be less than estimated*
  - ⇒ *Surprisingly, least likely to hear about energy-efficiency investments from others.*

There are three areas in which the responses appear to be related to size. The larger customers are:

- *More likely to feel in control of energy-efficiency investments*
- *More likely to believe that efficient equipment will perform at least as well as standard equipment*
- *Less likely to feel that lack of financing is an investment barrier.*

The largest customers also are more likely to exchange information with others about energy-efficiency investments.

Table 5-20
Mean Rating of Agreement with Statements Regarding Energy-Efficiency Investments
(1 = does not agree at all, 10 = agrees completely)

Response	Office	Retail	Institu-tional	Indu-strial	Other	All CA	Out of State
Actual savings less than estimated	5.6	6.1	6.6	5.6	6.2	6.0	5.8
Hassle to make informed decision	4.6	4.8	4.2	5.1	4.8	4.8	4.0
Uncertain about information provided	5.3	5.7	5.2	5.4	5.2	5.4	5.0
EE investments fall below other priorities	5.0	6.4	5.3	5.4	5.8	5.7	5.1
Not always in control of EE decisions	4.3	4.3	5.3	4.4	4.2	4.4	4.4
EE equipment will perform as well as standard equipment	5.3	5.3	5.9	5.5	5.2	5.4	4.9
Hassle to select contractor	4.6	5.6	3.7	4.5	3.8	4.5	4.3
Lack of financing is barrier to EE investments	3.9	5.0	6.3	4.9	5.5	5.2	4.3
There are important non-cost EE investment benefits	6.7	6.9	7.5	6.5	7.1	6.9	7.1
EE investments easy to understand/use	5.9	5.3	6.2	5.7	6.2	5.8	5.9
Actively advocate EE investments	5.5	5.0	7.2	5.2	6.2	5.7	5.4
Often hear about EE investments from others	5.1	4.3	5.6	3.9	4.8	4.6	3.9
# Respondents	*73*	*70*	*80*	*88*	*85*	*396*	*191*

5.4 EQUIPMENT CHANGES

We asked each customer several questions related to equipment changes, focusing on those changes that involved energy efficiency. One of the events likely to influence changes in energy-using equipment is remodeling, so we asked customers whether their space had been remodeled since 1998. Table 5-21 shows that about one-fourth of the California customers had remodeled during this period; only 19 percent of the non-California customers reported that they had remodeled over the same period.

- *The very smallest customers (<20 kW) are only about half as likely as other customers to have remodeled during this period.*
- *Not surprisingly, remodeling is most common among retail customers—35 percent remodeled since 1998.*

Table 5-21
Remodeled Since 1998?

Response	All CA	Out of State
Yes	23%	19%
No	77%	80%
Don't know/refused	1%	1%
# Respondents	*403*	*200*

5.4.1 Lighting Changes

Table 5-22 shows that since January 1998, 12 percent of the in-state and 10 percent of the OOS customers report that they have made lighting changes (other than standard maintenance and replacement).

- *Industrial customers are the least likely (7 percent) to have made lighting changes.*
- *Institutional and "other" customers (approximately 18 percent) are the most likely to have made lighting changes.*
- *The smallest customers are the least likely (9 percent) to have made lighting changes.*

Table 5-22
Were Indoor Lighting Changes Made Since January 1998?

Response	All CA	Out of State
No change	86%	88%
Yes	12%	10%
Don't know/refused	3%	2%
# Respondents	*403*	*200*

We asked each customer who had remodeled their space *and* made lighting changes whether the lighting changes were made as part of the remodel or strictly on a retrofit basis. Table 5-23 shows that if a customer remodeled *and* changed lighting, the change was usually done as part of the remodel, both in California and OOS. Based on the data for California customers, we estimate that:

- *About 31 percent of lighting changes occur as part of a remodel*
- *Only 16 percent of remodels, however, include a lighting change.*

The sample sizes are too small to draw conclusions for OOS customers or by customer size and type.

Table 5-23
If Remodeled and Lighting Changed, Were Lighting Changes Part of Remodel?

Response	All CA	Out of State
Remodel	55%	42%
Retrofit	26%	39%
Both	13%	18%
Don't know/refused	6%	0%
# Respondents	*22*	*6*
Note that sample sizes are too small for statistically valid comparisons.		

We asked those customers who made lighting changes what kinds of lighting equipment they installed, both as a retrofit and as part of a remodel. The sample sizes are too small to report meaningful statistics; however, we are able to make the following observations:

- *Energy-efficient equipment (such as T5 and T8 fixtures, CFLs, and electronic ballasts) is usually the focus of retrofits, both inside and outside California.*
- *Remodels are more likely to include less energy-efficient lighting equipment than retrofits.*

Table 5-24 shows that when lighting equipment is replaced, a significant proportion of the replaced equipment is fully functional. In California, 62 percent of lighting replacements involve fully functional lighting; this is higher than the OOS share (47 percent).

Table 5-24
Condition of Pre-Existing Lighting

Response	All CA	Out of State
New equipment - no replacements	24%	11%
Equipment was fully functional	47%	42%
Equipment functioning with problems	23%	38%
Equipment had failed	5%	9%
# Respondents	*48*	*18*
Note that sample sizes are too small for statistically valid comparisons.		

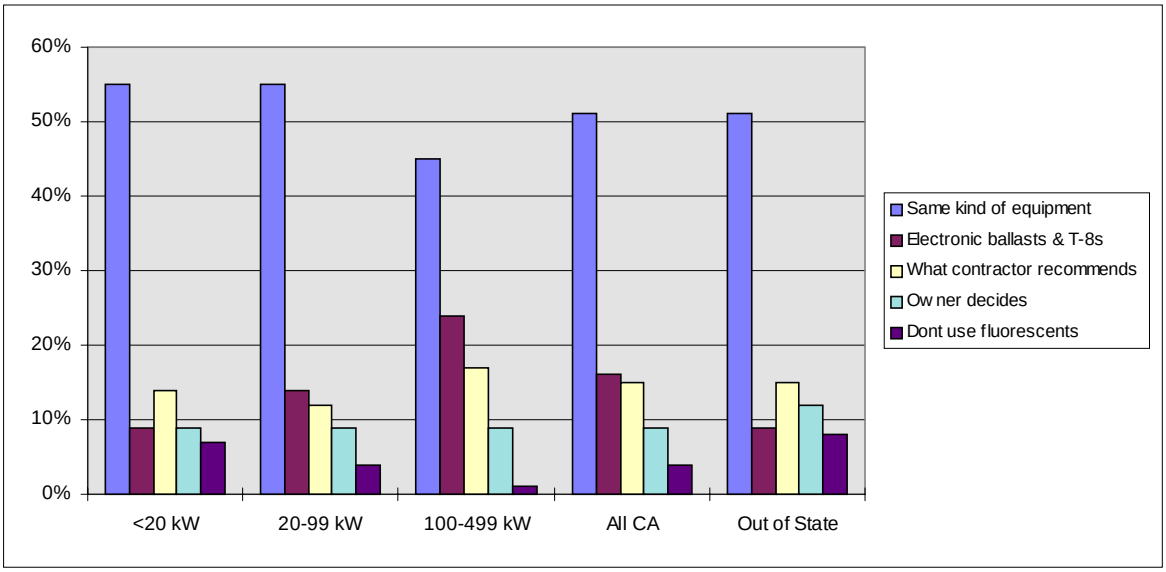
Table 5-25 shows that over half of the California customers who install lighting equipment (eliminating the non-responses) consider equipment of different efficiency levels. This is comparable for customers in the OOS area (although this sample size is very small). The sample sizes for different customer groups are too small to provide statistically valid comparisons.

Table 5-25
Review Lighting Equipment of
Varying Efficiency

Response	All CA	Out of State
Yes	49%	57%
No	40%	43%
Don't know/refused	11%	0%
# Respondents	*40*	*13*
Note that sample sizes are too small for statistically valid comparisons.		

As shown in Figure 5-3, when asked with what they would replace a failed magnetic ballast, around half of customers said they would replace with another magnetic ballast, 16 percent said an electronic ballast, 15 percent said whatever their contractor recommends, and 8 percent said that the "owner" decides. This indicates that a tremendous opportunity remains to capture high-efficiency fluorescent lighting savings from small/medium customers who will otherwise continue to replace failed components with low-efficiency equipment rather than group replace to high-efficiency components (principally electronic ballasts).

Figure 5-3
Replacement Decision Upon Failure of Magnetic Ballast



5.4.2 Cooling Equipment Changes

Table 5-26 shows that since January 1998, 20 percent of the California and 17 percent of the OOS customers report that they have made cooling equipment changes.

- *More than one-third of office and institutional customers report cooling changes.*

- *Fifteen percent or less of retail and "other" customers report such changes.*
- *The largest customers are more likely to have changed their cooling equipment.*

Table 5-26
Were Cooling Changes Made Since January 1998?

Response	Office	Retail	Institutional	Other	All CA	Out of State
No change	64%	85%	64%	82%	78%	82%
Yes	35%	13%	33%	15%	20%	17%
Don't know/refused	1%	2%	3%	4%	3%	1%
# Respondents	*75*	*73*	*80*	*88*	*316*	*164*

Customers who remodeled their space *and* changed their cooling equipment were asked whether the cooling changes were part of the remodel or were done as a retrofit. Table 5-27 shows that if cooling system changes *and* remodeling occur, cooling changes are typically part of the remodels in both California and the OOS area. We estimate, based on the survey responses from California customers, that:

- *About 29 percent of cooling changes occur as part of a remodel.*
- *About 20 percent of remodels include a cooling change.*

Sample sizes for OOS customers and California customers by size and type are too small to draw conclusions.

Table 5-27
If Remodeled and Cooling Changed,
Were Cooling Changes Part of Remodel?

Response	All CA	Out of State
Remodel	56%	35%
Retrofit	26%	48%
Both	14%	16%
Don't know/refused	4%	0%
# Respondents	*26*	*9*
Note that sample sizes are too small for statistically valid comparisons.		

When asked whether new cooling equipment is standard or high efficiency, both California and OOS customers are about evenly split between standard and high efficiency. Of course, these results are based on self reports, which are likely to overestimate the installation of high-efficiency equipment.

Table 5-28 shows that, unlike lighting, a relatively small proportion of cooling equipment that is replaced is fully functional. Excluding cases where equipment is for new installations, about 21 percent of cooling equipment replaces fully functioning equipment.

Table 5-28
Condition of Pre-Existing Cooling Equipment

Response	All CA	Out of State
New equipment - no replacements	23%	30%
Equipment was fully functional	17%	14%
Equipment functioning with problems	41%	35%
Equipment had failed	17%	21%
Don't know/refused	2%	0%
# Respondents	*61*	*30*

Table 5-29 shows that over half of California customers who change cooling equipment consider a range of efficiencies. The proportion is higher than that shown in Table 5-25 for lighting equipment, and it is higher than the share in the OOS area. Customer segment sample sizes are too small to draw reliable conclusions about differences across them.

Table 5-29
Review Cooling Equipment of Varying Efficiency

Response	All CA	Out of State
Yes	56%	41%
No	32%	56%
Don't know/refused	11%	3%
# Respondents	*53*	*27*
Note that sample sizes are too small for statistically valid comparisons.		

When asked with what level of efficiency they would replace their existing air conditioning units when they need replacement, 25 percent of those who ventured an opinion reported "standard efficiency," 32 percent, "high efficiency," 32 percent, "whatever contractor recommends," and 10 percent, "building owner decides."

5.4.3 Industrial Equipment Changes

Table 5-30 shows that about 5 percent of California and OOS industrial customers have installed equipment to improve process energy efficiency since January 1998.

- *Smaller industrial customers are more likely than larger customers to have changed equipment in this period.*

Table 5-30
Were Industrial Equipment Changes Made to Improve Efficiency Since January 1998?

Response	All CA	Out of State
No change	92%	96%
Yes	6%	4%
Don't know/refused	2%	0%
# Respondents	*87*	*36*

We also asked industrial customers whether they had made similar changes prior to January 1998. As shown in Table 5-31, about 20 percent of industrial customers in California and the OOS area made such changes.

Table 5-31
Were Industrial Equipment Changes Made to Improve Efficiency Prior to January 1998?

Response	All CA	Out of State
No change	72%	75%
Yes	18%	22%
Don't know/refused	10%	3%
# Respondents	*87*	*36*

Based on the data in Table 5-32, 63 percent of the California industrial customers who replaced existing equipment say that the equipment was fully functional. The proportion in the OOS area is lower, but the sample sizes are too small to draw any conclusions comparing the two areas.

Table 5-32
Condition of Pre-Existing Industrial Equipment

Response	All CA	Out of State
New equipment - no replacements	50%	13%
Equipment was fully functional	30%	27%
Equipment functioning with problems	14%	18%
Equipment had failed	3%	13%
Don't know/refused	3%	28%
# Respondents	*19*	*8*
Note that sample sizes are too small for statistically valid comparisons.		

The sample sizes are insufficient to present statistics about the types of efficiency changes made. Changes reported most often by California industrial customers include:

- *Premium efficiency motors*
- *Motor/drive maintenance programs*
- *Compressed air system improvements*
- *Wastewater treatment efficiency improvements.*

5.5 USE OF VENDORS TO PROVIDE EQUIPMENT AND SERVICES

This subsection presents information about customer use of vendors to install energy-related equipment. It discusses lighting, cooling, and industrial process equipment.

5.5.1 Lighting Equipment

Table 5-33 shows that, both in California and the OOS area, about half the customers report lighting is installed by contractors and half by the customer's own staff.

- *Large customers are much more likely to use a contractor.*
- *Small customers are much more likely to use their own staff.*

Table 5-33
Who Designed/Installed Added Lighting?

Response	All CA	Out of State
Contractor	46%	47%
No external service provider	44%	45%
Architect	2%	0%
Contractor & engineering firm	2%	0%
Other	5%	8%
Don't know/refused	1%	0%
# Respondents	*40*	*13*
Note that sample sizes are too small for statistically valid comparisons.		

Table 5-34 shows that for customers who use an outside vendor, it is most common to receive one to three bids. The small sample sizes do not permit a reliable comparison between California and OOS customers.

For both California and OOS customers, lower bid price is the most important factor in selecting a proposal. Timeliness of response is the second highest rated factor. The average customer does not view the vendor's input as very important in their lighting decision. Both California and OOS customers give the vendor's input an average rating of slightly over 5 on a 10-point scale. However, a segment of customers does consider the contractor's input critical, as evidenced by the fact that 15 percent say they will follow the contractor's recommendation on replacement equipment following burnout (see Figure 5-3).

Table 5-34
Number of Quotes From
Lighting Providers

Response	All CA	Out of State
Zero	10%	0%
One	22%	45%
Two	22%	13%
Three	18%	32%
Over three	7%	10%
Don't know/refused	21%	0%
# Respondents	*27*	*8*
Note that sample sizes are too small for statistically valid comparisons.		

5.5.2 Cooling Equipment

Compared with lighting equipment, customers rely considerably less on internal staff to install cooling equipment, as shown in Table 5-35. Customers in the OOS area, however, appear to be more likely to use internal staff.

- *As with lighting, large customers are more likely to use a contractor.*
- *Small customers are more likely to use their own staff.*

Table 5-35
Who Designed/Installed Added Cooling?

Response	All CA	Out of State
Contractor	77%	69%
Engineering firm	4%	3%
Energy services firm	5%	3%
No external service provider	8%	21%
Architect	2%	0%
Contractor & engineering firm	0%	1%
Other	3%	2%
Don't know/refused	1%	0%
# Respondents	*53*	*27*
Note that sample sizes are too small for statistically valid comparisons.		

Table 5-36 suggests that California customers are more likely to get three or more bids for cooling equipment than for lighting equipment. The small sample sizes do not permit a reliable comparison between California and OOS customers.

Table 5-36
Number Of Cooling Providers
Received Quotes From

Response	All CA	Out of State
Zero	0%	7%
One	18%	39%
Two	9%	24%
Three	51%	13%
Over three	8%	6%
Don't know/refused	15%	11%
# Respondents	*47*	*24*
Note that sample sizes are too small for statistically valid comparisons.		

As with lighting equipment, lower bid price is the most important factor in selecting from different contractor proposals. Ease of doing business with the contractor and contractor reputation are relatively important considerations also.

As with lighting equipment, the average customer may not view the vendor's input as very important in their cooling equipment decision. Both California and OOS customers give the vendor's input an average rating of about 6 on a 10-point scale. Again, however, note that about a third of customers say that upon burnout of the air conditioner, they will base their choice of standard versus high efficiency on whatever the contractor recommends (see text at the end of Section 5.4.2).

5.5.3 Industrial Equipment

The number of industrial customers we interviewed who provided usable information about installation of industrial equipment is too small to draw any conclusions about this customer group's interactions with vendors.

5.6 REASONS FOR INSTALLING ENERGY-EFFICIENT EQUIPMENT

This subsection briefly discusses findings regarding reasons that customers give for why they installed or did not install energy-efficient equipment.

5.6.1 Lighting Equipment

We asked those customers who had installed lighting equipment why they installed the equipment they did, whether it was efficient or standard equipment. Similar to the results shown in Table 5-18 for the anticipated advantages of efficient lighting, the most commonly cited reason customers actually install efficient lighting is to reduce operating costs, as shown in Table 5-37. In California, the second most commonly cited reason is improved quality of the work environment. The sample sizes are too small to draw reliable conclusions; however, we note that the work environment factor is rated to be far more important here than for customers overall

(see Table 5-18). Thus, there may be a small group of customers who uniquely value this benefit (all in the retail, office, and other segments in our interviews).

Table 5-37
Reasons Customers Installed Energy-Efficient Lighting Equipment

Response	All CA	Out of State
Lower energy (operating) cost	72%	54%
Enhance productivity	4%	21%
Improve quality of work environment	33%	12%
Take advantage of rebates	1%	0%
Improve environmental image	2%	0%
None	0%	22%
Other	13%	0%
Don't know	2%	0%
# Respondents	*32*	*11*
Note that sample sizes are too small for statistically valid comparisons.		

The sample of customers who installed new lighting, but not energy-efficient types, is too small to make any statistically valid inferences. The two most common reasons given by California customers for not installing efficient lighting are aesthetics and lack of availability.

5.6.2 Cooling Equipment

The primary reason given for installing high-efficiency cooling equipment is lower operating costs, as shown in Table 5-38. This is consistent with the responses from customers who installed energy-efficient lighting equipment and the general responses from all customers about advantages of high-efficiency cooling equipment (Table 5-19).

Table 5-38
Reasons Customers Installed Energy-Efficient Cooling Equipment

Response	All CA	Out of State
Lower energy (operating) cost	76%	60%
Enhance productivity	7%	4%
Improve quality of work environment	18%	0%
Reduce environmental impact	6%	0%
Improve environmental image	2%	16%
Other	13%	20%
Don't know	0%	4%
# Respondents	*34*	*18*
Note that sample sizes are too small for statistically valid comparisons.		

The most common reason customers give for installing standard- instead of high-efficiency cooling equipment is that funds were not available for the added costs. The sample sizes of California and OOS customers are too small to draw additional conclusions.

5.6.3 General Reasons for Not Installing High Efficiency Equipment

We asked customers whether they had identified any actions to save energy in the past two years that they did not undertake and, if so, why not.

- *Seven percent of California customers and 11 percent of customers in the OOS area said they had identified such actions.*
- *Nearly one-fourth of California institutional customers said there were such actions identified, but only 1 percent of retail customers said there were.*

Table 5-39 shows that the most common reason given by these customers for not taking the actions is lack of funds for the investment, both in California and the OOS area. The second most common reason is other priorities for capital spending; institutional customers, however, cite this most often as the reason they do not undertake such actions (not shown in table).

5.6.4 Intentions to Install Efficient Equipment

Customers who had installed new equipment recently were asked whether they would install energy-efficient equipment in the future. Results are not reported for customers who installed industrial equipment because the sample sizes were too small.

Lighting Equipment

Table 5-40 shows that customers in California who had installed new lighting equipment recently are very likely to install efficient equipment in the future. Customers in the OOS area also indicate they are very likely to install efficient equipment in the future. Because the sample sizes are so small, the differences between California and OOS customers are not considered to be statistically significant.

Cooling Equipment

Table 5-41 shows that customers in California who had installed new cooling equipment recently are very likely to install efficient equipment in the future. Customers in the OOS area also indicate they are very likely to install efficient equipment in the future. Because the sample sizes are so small, the differences between California and OOS customers are not considered to be statistically significant.

Table 5-39
Reasons for Not Taking Energy Saving Actions

Response	All CA	Out of State
No funds available for investment	24%	35%
Other priorities for capital spending	15%	16%
Other	13%	10%
Savings did not justify added costs	12%	10%
Timeliness	12%	0%
Too much time for a convincing analysis	11%	0%
Energy savings were too uncertain	5%	13%
Building owner would not allow it	5%	0%
Not enough management time for project	4%	0%
None	3%	0%
Other decision maker	3%	0%
Could not obtain financing	2%	0%
Needed more information to make decision	2%	0%
Don't know	4%	22%
# Respondents	*35*	*22*
Note that sample sizes are too small for statistically valid comparisons.		

Table 5-40
Likelihood of Future Energy-Efficiency Equipment Purchases by Customers Who Had Installed Lighting Equipment

Response	All CA	Out of State
Likelihood of future EE equipment purchases	8.9	7.4
# Respondents	*38*	*13*
Note that ratings are based on a scale from 0=not at all likely to 10=extremely likely.		

Table 5-41
Likelihood of Future Energy-Efficiency Equipment Purchases by Customers Who Had Installed Cooling Equipment

Response	All CA	Out of State
Likelihood of future EE equipment purchases	8.5	8.8
# Respondents	*52*	*24*
Note that ratings are based on a scale from 0=not at all likely to 10=extremely likely.		

5.7 SOURCES OF ENERGY AND ENERGY-EFFICIENCY INFORMATION

This subsection discusses the sources that customers use for information about energy and energy efficiency. It discusses first the initial source customers would consult and then discusses results related to use of the Internet.

5.7.1 Initial Source

Customers were asked whom they would call first for information about energy efficiency. Table 5-42 shows that overall most California and OOS area customers would contact their electric distribution company first. Key points to note include the following:

- *Customers in California are about twice as likely as OOS customers to contact their utility first.*
- *Institutional customers indicate that their second most common source is engineering/architectural firms. The proportion is much higher than for any other type of customer.*
- *The highest share of customers saying they didn't know (or refused) whom they would contact is in the industrial category. Only a small proportion of industrial customers indicate that they would contact equipment contractors or ESCOs.*
- *The proportion of OOS customers who mention they would contact ESCOs first is about twice the proportion of California customers who mention ESCOs. The only segment in California where more than 5 percent mention ESCOs is retail customers.*
- *The share of OOS customers who would contact energy equipment contractors first is about twice the share of California customers who would do so.*
- *When the responses are compared based on customer size (not shown in the table), the only significant difference is that the larger customers are, the more likely they are to contact ESCOs, although the share of the large customers (100 to 500 kW) identifying ESCOs as their first information source is only 9 percent.*

5.7.2 Use of the Internet

We asked several questions about use of the Internet (or World Wide Web) because this information source has received increasing attention from utilities and others. Table 5-43 shows that use of the Internet for business purposes is very common—80 percent of California customers and 71 percent of those in OOS area use the Internet. There are some variations across customer segments:

- *Retail customers are the least likely (63 percent) to use the Internet.*
- *Over 90 percent of customers in the office and institutional categories use the Internet for business.*

- *Use of the Internet increases with customer size, from 74 percent for the smallest customers to 87 percent for the large (100 to 500 kW) customers (not shown).*

Table 5-42
Call First for Energy-Efficiency Help

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Electric distribution company	63%	60%	51%	59%	60%	59%	32%
Energy equipment contractors/installers	13%	16%	13%	6%	16%	14%	28%
Energy Service Companies (ESCOs)	5%	9%	2%	3%	0%	4%	9%
Engineering / architectural firms	4%	2%	16%	0%	1%	3%	7%
Equipment manufacturers	0%	2%	1%	1%	3%	2%	3%
Other energy service providers (ESPs)	3%	2%	2%	1%	0%	1%	4%
Building maintenance companies	0%	1%	0%	0%	2%	1%	1%
Other	7%	3%	14%	11%	7%	7%	11%
Don't know/refused	5%	6%	2%	18%	10%	9%	6%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

Table 5-43
Use Internet for Business

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Yes	92%	63%	90%	84%	84%	80%	71%
No	3%	36%	10%	16%	15%	19%	26%
Don't know/refused	4%	1%	0%	0%	1%	1%	3%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

The proportion of customers who use the Internet for energy-related products, however, is considerably smaller, as shown in Table 5-44. Only about one-third of California customers and one-fifth of OOS area customers use the Internet for information about such products. Notable differences across customers groups include the following:

- *Only about one-third of all customer types, except institutional, have used the Internet for such products.*
- *As with Internet use in general, institutional customers are the most likely to use it to get energy product information.*

- *There is no consistent relationship between customer size and use of the Internet for energy product information—the larger customers (100 to 500 kW) are most likely to use the Internet, but midsize customers (20 to 100 kW) are the least likely.*

Table 5-44
Use Internet for Energy-Related Products

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Yes	27%	28%	43%	28%	31%	31%	22%
No	66%	62%	51%	68%	66%	64%	66%
Don't know/refused	7%	10%	5%	4%	3%	6%	12%
# Respondents	*70*	*46*	*73*	*74*	*72*	*335*	*155*

We asked customers what web site they use for energy-related information. The most common reply was "Don't know" (54 percent of California customers overall). The second and third most common were "Utilities" and "Vendors/suppliers."

5.8 ENERGY-EFFICIENCY DECISION-MAKING

This subsection describes practices related to customers' energy-efficiency decision-making.

5.8.1 Equipment and Efficiency Decision-Making

Table 5-45 shows that about 36 percent of California customers overall and OOS area customers have someone responsible for overseeing energy usage and costs. For California customer groups, the responsibility is closely correlated to the relative importance of energy costs (see Table 5-15):

- *Institutional customers rate energy costs to be most important and are most likely to have someone responsible for energy costs and usage.*
- *Industrial and "other" customers give energy costs the lowest importance ratings and are least likely to have someone responsible for energy costs and usage.*
- *Larger customers rate energy costs as more important than smaller customers and are more likely to have someone responsible for energy costs and usage.*

The results shown for whether customers have an energy-efficient equipment policy in Table 5-46 are very consistent with other data across California customer groups:

- *Institutional customers are the most likely to have a policy about energy-efficient equipment and have someone responsible for energy costs and usage.*
- *Industrial customers are the least likely to have a policy and have someone responsible for energy costs and usage.*
- *The larger customers are considerably more likely than smaller customers (34 percent v. 21 percent) to have an energy-efficient equipment policy.*

California customers overall, however, are nearly twice as likely as customers in the OOS area to have such a policy, but this is not very consistent with how similar they are in terms of having someone responsible for energy costs and usage.

Table 5-45
Person In Charge of Energy Usage/Costs?

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Yes, in-house staff person	27%	30%	33%	25%	19%	26%	26%
Yes, group of staff	2%	6%	12%	3%	6%	6%	3%
Yes, outside contractor	6%	3%	4%	2%	1%	3%	4%
No	60%	61%	46%	70%	72%	64%	63%
Don't know/refused	5%	0%	4%	0%	1%	1%	3%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

Table 5-46
Energy-Efficiency Equipment Policy?

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Yes	23%	24%	46%	21%	24%	26%	15%
No	74%	68%	51%	78%	73%	70%	77%
Don't know/refused	3%	8%	3%	1%	3%	4%	7%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

Table 5-47 shows that replies to a question about what the customer would replace a failed magnetic ballast with are also fairly consistent with the results above:

- *Institutional customers are most likely to replace the ballast with an efficient electronic ballast and lamp.*
- *Industrial customers are most likely to replace it with the same kind of equipment.*
- *Customers overall in California are almost twice as likely to install an efficient ballast/lamp as customers in the OOS area*
- *The results vary significantly by customer size (not shown), with larger customers over twice as likely to install a higher efficiency ballast/lamp (24 percent v. 9 percent).*

These findings are virtually the same as those involving failed cooling equipment, as shown in Table 5-48. The only notable difference between the results for lighting and cooling equipment is the higher propensity of customers to rely on contractor recommendations for cooling equipment.

Table 5-47
Replace Failed Magnetic Ballast with …

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
The same kind of equipment	44%	50%	42%	61%	53%	51%	51%
Electronic ballasts and T-8 lamps	22%	10%	34%	13%	14%	16%	9%
Whatever contractor recommends	12%	17%	14%	14%	15%	15%	15%
Owner decides	15%	12%	4%	4%	8%	9%	12%
Don't use fluorescent equipment	3%	6%	2%	1%	4%	4%	8%
Don't know/refused	4%	5%	3%	8%	5%	5%	6%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

Table 5-48
Replace Failed Cooling Equipment with …

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Replace with standard efficiency	22%	20%	19%	15%	18%	19%	19%
Replace with high efficiency	25%	29%	45%	19%	16%	25%	16%
Whatever contractor recommends	22%	26%	17%	21%	31%	25%	29%
Owner decides	8%	8%	5%	12%	6%	8%	18%
Don't have a cooling unit	13%	8%	1%	16%	12%	10%	10%
Don't know/refused	9%	8%	13%	17%	16%	13%	6%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

5.8.2 Investment Criteria

Table 5-49 shows that California and OOS area customers are about equally likely to apply some type of investment analysis to decisions about energy-using equipment. There are modest differences across different customers groups:

- *Institutional customers are the most likely to apply such an analysis.*
- *Retail customers are the least likely to do so.*
- *The use of analysis varies substantially with customer size (not shown)—larger customers are far more likely to use analysis than smaller customers (54 percent v. 16 percent).*

Table 5-49
Use Investment Analysis for Energy Equipment?

Response	Office	Retail	Institutional	Industrial	Other	All CA	Out of State
Yes	36%	27%	40%	37%	31%	32%	26%
No	60%	62%	53%	56%	63%	60%	61%
Don't know/refused	5%	11%	7%	7%	6%	8%	14%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*	*200*

For those customers who conduct an analysis, the primary investment criterion they use is payback period, as shown in Table 5-50. A substantial fraction of California and OOS area customers, however, either did not know or refused to specify the criterion they use. Although results suggest that life-cycle-cost analysis and internal rate of return are used more commonly in the OOS area than in California, the large number of non-responses caution against drawing any conclusions. There is no clear relationship between customer size and the investment criterion used.

Table 5-50
Primary Investment Criterion Used

Response	All CA	Out of State
Payback period	53%	39%
Life cycle costing analysis	9%	14%
Internal rate of return	10%	15%
Something else	10%	5%
Don't know/refused	19%	26%
# Respondents	*132*	*52*

Table 5-51 shows that the most common payback period used to assess energy-efficiency investments is 5 years in both California and the OOS area. The median for California customers appears to be slightly smaller than for OOS area customers, but 40 percent or more of the answers are non-responses, so accurate comparisons are not possible.

Table 5-51
Payback Period for Energy-Efficiency Investment

Response	All CA	Out of State
1 year or less	13%	10%
2 years	11%	8%
3 years	10%	10%
4 years	1%	1%
5 years	18%	20%
6 - 10 years	6%	7%
Over 10 years	1%	1%
Don't know/refused	40%	43%
# Respondents	*403*	*200*

5.9 PARTICIPATION IN ENERGY-EFFICIENCY PROGRAMS

Table 5-52 shows that basic awareness of California's utility energy-efficiency programs and resources is relatively limited. There are some difference across customer groups:

- *Overall, customers are most aware of non-specific rebate/incentive programs.*
- *Only about 1 percent of customers are aware of any specific efficiency programs.*
- *Industrial customers are most likely to be aware of the SPC Program, but even so, only 3 percent say they know about the program.*
- *Institutional customers are most likely to be aware of the Express Efficiency Program.*
- *The awareness of non-specific rebate/incentive programs increases with customer size (not shown).*
- *The smaller customers are more likely to not be aware of any utility programs (not shown).*

Table 5-52
Aware of California Utility Energy-Efficiency Programs/Resources

Response	Office	Retail	Institutional	Industrial	Other	All CA
SPC / standard performance contracting	0%	0%	1%	3%	0%	1%
Business energy audits	1%	1%	2%	0%	1%	1%
Express Efficiency	1%	2%	6%	1%	0%	1%
Rebates / incentives (non-specific)	15%	10%	12%	7%	11%	11%
No, not aware of any programs	59%	66%	61%	76%	65%	66%
Consultant / analyst / surveyor	0%	0%	1%	0%	3%	1%
Lighting program - nonspecific	5%	0%	1%	1%	3%	2%
Class/seminar	0%	0%	1%	2%	2%	1%
Other programs	3%	2%	6%	3%	4%	3%
Refuse	1%	0%	0%	0%	0%	<1%
Don't know	15%	20%	13%	9%	14%	15%
# Respondents	*75*	*73*	*80*	*89*	*86*	*403*

Table 5-53 shows that of those California customers aware of one or more utility programs, 78 percent either did not participate or did not know whether they participated in 1999. The Express Efficiency Program is most often named by customers as one they participated in; nevertheless, only 4 percent of those aware of any programs say they participated in 1999. Sample sizes are too small to identify differences across customer groups.

Table 5-53
Utility Program Participation in 1999

Response	All CA
Yes, Express Efficiency	4%
Yes, SPC / standard performance contracting	<1%
Yes, energy audits	2%
Did not participate in other 1999 programs	72%
Yes, rebate program - nonspecific	5%
Yes, other	11%
Don't know	6%
# Respondents	*105*

6 SUPPLY-SIDE BASELINE

In this section we present a detailed market characterization and baseline information for the supply side of the *general* market for nonresidential packaged air conditioners (A/C) and lighting equipment. Information in this section is drawn from three principal sources: primary research conducted for this study consisting of 1) detailed surveys with contractors (both within and outside California), 2) detailed surveys with distributors (within the state) and 3) secondary sources such as the *PG&E/SDG&E Commercial Lighting Market Effects Study* (XENERGY 1998) and Dun & Bradstreet's iMarket database. We present information on the structure of the two end-use markets, including estimates of market size, descriptions of the roles of each market actors, product flows through distribution channels, perceptions of recent market trends, and efficiency-related practices and sales. This section is organized into the following subsections:

- Efficient Lighting Market Characterization
- Packaged A/C Market Characterization.

6.1 LIGHTING MARKET CHARACTERIZATION: CONTRACTORS AND DISTRIBUTORS

This subsection provides a characterization of the commercial lighting market based on data from surveys of lighting contractors and distributors in California and out-of-state (OOS) contractors, as well as secondary data sources.

6.1.1 Overview of the Commercial Lighting Market

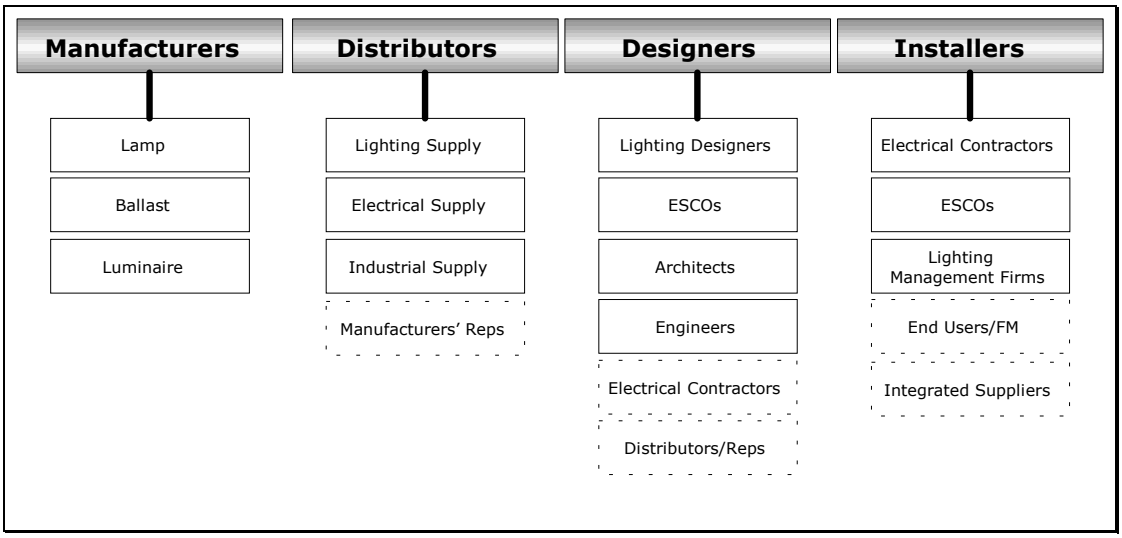
This subsection first provides a segmentation of the commercial lighting market supply side. It also shows major points of market influence through which market intervention efforts can occur. Lastly, it presents an analysis of how products flow through the market, from manufacturers to end users.

Supply-side Segmentation

The supply side of the nonresidential lighting market is characterized by a wide range of business models found along the supply chain. Changes due to forces both within and external to the industry have altered the landscape of the commercial lighting market significantly over the past decade in California as well as across the nation. For a variety of reasons, including rapid technological evolution, changes in utility program funding, and increasing pressures to reduce costs, the commercial lighting industry has been forced to adapt and seek new markets and submarkets. As a result of the market change and the uncertainty that accompanies it, new business models have evolved, some focusing heavily upon energy efficiency as a tool for boosting revenues.

To understand the structure of the supply side of the commercial lighting market, it is important to identify and examine the motivations and dispositions of its component parts. The supply-side analysis developed in a previous study (XENERGY 1998) identified 4 primary segments, 13 total subsegments, and 5 quasi-segments that did not clearly fall under the primary segments. Figure 6-1 summarizes the segmentation developed previously. Note that the current study adds primary research data for only two of the four primary segments: distributors and contractors (installers).

Figure 6-1
Lighting Supply-Side Segmentation Scheme



Source: XENERGY, 1998

The boxes with solid lines in the figure represent discrete subsegments that fall under the primary segment identified in the shaded box above it. The boxes with dashed lines represent quasi-segments that do not fall clearly under any one segment. For example, the End User/FM (facilities maintenance) subsegment is shown under Installers; however, they are not a component of the supply side (nor are they included in the primary research conducted for the current study). Integrated Suppliers span all four segments but to avoid duplication were grouped under Installers. Another quasi-segment is Manufacturers' Reps. These entities act as sales conduits for manufacturers, providing design and layout services as a sales tactic. These firms, whether independent or manufacturer-owned, do not fall definitively under any single primary segment as defined; yet they have a significant market presence and, therefore, merit recognition in the segmentation scheme. Finally, electrical contractors and distributors/reps fall under the designer segment because these are secondary services offered by these groups.

Although this discrete segmentation of the supply-side market is generally appropriate and useful, it is also important to recognize that many supply-side lighting firms engage in multiple levels of the supply chain.

Market Influence

This subsection presents influence diagrams for major sectors of the market (again, as developed in XENERGY 1998). Figure 6-2 depicts the overall structure of the commercial lighting market and identifies major interventions that can apply at each point in the market. Arrows generally indicate product flows and design influence; boxes represent major segments. Not all possible product flows and influences are shown in the to avoid an unnecessarily overcomplicated diagram. Consequently, the diagram represents simplified primary market relationships, rather than an exhaustive depiction of all relationships we identified in our research.

The two subsequent influence diagrams, Figure 6-3 and Figure 6-4, dissect the overall market diagram into a manufacturer and design and specification diagram. These two segments of the market structure illustrate the "external" pressures affecting the decision-making of both supply-side groups. Again, no new primary research on these actors is included in this study; see XENERGY 1998 for additional information on the motivations and trends among these actors. The current study focuses on distributors and contractors as these market actors are the focus of current program initiatives aimed at the commercial retrofit market.

Product Flows

Within California, the majority of commercial lighting products flow from manufacturers to distributors, from distributors to contractors, and then on to end users. Figure 6-5 presents product flow estimates among the members of the lighting value chain. These estimates were developed from the primary research conducted with distributors and contractors for this study. As shown in Figure 6-5, distributors also sell a significant fraction of fluorescent lamps, ballasts, and fixtures directly to end users. It is likely that much of this flow goes to the replace-on-burnout market.

Size of Lighting Contractor and Distributor Populations

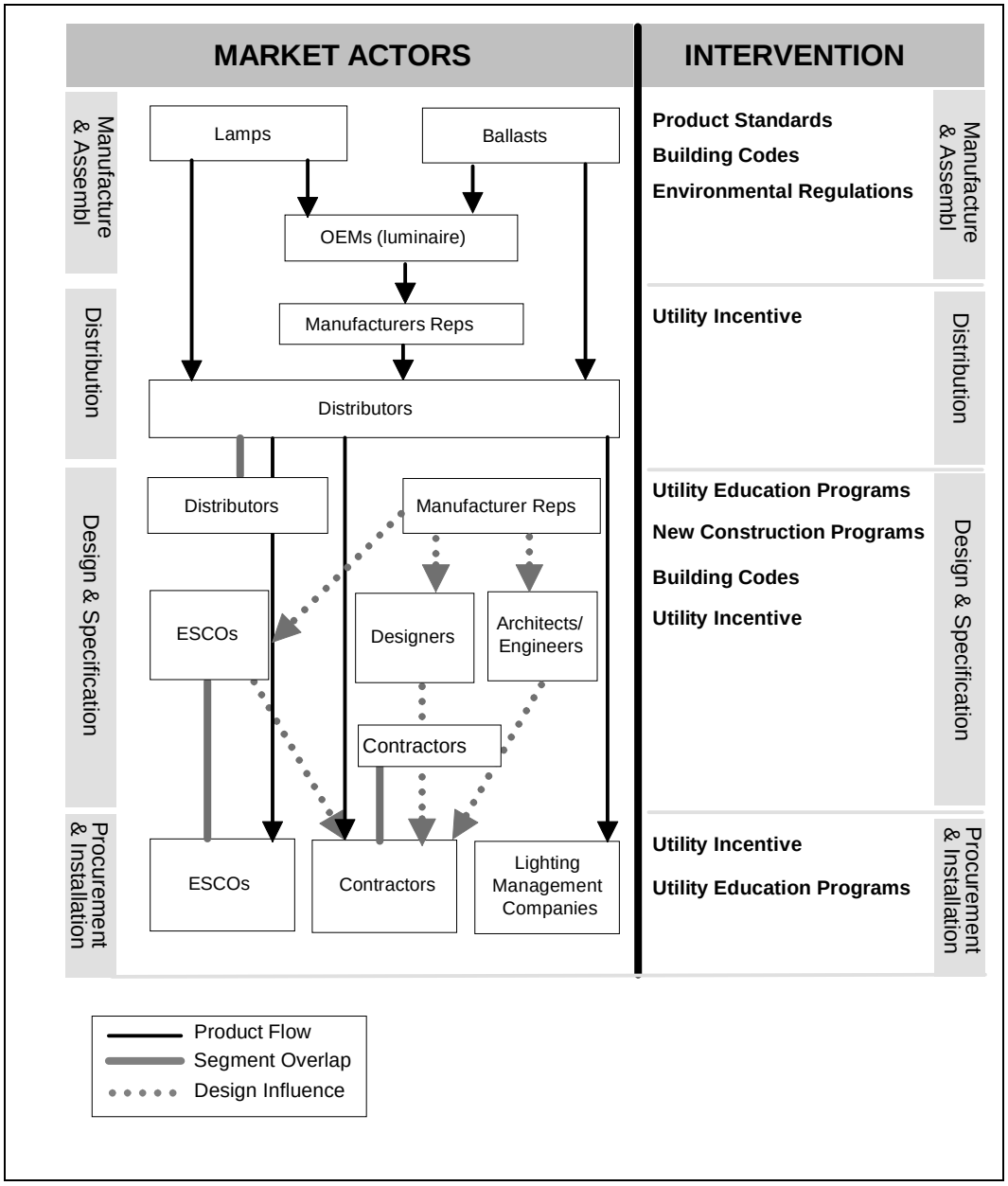
The size of the lighting contractor and distributor population in California is shown in Table 6-1. We estimate that there are over 6,200 lighting contractor and 571 lighting distributor *locations* in California. These estimates were developed from a combination of Dun and Bradstreet (D&B) listing of businesses in relevant eight-digit SIC groups and adjustment ratios that we developed based on the results of our screening protocols implemented during our interviewing recruitment. We found that only about 80 percent of the businesses listed in D&B under the relevant SIC codes actually met our criteria for defining lighting contractors or distributors.

6.1.2 Analysis of Primary Interview Results

Analysis of the efficient lighting equipment market information developed from our primary research on supply-side market actors is presented in the following subsections on interviewee characteristics and market trends. This subsection characterizes the commercial lighting market in California based on data from interviews with electrical contractors and distributors. In addition to contractors from California, contractors from outside the state were also interviewed. We developed our sample design to provide population estimates. Our sample frame was based on Dun & Bradstreet data for contractors and distributors, using detailed SIC codes to define the

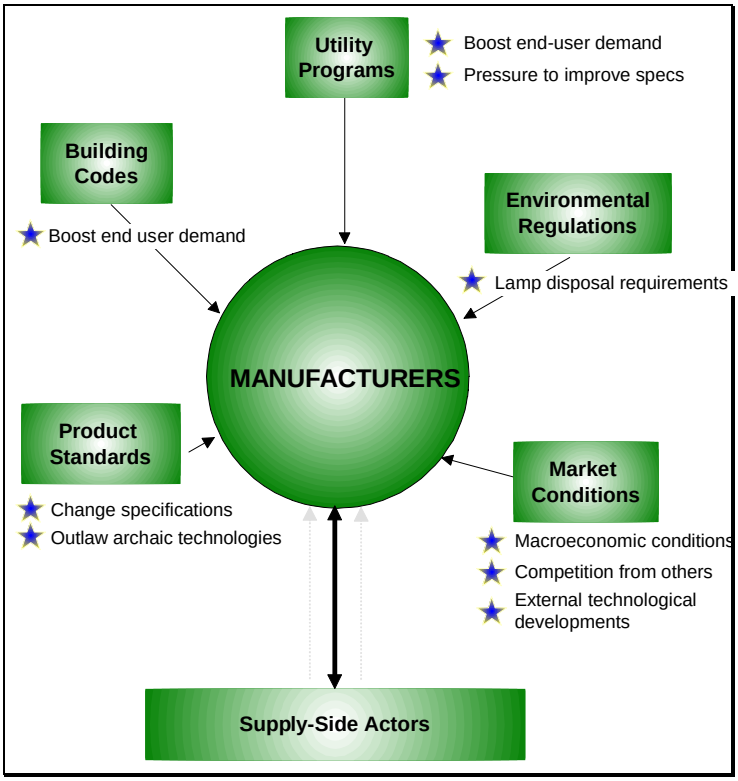
categories to be included in the sample frame. The population of contractors and distributors was stratified by utility and the three size groups shown in Table 6-1, and interviewees were selected on a random basis. **The results were then weighted based on the ratio of the population in each stratum divided by the sample in each stratum times the average number of employees per location in each stratum**. Consequently, the survey results can be used as population estimates.

Figure 6-2
Commercial Lighting Market and Intervention Diagram



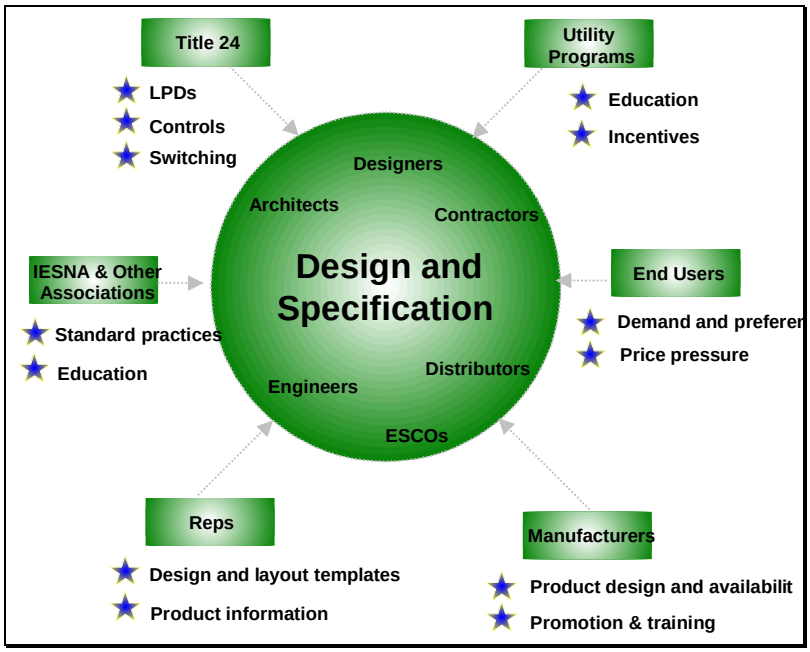
Source: XENERGY 1998

Figure 6-3
Manufacturer Influence Diagram



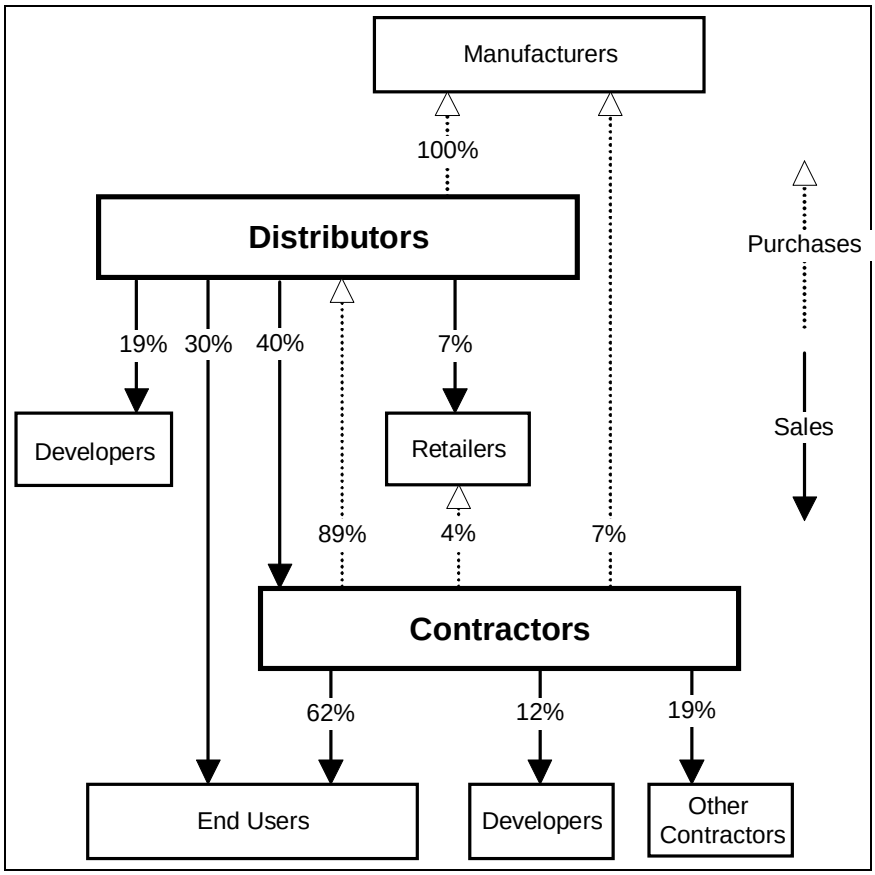
Source: XENERGY 1998

Figure 6-4
Design & Specification Influence Diagram



Source: XENERGY 1998

Figure 6-5
Product Flows in the Commercial Lighting Market in California



Source: XENERGY Interviews.

Table 6-1
Lighting Contractor and Distributor Population Estimates and Sample Points, California

Market Actor	Category	# Employees	# Establishments	Interviews Completed
Lighting Contractors	Small	1-9	5,457	32
	Medium	10-49	748	44
	Large	>50	34	24
	Total		6,239	100
Lighting Distributors	Small	1-9	407	22
	Medium	10-24	110	16
	Large	>25	53	10
	Total		571	48

Source: Derived from the Dun & Bradstreet Database and adjusted based on XENERGY screening interviews for this study.

Characteristics of Lighting Contractors and Distributors

As shown in Table 6-1, we interviewed 100 California lighting contractors and 48 distributors. Sixty contractors outside of California were interviewed.

Of California-based lighting contractors, 91 percent classified themselves as electrical contractors, as shown in Table 6-2. Lighting management companies and energy service companies represented 7 percent and 2 percent of the contractors, respectively. One hundred percent of the OOS contractors classified themselves as electrical contractors.

Table 6-2
Contractors: Type of Firm

Response	CA	Out of State
Electrical contractor	91%	100%
Energy service company	2%	<1%
Lighting management company	7%	0%
# Respondents	*100*	*60*

Table 6-3 shows that the majority of distributors classified themselves as electrical equipment (41 percent) or lighting suppliers (41 percent).

Table 6-3
Distributors: Type of Firm

Response	CA
Catalog/mail order firm	1%
General industry supplier	17%
Electrical equipment supplier	41%
Lighting supplier only	41%
Manufacturer representative	8%
# Respondents	*48*

A large majority of contractors and distributors have been in business over 10 years, as shown in Table 6-4. Between one-quarter and one-third of contractors and distributors have been in business over 30 years.

Table 6-4
Years In Business

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
0 to 10	23%	28%	17%
11 to 20	34%	23%	37%
21 to 30	19%	26%	12%
31 to 40	10%	8%	5%
Over 40	13%	15%	29%
# Respondents	*100*	*60*	*48*

Contractors are relatively small businesses, with 73 percent of the California contractor market having 20 full-time employees or fewer, as shown in Table 6-5 (again as weighted by number of employees, note that, on a location basis, 87 percent of contractor locations have fewer than 10 employees, as indicated in Table 6-1). This finding is similar for the OOS contractors, where almost two-thirds had 20 employees or fewer. Distributors followed a similar pattern although they tended to be slightly larger.

Table 6-5
Full-Time Equivalent Employees

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
1 to 5	28%	23%	7%
6 to 10	20%	22%	23%
11 to 20	25%	19%	28%
21 to 50	15%	22%	31%
51 to 100	4%	10%	5%
Over 100	7%	1%	4%
Don't know/refused	1%	3%	2%
# Respondents	*100*	*60*	*48*

The distribution of sales for 1999 is shown in Table 6-6. Most of the California (76 percent) and OOS (62 percent) lighting contractors had less than $5 million in sales for 1999. Approximately one-third (35 percent) of the distributors had 1999 sales less than $5 million. We estimated that the 87 percent of contractor locations with fewer than 10 employees account for only about half of the lighting revenues, while locations with 10 to 49 employees (12 percent of locations) account for 40 percent of revenues, and locations with more than50 employees (less than 1 percent of locations) account for 10 percent of revenues.

Table 6-6
Total 1999 Sales at This Location

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Under $1 million	35%	39%	11%
$1 - 4.9 million	41%	23%	24%
$5 - 49.9 million	13%	20%	49%
Over $50 million	6%	6%	5%
Don't know/refused	6%	12%	11%
# Respondents	*100*	*60*	*48*

Contractors were asked to estimate the percentage of their total sales that came from lighting or lighting-related services. Table 6-7 shows that over 80 percent of the contractors, both in California and out of state, reported that lighting-related sales comprised one-half or less of their total sales. About 60 percent of the distributors reported that lighting-related sales were a half or less of their total sales; 25 percent indicated that all their sales were related to lighting.

Table 6-7
Commercial Lighting as Percentage of Total Sales

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
0% to 10%	16%	21%	6%
11% to 20%	22%	17%	19%
21% to 30%	22%	22%	14%
31% to 50%	21%	25%	21%
51% to 99%	4%	6%	11%
100%	6%	4%	25%
Don't know/refused	8%	5%	4%
# Respondents	*100*	*60*	*48*

Contractors and distributors were asked if they installed or sold specific types of lighting equipment; the results are shown in Table 6-8. The table shows that there is no longer much of a difference in the share of California and OOS companies installing typical lighting equipment, such as fluorescent fixtures/lamps and HID fixtures/lamps. California contractors, however, are still considerably more likely to install more advanced lighting technologies, such as dimming ballasts and occupancy controls, which are usually associated with higher efficiency.

Table 6-8
Contractors: Company Installs This Lighting Equipment

Response	CA	Out of State
4-foot fluorescent lamps	100%	97%
Dimming ballast	89%	67%
4-foot fluorescent fixtures	100%	91%
Compact fluorescent lamps	95%	86%
HID lamps or fixtures	100%	89%
Occupancy controls	89%	69%
# Respondents	*100*	*60*

Table 6-9 shows that about 90 percent or more of the California distributors sell each technology except one; only 76 percent sell occupancy controls.

Table 6-9
Distributors: Company Sells This Lighting Equipment

Response	CA
4-foot fluorescent lamps	90%
Dimming ballast	92%
4-foot fluorescent fixtures	88%
Compact fluorescent lamps	99%
HID lamps or fixtures	97%
Occupancy controls	76%
# Respondents	*47*

Contractors were asked what share of their business was in the commercial, residential, and industrial sectors. Table 6-10 shows that on the average, approximately two-thirds of the contractors' business was from the commercial sector in both California and the OOS area, while about 20 percent and 14 percent were from the industrial and residential sectors, respectively, in California.

Table 6-10
Contractors: Percent of Customers by Sector

Response	CA	Out of State
Commercial	66%	69%
Residential	14%	17%
Industrial	20%	14%
Other	<1%	<1%
# Respondents	*100*	*60*

When asked who their direct customers were, the results for California and OOS contractors were similar, as shown in Table 6-11. Over 60 percent of the contractors' sales were directly to end-users. Approximately one-third was to other contractors or developers. As would be expected, distributors' sales to end users were considerably less, though still a significant and important share—30 percent were directly to end-users, and almost two-thirds were to contractors or developers.

Table 6-11
Percent of Lighting Projects by Customer Type

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Contractors	19%	25%	40%
Direct to end users	62%	63%	30%
Developers	15%	12%	19%
Other	4%	1%	7%
Retail stores	n/a	n/a	2%
# Respondents	*100*	*60*	*47*

Contractors in California report doing relatively similar amounts of new construction projects and retrofits or expansions projects, as shown in Table 6-12. OOS contractors report that they are involved in a higher proportion of new construction projects than their California-based counterparts.

Table 6-12
Contractors: Percent of Lighting Projects by Project Type

Response	CA	Out of State
Retrofits and expansions	43%	30%
New construction	53%	68%
Other	4%	3%
# Respondents	*100*	*60*

Table 6-13 shows that contractors buy the vast majority of their lighting equipment from wholesalers and distributors.

Table 6-13
Contractors: Percent of Lighting Equipment Purchases by Vendor Type

Response	CA	Out of State
Wholesalers and distributors	89%	93%
Directly from manufacturers	7%	4%
Retail outlets	4%	3%
Other	<1%	1%
# Respondents	*100*	*60*

6.1.3 High-Efficiency Products and Services

This subsection provides a summary of interview results related to energy-efficient lighting. This subsection is organized into the following topic areas:

- Promotion of high-efficiency products and services
- Perceptions and adoption of building commissioning practices
- Market penetration of high-efficiency lighting
- Barriers to high-efficiency lighting
- Market trends
- Utility efficiency programs.

Promoting and Recommending High-Efficiency Products and Services

Contractors and distributors were asked in what percent of jobs they recommended or specified T8 lamps or compact fluorescent lamps as options to T12 or incandescent lamps, respectively. Table 6-14 shows that California contractors and distributors recommend T8 and compact fluorescent lamps in about three-fourths of their jobs, and contractors are more likely to do so. California contractors are somewhat more likely to recommend the high-efficiency technologies than OOS contractors.

Table 6-14
Percent of Jobs Where High-Efficiency Technology Is Recommended

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Jobs/Sales where T8s recommended	80%	73%	77%
Jobs/Sales where CFLs recommended	71%	59%	64%
# Respondents	*98*	*54*	*46*

When asked how important offering high-efficiency lighting equipment was in maintaining the their firm's competitive position, over 80 percent of the contractors and distributors responded "very important" or "somewhat important," as shown in Table 6-15. The results for California and OOS contractors were very comparable.

Table 6-15
Importance of Offering Efficient Lighting

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Very important	49%	47%	75%
Somewhat important	32%	36%	19%
Not very important	13%	6%	
Not at all important	4%	10%	6%
Don't know/refused	2%	<1%	
# Respondents	*100*	*60*	*48*

Market Penetration of Efficient Products

The contractor and distributor self-reported shares of sales for a variety of high-efficiency lighting technologies are shown in Table 6-16. The shares for most high-efficiency technologies are only slightly higher for California contractors than for OOS contractors, except for electronic ballasts. In previous studies we have documented that California led the rest of the country in high-efficiency lighting component penetration through most of the 1990s, through subsequent spillover to low-DSM states, however, this gap appears to have now been closed (see Figure 6-6 and XENERGY 1998 and XENERGY 1999b).

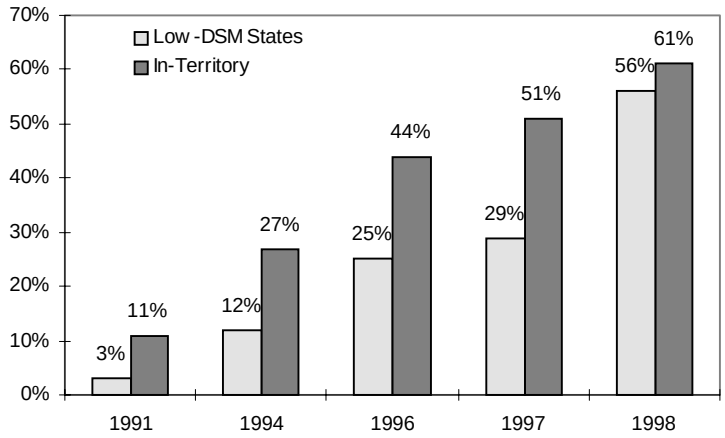
Table 6-16
Percent of Sales That Are High-Efficiency Technologies

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Downlight sales that are CFLs	49%	43%	39%
Fluorescent sales that are T8	68%	63%	56%
Ballast sales that are electronic	71%	82%	51%
4-foot fluorescents that are indirect	22%	19%	11%
# Respondents	*100*	*60*	*48*

Building Commissioning

We also asked the interviewees several questions related to building commissioning because it can be instrumental in ensuring that equipment and controls (especially daylighting and occupancy sensors) perform as desired.. For the purposes of this study building commissioning was defined as a method of confirming proper functioning of building systems after occupancy through the use of measurement and verification. This description was read to the interviewee. Unfortunately, we believe that respondents either did not fully understand the description given or substituted their own definitions of commissioning in their responses. Most experts on commissioning believe that comprehensive commissioning of the type we described (i.e.,

Figure 6-6
Long-Term Trend of T8 Lamps As Percent of 4-foot Linear Fluorescent Sales
(Based on Distributor Self-Reports from two studies, see footnote;
"In-territory" refers to PG&E)



Sources: For 1991, 1994, and 1997; XENERGY, 1998. For 1996 and 1998, XENERGY 1999b.

commissioning focused on lighting control systems) is rare in the current market, yet, as shown below, large percentages of contractors report high awareness and implementation of commissioning. For the record, we report these results here, however, ***we believe they are unreliable and over-reported***. A more focused assessment of commissioning is needed to clarify the baseline for this practice.

When asked if they were aware of building commissioning to enhance energy efficiency in buildings, about half of each group of contractors indicated that they were, as shown in Table 6-17. Those who said they were aware were then asked if they had considered using building commissioning to sell products or enhance their business. Table 6-18 shows that one-third of the California contractors and almost half of the OOS contractors *report* that they had already used building commissioning to enhance their business. (Again, we caution that we believe these figures are significantly over-reported and unreliable.)

Table 6-17
Contractors: Awareness of Building Commissioning
(Authors' Note: We suspect levels are over-reported)

Response	CA	Out of State
Yes	50%	51%
No	49%	47%
Don't know/refused	1%	2%
# Respondents	*100*	*60*

Table 6-18
Contractors: Considered Using Building Commissioning
To Sell Products or Enhance Business
(Authors' Note: We suspect levels are over-reported)

Response	CA	Out of State
Used building commissioning	37%	49%
Considered, but not used	30%	9%
No	33%	41%
Don't know/refused	0%	1%
# Respondents	*54*	*30*

When asked where they had heard about building commissioning, a variety of sources was cited. The main sources noted by both California and OOS contractors were trade organizations, business colleagues, and utility representatives, as shown in Table 6-19.

Table 6-19
Contractors: Where Heard about Building Commissioning

Response	CA	Out of State
Trade organization	18%	34%
Business colleague	20%	28%
Utility representative	21%	22%
Mail advertisement	5%	0%
Equipment distributor	7%	1%
Other	15%	8%
Don't know/refused	15%	7%
# Respondents	*54*	*30*

Barriers to Increasing Demand for High-Efficiency Lighting Equipment

Contractors and distributors were asked what obstacles they thought stood in the way of increasing customer demand for high-efficiency lighting. The results are shown in Table 6-20. Over 70 percent of both California and OOS contractors cited cost as an obstacle. Customer education was mentioned second most often, but it was a distant second. Interestingly, only about half the distributors mentioned cost, but almost a third cited customer education and, as noted earlier, 40 percent of distributor sales are to contractors.

Perceptions of Market Trends

Distributors were asked what changes they anticipate in the lighting equipment market over the next three years. The results are shown in Table 6-21. The major changes distributors anticipate are technological changes such as more efficient equipment (56 percent), more electronic devices (32 percent), and more T5 and T8 lamps.

Table 6-20
Obstacles To More Efficient Lighting

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Extra First Cost	71%	71%	51%
Customer education	8%	10%	28%
Financing options	5%	2%	7%
Payback	5%	4%	2%
Availability	2%	5%	-
Customer awareness	3%	5%	3%
Hassle	4%	5%	-
Split incentives	1%	0%	-
Inferior technology	4%	0%	-
No barriers	7%	7%	-
Other	6%	0%	15%
Don't know	5%	8%	7%
# Respondents	*99*	*58*	*48*

Table 6-21
Distributors: Anticipated Changes in Lighting Market

Response	**CA**
More efficient equipment	56%
More electronic devices	32%
More T5s, T8s, etc.	20%
More fluorescents/CFLs	9%
More conversions	9%
More new technologies	8%
Other	8%
HID changes	6%
More sales	3%
More compact equipment	1%
Don't know	4%
# Respondents	*48*

Awareness/Use of Utility Programs

This subsection presents the results of a series of questions asked of contractors and distributors about their awareness of and participation in utility programs. Results are presented first for California contractors and distributors and then for the OOS contractors.

California Contractors and Distributors

Most California respondents, both contractors and distributors, reported that they were aware that utilities provided business energy audits—61 percent of contractors and 100 percent of distributors believed audits were offered. Besides a general sense that audits were offered, most supply-side actors were not aware of specific incentive programs. Slightly less than 20 percent of contractors were aware of the Express Efficiency, SBSPC, or LNSPC programs. Distributors were slightly more aware of these programs.

Table 6-22
Familiarity with Utility Programs

	Contractors	Distributors
Response	**CA**	**CA**
Express Efficiency	17%	23%
Small business SPC	19%	21%
Large nonresidential SPC	18%	36%
Utility business energy audits	61%	100%
# Respondents	*71*	*31*
Note that respondents who gave no response or "don't know" are not included.		

Those who were familiar with a program were asked whether they had used or considered using it to sell products or enhance their businesses. Table 6-23 shows that two-thirds of the contractors who were familiar with the Express Efficiency Program had used it to sell products or services. This is approximately double the share of contractors aware of the Small Business SPC (Table 6-24) or the Large Non-Residential SPC Programs (Table 6-25) who used the program to enhance their business. These results contrast with those of the distributors who reported they were as likely or more likely to leverage the programs other than Express Efficiency. The results for distributors, however, should be used with caution because the number of respondents is less than nine in all cases.

Table 6-26 we show that the percentage using energy audits for business enhancement purposes was about the same as for the Small Business SPC Program and well below that of the Express Efficiency Program.

It should be noted that detailed information about how customers used these programs was not collected. It was not possible, therefore, to determine how contractors and distributors leveraged the programs to enhance their business or whether it varied by program.

Table 6-23
Use of Express Efficiency Program for Sales (of those aware)

	Contractors	Distributors
Response	**CA**	**CA**
Used it	67%	46%
Considered, not used	25%	22%
Don't know/refused	8%	32%
# Respondents	*19*	*7*
Note that sample sizes are too small for statistically valid comparisons.		

Table 6-24
Use of Small Business SPC for Sales (of those aware)

	Contractors	Distributors
Response	**CA**	**CA**
Used it	31%	41%
Considered, not used	41%	26%
Not considered	25%	6%
Don't know/refused	2%	27%
# Respondents	*21*	*6*
Note that sample sizes are too small for statistically valid comparisons.		

Table 6-25
Use of Large Non-Residential SPC for Sales (of those aware)

	Contractors	Distributors
Response	**CA**	**CA**
Used it	36%	64%
Considered, not used	40%	3%
Not considered	21%	16%
Don't know/refused	3%	18%
# Respondents	*19*	*8*
Note that sample sizes are too small for statistically valid comparisons.		

Table 6-26
Use of Energy Audit Programs for Sales

	Contractors	Distributors
Response	**CA**	**CA**
Used it	34%	42%
Considered, not used	33%	19%
Not considered	31%	39%
Don't know/refused	1%	n/a
# Respondents	*63*	*30*

California contractors and distributors also were asked if their firms had obtained any business installing/selling energy saving measures based on recommendations customers received from an energy audit. Table 6-27 shows that 37 percent of contractors and 51 percent of the distributors said they had obtained business as a result of audits.

Table 6-27
Any Business Resulting from Recommendations of an Energy Audit?

	Contractors	Distributors
Response	**CA**	**CA**
Yes	37%	51%
No	58%	42%
Don't know/refused	5%	8%
# Respondents	*63*	*30*

California contractors and distributors who were aware of various programs were asked from whom they first heard of the program(s). Table 6-28 shows that utility representatives were cited most often, followed by business colleagues and mail advertisements.

California contractors and distributors who were aware of various utility programs were asked how much of an effect the program(s) had on their sales of high-efficiency equipment. Table 6-29 shows that distributors attributed more of an effect to the programs than contractors did. About 40 percent of the distributors and 20 percent of the contractors said the effect was fairly substantial.

Contractors and distributors were asked how much of an effect the utility program(s) had on their opinion of the quality and performance of high-efficiency equipment. Table 6-30 shows that about two-thirds of the California contractors and half the distributors said the program(s) had at least a moderate effect.

Table 6-28
First Source of Information About Utility Programs

	Contractors	Distributors
Response	**CA**	**CA**
Trade organization	7%	18%
Business colleague	14%	25%
Utility representative	47%	39%
Mail advertisement	11%	18%
Equipment distributor	3%	7%
Industry experience	3%	-
Internet	2%	-
Customers	5%	-
Other	4%	10%
Don't know/refused	4%	-
# Respondents	*71*	*29*

Table 6-29
Programs Effect on High-Efficiency Sales
(Includes only those aware of at least one program)

	Contractors	Distributors
Response	**CA**	**CA**
1 - Little effect	36%	25%
2	15%	19%
3 - Moderate effect	22%	15%
4	11%	22%
5 - Major effect	9%	17%
Don't know/refused	8%	1%
# Respondents	*71*	*31*

Table 6-30
Program Effect on Opinion of Equipment
(Includes only those aware of at least one program)

	Contractors	Distributors
Response	**CA**	**CA**
1 - Little effect	18%	32%
2	8%	19%
3 - Moderate effect	28%	15%
4	22%	16%
5 - Major effect	16%	18%
Don't know/refused	9%	1%
# Respondents	*71*	*31*

OOS Contractors

Contractors from out of state were asked if their electric utilities offered various programs. The reader should note that it is questionable to compare the responses of California and OOS contractors directly in part because the OOS contractors were asked about generic utility programs, but the California contractors were asked about specific programs. Also, we were unable to probe contractor responses adequately to determine how they defined the various program types and whether they were consistent with the California program definitions.

Table 6-31 shows that OOS contractors most often mentioned that their utilities offered energy audits. Rebate programs were mentioned second most often. Table 6-32 through Table 6-35 show whether the contractors used the programs they were familiar with. Over half of the respondents used rebate programs, energy audits, and information programs to enhance their sales. Twenty-three percent of those who thought their utility offered an SPC-type program said they used it to improve sales.

Table 6-31
Contractors: Programs Offered by Utility (Outside CA)

Response	Out of State
Rebate programs	43%
SPC programs	19%
Business energy audits	59%
Informational or education programs	37%
# Respondents	*59*

Table 6-32
Contractors: Use of Rebate Program for Sales (Outside CA)

Response	Out of State
Used it	56%
Considered, not used	12%
Not considered	32%
# Respondents	*27*
Note that sample sizes are too small for statistically valid comparisons.	

Table 6-33
Contractors: Use of SPC-Type Program for Sales (Outside CA)

Response	Out of State
Used it	23%
Considered, not used	14%
Not considered	63%
# Respondents	*11*
Note that sample sizes are too small for statistically valid comparisons.	

Table 6-34
Contractors: Use of Energy Audit Programs for Sales (Outside CA)

Response	Out of State
Used it	52%
Considered, not used	19%
Not considered	30%
# Respondents	*31*
Note that sample sizes are too small for statistically valid comparisons.	

Table 6-35
Contractors: Use of Information Programs for Sales (Outside CA)

Response	Out of State
Used it	57%
Considered, not used	12%
Not considered	26%
Don't know/refused	5%
# Respondents	*20*
Note that sample sizes are too small for statistically valid comparisons.	

6.1.4 Use of Internet in Business

This subsection explores whether and how contractors and distributors use the Internet in their businesses. Table 6-36 shows that approximately two-thirds of the contractors and 85 percent of distributors use the Internet. About 40 percent of the respondents use it moderately or extensively for business, as shown in Table 6-37.

Table 6-36
Does Firm Use Internet?

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Yes	65%	69%	85%
No	34%	31%	15%
Don't know/refused	<1%	0%	-
# Respondents	*100*	*60*	*48*

Table 6-37
How Much Is Internet Used for Business?

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Non-existent	5%	3%	
Minimal	54%	59%	61%
Moderate	37%	31%	24%
Extensive	5%	4%	15%
Don't know/refused	0%	3%	
# Respondents	*69*	*46*	*38*

In Table 6-38 we show the type of information contractors and distributors seek through the Internet. Information on manufacturers was mentioned most often by contractors and distributors. The second most mentioned response was product information. Distributors, on the other hand, seek information on contractors, one of their key customer constituents, on the Internet. The share that uses the Internet for energy information is very small for all groups.

When asked if they were aware that their local utility web site had a section addressing energy efficiency, 28 percent of the California contractors and 44 percent of the distributors responded affirmatively, as shown in Table 6-39. Table 6-40 shows that of those that were aware of a utility's energy efficiency section of its web site, 73 percent visited that section of the web site. Table 6-41 shows that 82 percent found the information they found on the web site to be useful. Table 6-42 shows that 36 percent of the OOS contractors had visited a utility web site.

Table 6-38
Types of Information Sought on the Internet

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Manufacturers	46%	46%	56%
Other	22%	19%	-
Product information	16%	31%	4%
Communication with customers	12%	0%	-
Wholesalers/vendors	11%	13%	13%
Competitors	9%	6%	8%
Utilities	6%	1%	2%
Energy information	4%	1%	6%
Bldg codes/govt. regulations	4%	1%	-
General industry information	3%	0%	-
Plans/specifications	1%	0%	-
Contractors	-	-	18%
Various	-	-	6%
Customers	-	-	9%
Nothing	-	-	3%
Refuse	0%	7%	-
Don't know	1%	0%	2%
# Respondents	*64*	*43*	*38*

Table 6-39
Aware of Energy Efficiency Section on Utility Web Site

	Contractors	Distributors
Response	**CA**	**CA**
Yes	28%	44%
No	72%	56%
# Respondents	*65*	*38*

Table 6-40
Looked in Energy Efficiency Section of Web Site
(% of those aware)

	Contractors	Distributors
Response	**CA**	**CA**
Yes	73%	36%
No	27%	64%
# Respondents	*20*	*17*
Note that sample sizes are too small to be statistically valid.		

Table 6-41
Found Energy-Efficiency Information on Web Site Useful
(% of those who visited utility web site)

	Contractors	Distributors
Response	**CA**	**CA**
Yes	82%	81%
No	-	4%
Don't know/refused	18%	14%
# Respondents	*15*	*6*
Note that sample sizes are too small for statistically valid comparisons.		

Table 6-42
Contractors (Out of State): Have You Visited Utility Web Site?

Response	Out of State
Yes	36%
No	64%
# Respondents	*44*

6.1.5 Comments and Recommendations

Respondents were asked how they thought energy-efficiency programs could be improved. Table 6-43 shows that California contractors identified rebates and/or financing as their major preference, followed by more promotion/awareness. Out of state contractors listed education and more promotion/awareness as the major program needs. Similar to OOS contractors, California distributors indicated information and more promotion/awareness as the major improvements needed to energy-efficiency programs.

6.2 HVAC MARKET CHARACTERIZATION: CONTRACTORS AND DISTRIBUTORS

This subsection provides a characterization of the commercial packaged A/C market based on data from surveys we conducted with A/C contractors and distributors in California and A/C contractors from out California.

6.2.1 Overview of Commercial Packaged Unit Market[1]

Nationally, there were approximately 5.35 million packaged A/C units (central air conditioners and air-source heat pumps) shipped in 1997, according to the Air Conditioning and Refrigeration Institute (ARI). Most packaged A/C units destined for commercial customers are in the 5- to 20-

[1] Most of this subsection is drawn from the PG&E C/I Market Effect Baseline (HVAC/Motors) Study, prepared by Quantum Consulting for PG&E, 1998.

Table 6-43
Energy-Efficiency Program Improvements

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Rebates/financing	33%	8%	14%
More promotion/awareness	28%	26%	21%
Education	15%	26%	
Information	15%	0%	34%
Other	15%	12%	8%
Get more input from contractors	8%	0%	
Target architects/designers	5%	0%	
Increased availability	2%	0%	
More contact with reps	2%	0%	13%
Better equipment design/appearance	2%	0%	
Lower costs	1%	17%	4%
Nothing	1%	3%	5%
Government mandates/codes	0%	7%	
Don't know	4%	6%	
# Respondents	*75*	*50*	*46*

ton size range. Domestic shipments by the manufacturers who make up the membership of the ARI are said to account for more than 90 percent of the national market.

All of the major national **manufacturers** are represented in the California market, and several have manufacturing/assembly facilities in the state. Despite the presence of a relatively large number of brand names, units are actually manufactured by just a handful of firms. Manufacturers of packaged units sell through a network of **distributors**, although some of those distributors are "captive;" that is, they are owned by the manufacturer and only sell a single manufacturer's products. Distributors provide the stocking function for A/C units other than the most popular models, which may also be stocked by contractors.

Contractors provide the retail sales function in the market for packaged commercial air conditioners. These are numerous and diverse in California. We estimate that there are more than 7,700 A/C contractors, ranging in size from one-person operations to companies with more than 50 employees in the state. Most of these specialize in residential installations, but even residential contractors typically do some commercial business. We screened respondents in our study based on whether or not they did more than $100,000 in *commercial* packaged A/C business per year. Based on this criteria, we estimate there are approximately 6,200 contractors that serve the *commercial* packaged A/C market.

Design professionals, including both consulting engineers and architectural firms, are involved in the A/C market to the extent that they specify the size, type, and efficiency of equipment to be installed. A&E firms often specify equipment to be installed in the new construction market;

they are less influential in the replacement market. **Energy Service Company** (ESCO) involvement in the packaged A/C market generally comes about as part of a larger, comprehensive energy project. Despite the broad capabilities that ESCOs offer, their role in the market for packaged air conditioning is still relatively limited.

In Figure 6-7 we present a flow chart of purchases and sales within the packaged A/C market based on results developed from our survey data. The percentages for sales and purchases shown in the figure do not add exactly to 100 percent due to rounding and the presence of very small product flows to and from other sources. Note that contractors report that they buy predominantly from distributors, and distributors report that they sell predominantly to contractors. Contractors report that they sell packaged A/C units mostly to end users (49 percent), but also to developers (14 percent) and other contractors (35 percent), principally *general* contractors that oversee large jobs.

6.2.2 Analysis of Primary Interview Results

Analysis of the HVAC equipment market information developed from our primary research is presented in the following subsections for HVAC contractors and distributors. Interviews were conducted of contractors located inside and outside of California. All distributors interviewed were from California.

We developed our sample design to provide population estimates. Our sample frame was based on Dun & Bradstreet data for HVAC contractors and distributors, using detailed SIC codes to define the categories to be included in the sample frame. The population of contractors was stratified by utility and the three size groups shown in Table 6-44, and interviewees were selected on a random basis. **The results were then weighted based on the ratio of the population in each stratum divided by the sample in each stratum times the average number of employees per location in each stratum.** Consequently, the survey results can be used as population estimates.

Size of HVAC Contractor and Distributor Populations

The size of the HVAC contractor and distributor population in California is shown in Table 6-44. This table shows that there are almost 6,300 HVAC commercial contractor, and 232 commercial HVAC distributor *locations* in California, based on our screening criteria. The data did not allow stratification by number of employees for distributors.

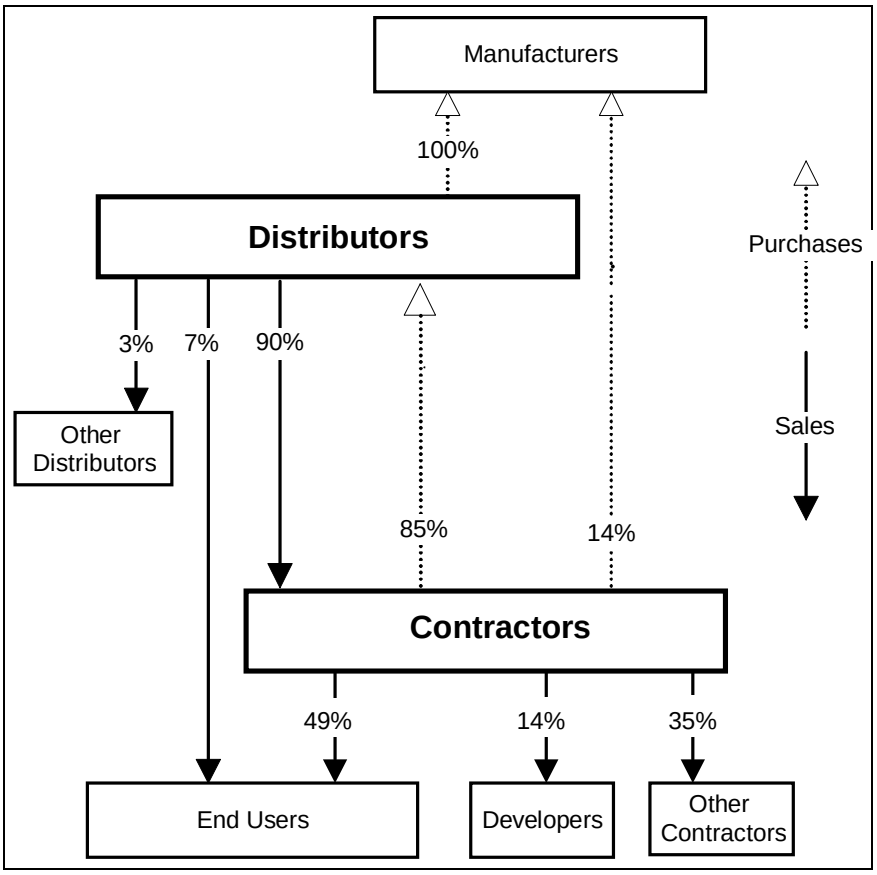
Characteristics of HVAC Contractors

The majority of the 100 California and 59 OOS contractors interviewed (92 percent of the California and 94 percent of the OOS contractors) classified themselves as HVAC contractors (see Table 6-45).

Table 6-46 shows that over half (57 percent) of the 35 California distributors interviewed were manufacturer representatives, and about one-third (34 percent) were general industry suppliers.

Most contractors (75 percent California and 80 percent OOS) and distributors (89 percent) have been in business over 10 years, as shown in Table 6-47.

Figure 6-7
Product Flows in the Commercial Packaged A/C Units in California



Source: XENERGY Interviews.

Table 6-44
HVAC Contractor and Distributor Population Estimates and Sample Points
California

Market Actor	Category	# Employees	# Establishments	Interviews Completed
HVAC Contractors	Small	1-9	5,279	32
	Medium	10-49	890	58
	Large	>50	107	10
	Total	All	6,276	100
HVAC Distributors	Total	All	232	35

Source: Derived from the Dun & Bradstreet Database and adjusted based on XENERGY screening interviews for this study.

Table 6-45
Contractors: Type of Firm

Response	CA	Out of State
HVAC contractor	92%	94%
Sheet metal contractor	2%	0%
General contractor	0%	3%
Part of a design-build firm	4%	0%
A&E design firm	1%	0%
Other	2%	3%
# Respondents	*100*	*59*

Table 6-46
Distributors: Type of Firm

Response	CA
Manufacturer representative	57%
General industry supplier	34%
Other	9%
# Respondents	*35*

Table 6-47
Years in Business

	Contractors		Distributors
Response	CA	Out of State	CA
0 to 10	25%	20%	11%
11 to 20	29%	25%	29%
21 to 30	20%	25%	20%
31 to 40	10%	3%	40%
Over 40	17%	26%	-
# Respondents	*100*	*59*	*35*

HVAC contractors are relatively small companies, with over two-thirds of the firms having 20 or fewer employees, as shown in Table 6-48 (as weighted by number of employees, note that, on a location basis, 84 percent of contractor locations have less than 10 employees, as indicated in Table 6-44). Table 6-49 shows that the 1999 sales for California and OOS contractors were very similar, with about two-thirds of the firms reporting sales less than $5 million for 1999. Almost half (49 percent) of the distributors had sales in excess of $10 million. We estimated that the 84 percent of contractor locations with less than 10 employees account for only about 41 percent of the lighting revenues, while locations with 10 to 49 employees (14 percent of locations) account for roughly another 42 percent of revenues, and locations with fewer than 50 employees (2 percent of locations) account for 17 percent of revenues.

Table 6-48
Full-Time Equivalent Employees

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
1 to 5	24%	19%	28%
6 to 10	19%	13%	20%
11 to 20	27%	34%	20%
21 to 50	17%	22%	20%
51 to 100	8%	8%	3%
Over 100	5%	5%	9%
# Respondents	*100*	*59*	*35*

Table 6-49
Contractors: Total 1999 Sales at This Location

	Contractors	
Response	**CA**	**Out of State**
Under $1 million	33%	33%
$1-4.9 million	30%	38%
$5-49.9 million	24%	20%
Over $50 million	9%	4%
Don't know/refused	4%	5%
# Respondents	*100*	*59*

As shown in Table 6-50 just over one-third (37 percent) had sales between $1 to $10 million.

Table 6-50
Distributors: Total 1999 Sales at This Location

	Distributors
Response	**CA**
Under $1 million	6%
$1.1 - 10 million	37%
Over $10 million	49%
Don't know/refused	*9%*
# Respondents	*35*

Thirty-seven percent of the California contractors estimated over half their total sales come from packaged A/C, while 27 percent of OOS contractors reported the same. Table 6-51 shows that 18 percent of the distributors reported that packaged A/C comprised over half of their total sales.

Table 6-51
Contractors: Percent of Sales from Packaged A/C

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
0% to 10%	8%	6%	29%
11% to 20%	14%	19%	17%
21% to 30%	18%	25%	17%
31% to 50%	21%	23%	11%
51% to 70%	20%	6%	6%
71% to 99%	11%	18%	6%
100%	6%	3%	6%
Don't know/refused	3%	0%	9%
# Respondents	*100*	*59*	*35*

Almost half of the California contractors' projects (49 percent) were provided to contractors or developers, as shown in Table 6-52. This is slightly higher than the 43 percent of OOS contractors. Forty-nine percent of the projects of California contractors were provided directly to end users, while 55 percent for OOS contractors were provided to end users. Distributors sold their products primarily to contractors (90 percent) (see Table 6-53). A small portion (7 percent) were sold directly to end users.

Table 6-52
Contractors: Percent of HVAC Projects by Customer Type

Response	**CA**	**Out of State**
Other contractors	35%	33%
Direct to end users	49%	55%
Developers	14%	10%
Other	3%	2%
# Respondents	*100*	*59*

Table 6-53
Distributors: Percent of HVAC Projects by Customer Type

Response	**CA**
Contractors	90%
End users (direct sales)	7%
Other distributors	3%
Retail	1%
Other	<1%
# Respondents	*35*

The breakdown of HVAC projects by type is shown in Table 6-54. Most projects are to replace existing units; about one-third of projects were planned replacements of existing units for California and OOS contractors and distributors. Emergency replacements of existing units account for approximately one-fifth of the HVAC projects.

Table 6-54
Percent of HVAC Projects By Type

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Planned replacement, existing units	30%	31%	31%
Emergency replacement, existing units	19%	22%	18%
New units, existing buildings	30%	20%	25%
New units, new buildings	19%	28%	25%
Other	1%	1%	2%
# Respondents	*100*	*59*	*35*

The distribution of contractors' customers by sector is similar for California and OOS contractors, as shown in Table 6-55. Most customers are from the commercial sector, followed by residential and industrial sector customers.

Table 6-55
Contractors: Percent of Customers By Sector

Response	CA	Out of State
Commercial	55%	59%
Residential	33%	31%
Industrial	12%	9%
Other	0	<1%
# Respondents	*100*	*59*

Contractors, both in California (85 percent) and OOS (83 percent), make most of their purchases from wholesalers and distributors, as shown in Table 6-56. Purchasing directly from the manufacturer takes place in 14 percent and 15 percent of the purchases for California and OOS contractors, respectively. Retail outlets are used in a small number of purchases.

The data shown in Table 6-57 suggest that California contractors install more packaged A/C units than OOS contractors. Forty-four percent of OOS contractors install 50 or fewer units, compared with 29 percent for California contractors. On the other hand, 27 percent of the California contractors install over 100 units per year, compared with 18 percent for OOS contractors.

Table 6-56
Contractors: Percent of Purchases by Vendor Type

Response	CA	Out of State
Wholesalers and distributors	85%	83%
Directly from manufacturers	14%	15%
Retail outlets	<1%	2%
Other	0%	0%
# Respondents	*100*	*59*

Table 6-57
Contractors: Packaged A/C Units Installed Per Year

Response	CA	Out of State
0 to 20	14%	17%
21 to 50	15%	27%
51 to 100	24%	21%
101 to 200	15%	10%
Over 200	12%	8%
Don't know/refused	19%	16%
# Respondents	*100*	*59*

Contractors were asked to estimate the average number of packaged A/C units installed per job. These results, shown in Table 6-58, show that most jobs are relatively small, with close to half the jobs installing one or two units. Twelve percent and 14 percent of the jobs involve more than five packaged units for California and OOS contractors, respectively.

Table 6-58
Contractors: Packaged A/C Units Installed Per Job

Response	CA	Out of State
1	26%	27%
2	30%	19%
3	13%	14%
4	8%	6%
5	6%	10%
Over 5	12%	14%
Don't know/refused	4%	10%
# Respondents	*100*	*59*

6.2.3 High-Efficiency Products and Services

This subsection provides a summary of the data collected through interviews of the supply-side actors in the packaged HVAC market: contractors and distributors.

In addition to packaged A/C units, contractors and distributors were asked what other products their firm installs or sells. Table 6-59 shows that all groups sell a substantial number of other products.

Table 6-59
Additional Products Firm Specifies

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Water-cooled air conditioners	81%	69%	49%
Evaporative air conditioners	-	-	80%
Gas powered A/C-heat units	70%	53%	46%
Heat pumps	94%	85%	97%
VSDs (variable speed drive controllers)	75%	70%	54%
Programmable thermostats	95%	86%	97%
# Respondents	*100*	*59*	*35*

Promoting and Recommending High-Efficiency Products and Services

Contractors and distributors were asked a number of questions about the extent to which they promote and recommend high-efficiency packaged units and their stocking practices. When asked whether they actively promoted or marketed high-efficiency packaged units, 70 percent of the California contractors responded that they did, compared with only 43 percent of the OOS contractors. As shown in Table 6-60, 80 percent of the distributors responded that they actively promoted high-efficiency packaged units.

Table 6-60
Promote High-Efficiency Packaged A/C for Existing Buildings

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Yes	70%	43%	80%
No	28%	54%	20%
Don't know/refused	2%	3%	0%
# Respondents	*100*	*59*	35

Contractors were asked how often they recommend or specify high-efficiency commercial packaged units instead of, or as an option to, standard-efficiency units for jobs in existing buildings. Table 6-61 shows that California contractors recommend or specify high-efficiency

units in a higher percentage of their jobs (66 percent) than do OOS contractors (40 percent). Distributors recommend high-efficiency units in just over half (54 percent) of their sales.

Contractors and distributors also were asked to estimate the percentage of sales during 1999 of given sizes of packaged units that were high-efficiency. Table 6-61 shows that a slightly higher share of high-efficiency packaged units were sold in the smaller sizes.

Table 6-61
Jobs Where High-Efficiency Technology Is Recommended and High-Efficiency Sales

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
% Jobs, high-efficiency pkg. units recommended	66%	40%	54%
% <6 ton unit sales, 11.0 SEER or more	39%	37%	32%
% 6-12 ton unit sales, 10.3 EER or more	33%	30%	23%
% 13-20 ton unit sales, 9.7 EER or more	n/a	n/a	18%
% >20 ton unit sales, 9.5 EER or more	n/a	n/a	20%
# Respondents	*100*	*59*	*35*

When asked how difficult or easy it is to sell high-efficiency packaged units compared to standard-efficiency units, over 60 percent of the contractors and distributors reported that it is much more difficult or somewhat more difficult. Table 6-62 shows that 70 percent of the OOS contractors had a more difficult time selling high-efficiency units.

Table 6-62
Contractors: Ease of Selling High-Efficiency v. Standard A/C Units

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Much more difficult	26%	37%	35%
Somewhat more difficult	35%	33%	28%
About the same	28%	19%	28%
Somewhat less difficult	6%	1%	9%
Much less difficult	1%	7%	0%
Don't know/refused	3%	3%	-
# Respondents	*100*	*59*	*35*

Contractors felt that it was important to offer high-efficiency packaged units to maintain their competitive position. Table 6-63 shows that 42 percent of the California contractors responded that it was very important while 28 percent responded that it was somewhat important. OOS contractors gave similar responses.

Table 6-63
Contractors: Importance of Offering High-Efficiency Units

Response	CA	Out of State
Very important	42%	32%
Somewhat important	28%	35%
Not very important	18%	22%
Not at all important	9%	11%
Don't know/refused	3%	0%
# Respondents	*100*	*59*

Stocking Practices

In this subsection we present the results of our inquiries to distributors about their stocking practices of high-efficiency packaged units by different sizes. The distributors were asked what high-efficiency, air-cooled commercial packaged units they stocked in quantities to ensure timely delivery. Table 6-64 shows that 12 percent of the distributors reported not stocking any high-efficiency packaged units, while 86 percent reported that they stocked the smaller units. Among the reasons given for not stocking high-efficiency units were that units are built to order and that there are not a lot of requests for high-efficiency units.

Table 6-64
Distributors: High-Efficiency A/C Units Stocked

Response	CA
<6 ton with 11.0 SEER or higher	86%
6-12 ton with 10.3 SEER or higher	66%
13-20 ton with 9.7 SEER or higher	49%
20 ton with 9.5 SEER or higher	23%
None	12%
# Respondents	*35*

Distributors were asked how their stock of high-efficiency air-cooled commercial packaged units has changed over the past three years. The results presented in Table 6-65 show that over 60 percent have increased their stock of high-efficiency units during that time.

Building Commissioning

As in the lighting interviews, we asked the HVAC interviewees several questions related to building commissioning because it can be instrumental in ensuring that equipment performs as desired.. For the purposes of this study, building commissioning was defined as a method of confirming proper functioning of building systems after occupancy through measurement and verification. This description was read to the interviewee. Unfortunately, we believe that

Table 6-65
Distributors: Change in Stock of High-Efficiency Units
Over the Past 3 Years

Response	CA
Significantly increased	45%
Somewhat increased	16%
Stayed about the same	30%
Somewhat decreased	6%
Significantly decreased	3%
# Respondents	31

respondents either did not fully understand the description given or substituted their own definitions of commissioning in their responses. Most experts on commissioning believe that comprehensive commissioning of the type we described is rare in the current market, yet, as shown below, large percentages of contractors report high awareness and implementation of commissioning. For the record, we report these results here, however, ***we believe they are unreliable and over-reported***. A more focused assessment of commissioning is needed to clarify the baseline for this practice.

When asked if they were aware of building commissioning to enhance energy efficiency in buildings almost two-thirds of the California contractors and half of the OOS contractors indicated they were, as shown in Table 6-66. Contractors were then asked if they had considered using building commissioning to sell products or enhance their business. Table 6-67 shows that 41 percent of the California contractors and 42 percent of the OOS contractors *report* that they had already used building commissioning to enhance their businesses (again, we caution that we believe these figures are significantly over-reported and unreliable).

Table 6-66
Contractors: Awareness of Building Commissioning
(Authors' Note: We suspect levels are over-reported)

Response	CA	Out of State
Yes	63%	49%
No	35%	49%
Don't know/refused	1%	2%
# Respondents	*100*	*59*

Table 6-67
Contractors: Considered Using Building Commissioning
(Authors' Note: We suspect levels are over-reported)

Response	CA	Out of State
Used building commissioning	41%	42%
Considered, but not used	18%	19%
Not used at all	34%	40%
Don't know/refused	7%	0%
# Respondents	*60*	*31*

When asked where they heard about building commissioning a variety of sources was cited. Trade organizations and business colleagues were the most common responses for both California and OOS contractors, as shown in Table 6-68. Just under 10 percent of California contractors mentioned utility representatives.

Table 6-68
Contractors: Where Heard About Building Commissioning

Response	CA	Out of State
Trade organization	32%	45%
Business colleague	10%	11%
Utility representative	9%	0%
Mail advertisement	6%	10%
Equipment distributor	7%	4%
Other	20%	19%
Don' know/refused	17%	10%
# Respondents	*60*	*31*

Barriers to Specifying High-Efficiency HVAC Equipment

When asked what the obstacles where to increasing customer demand for high-efficiency systems and controls, most responses for contractors fell into categories other than the specific ones shown in Table 6-69. Cost was the obstacle cited most often by contractors that we could place in one of categories shown in the table. Table 6-69 shows that distributors ranked cost (76 percent) and customer education (22 percent) as the top two obstacles.

Perceptions of Market Trends

Contractors were asked what changes in the packaged A/C market they anticipate over the next three years. Table 6-70 shows that the most often cited change is "nothing," with 47 percent of California and 90 percent of OOS contractors providing this response. The next highest response for California contractors was "more energy efficiency;" 30 percent anticipated improved energy-efficiency technology emerging, compared to only 6 percent of OOS contractors.

Table 6-69
Obstacles to Installing/Selling More High-Efficiency Systems

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
Other	62%	94%	9%
Extra First Cost	27%	5%	76%
Payback	4%	-	4%
Nothing	3%	-	-
Customer education	2%	2%	22%
Customer awareness	2%	-	-
Hassle	2%	1%	-
Financing options	1%	-	-
Availability	1%	-	-
Split incentives	<1%	-	-
Don't know	5%	-	-
# Respondents	*98*	*59*	*33*

Table 6-70
Contractors: Anticipated Changes in Packaged A/C Market

Response	**CA**	**Out of State**
Nothing	47%	90%
More energy efficiency	30%	6%
More sales/replacements	9%	0%
Refrigerant changes	6%	0%
Improved control features	4%	4%
Other	3%	0%
Package system market growth	2%	0%
More reliability	0%	2%
Don't know	11%	0%
# Respondents	*51*	*25*

To get a bearing on what the term "high-efficiency" means in the market today, contractors and distributors were asked if a customer asked for a high-efficiency package air-cooled A/C of a given size, e.g., 15 tons, what EER would they recommend. Table 6-71 and Table 6-72 show the responses for 5-ton and 15-ton units, respectively. For a point of reference, we had defined high-efficiency 5-ton units to have an EER of at least 11.0 and 13 to 20-ton units to have an EER of at least 9.7. For 5-ton units Table 6-71 shows that only 11 percent of California contractors, 22 percent of OOS contractors, and no distributors gave values lower than our threshold. However, nearly 20 percent of California and OOS contractors did not know or did not respond. For 15-ton units, rounding up the threshold EER from 9.7 to 10.0, both California and OOS contractors were more likely to give EERs above the threshold we defined. Distributors, however, were more likely to give lower values.

Table 6-71
EER of High-Efficiency 5-Ton Unit

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
9	1%	0%	
10	10%	22%	3%
11	4%	2%	0%
12	48%	33%	29%
13	9%	15%	49%
14	4%	9%	10%
16	5%	1%	3%
17	1%	0%	
Don't know/refused	19%	18%	6%
# Respondents	*100*	*59*	*33*

Table 6-72
EER of High-Efficiency 15-Ton Unit

	Contractors		Distributors
Response	**CA**	**Out of State**	**CA**
8	3%	-	-
9	6%	-	14%
10	21%	29%	38%
11	8%	2%	21%
12	29%	43%	12%
13	7%	8%	3%
14	5%	3%	-
15	1%	2%	-
16	2%	-	-
Don't know/refused	17%	13%	12%
# Respondents	*100*	*59*	*34*

Awareness/Use of Utility Programs

This subsection presents the results of a series of questions asked of contractors on their awareness and use of utility programs. The results are presented first for contractors in California and then the OOS contractors. No data were collected for HVAC distributors.

California Contractors

As shown in Table 6-73, 62 percent of contractors were familiar with the utility business energy audit. There was much less awareness of other utility programs such as the Express Efficiency Program and the Small and Large SPC programs.

Table 6-73
Familiarity with Utility Programs

Response	CA
Express Efficiency	21%
Small business SPC	12%
Large nonresidential SPC	7%
Utility business energy audits	62%
# Respondents	*100*

Of those contractors who were aware of the Express Efficiency Program, 27 percent said that they had used the program to sell products or to enhance their business. Table 6-74 shows that 57 percent of the respondents considered using the program but had not.

Table 6-74
Use of Express Efficiency Program for Sales (of those aware)

Response	CA
Used it	27%
Considered, not used	57%
Not considered	16%
# Respondents	*15*
Note that sample sizes are too small for statistically valid comparisons.	

Of those familiar with the Small Business SPC Program, 26 percent had used it and 53 percent considered using it but had not, as shown in Table 6-75.

Table 6-75
Use of Small Business SPC For Sales (of those aware)

Response	CA
Used it	26%
Considered, not used	53%
Not considered	21%
# Respondents	*12*
Note that sample sizes are too small for statistically valid comparisons.	

In contrast to the Small Business SPC, 49 percent of those who were familiar with the Large Non-Residential SPC Program used the program and 33 percent considered using it but had not. Note that the small sample sizes, however, make any direct comparisons unreliable.

Table 6-76
Use of Large Non-Residential SPC For Sales (of those aware)

Response	CA
Used it	49%
Considered, not used	33%
Not considered	17%
# Respondents	*6*
Note that sample sizes are too small for statistically valid comparisons.	

Responses of those familiar with energy audits were similar to those for the Express Efficiency and Small Business SPC Programs, with 20 percent having used it and 39 percent having considered but not used it, as shown in Table 6-77.

Table 6-77
Use of Energy Audit Programs for Sales

Response	CA
Used it	20%
Considered, not used	39%
Not considered	39%
Don't know/refused	2%
# Respondents	*56*

Twenty-four percent of contractors responded that they had installed energy-saving measures within the last two years for customers based on recommendations the customer received from an energy audit, as shown in Table 6-78.

Table 6-78
Any Business Resulting from Recommendations of An Energy Audit?

Response	CA
Yes	24%
No	72%
Don't know/refused	4%
# Respondents	*56*

Almost half of the California contractors first heard about utility programs from a utility representative, as shown in Table 6-79. This is followed by trade organizations (18 percent) and mail advertisements (16 percent).

Table 6-79
First Source of Information About Utility Programs

Response	CA
Utility representative	47%
Trade organization	18%
Mail advertisement	16%
Business colleague	9%
Other	6%
Equipment distributor	2%
Don't know/refused	3%
# Respondents	*61*

California contractors who were aware of various utility programs were asked how much effect the program(s) had on sales of high-efficiency equipment. Over half reported the programs had little effect in increasing the sale of high-efficiency equipment. Table 6-80 shows that about 17 percent said the effect was fairly substantial.

Table 6-80
Program Effect On High-Efficiency Sales
(Includes only those aware of at least one program)

Response	CA
1 - Little effect	53%
2	14%
3 - Moderate effect	10%
4	9%
5 - Major effect	8%
Don't know/refused	6%
# Respondents	*61*

When asked how much effect the contractors thought the program(s) had on their opinion of the quality and performance of high-efficiency equipment, 39 percent reported the programs had little effect on their opinions of high-efficiency equipment. Table 6-81 shows that 37 percent indicated that the programs had at least a moderate effect.

OOS Contractors

OOS HVAC contractors were asked if their electric utilities offered various programs. As indicated in the discussion of lighting contractor responses, note that it is questionable to compare the responses of California and OOS contractors directly, in part because the OOS contractors were asked about generic utility programs while the California contractors were asked about specific programs. Also, we were unable to probe contractor responses adequately to determine how they defined the various program types and whether they were consistent with the California program definitions.

Table 6-81
Program Effect on Opinion of High-Efficiency Equipment
(Includes only those aware of at least one program)

Response	CA
1 - Little effect	39%
2	18%
3 - Moderate effect	23%
4	7%
5 - Major effect	7%
Don't know/refused	6%
# Respondents	*61*

As shown in Table 6-82, 37 percent of the OOS contractors indicated that they were familiar with rebate programs. This share was larger than the proportion in California who were aware of the Express Efficiency Program. As shown in Table 6-83, 62 percent of OOS contractors who were aware of rebate programs said that they had used them, and this was a larger share than for the California contractors who said they used the Express Efficiency Program. Eleven percent of those OOS contractors who said they were familiar with SPC-type programs used them, as shown in Table 6-84. This was a smaller share than in California for both the Small and Large SPC Programs. For those OOS contractors familiar with audit programs, 55 percent used them (Table 6-85); this was larger than the comparable share in California. Table 6-86 shows that 56 percent of those OOS contractors familiar with utility information programs used them to enhance their sales and business activities.

Table 6-82
Contractors: Aware of Programs
Offered by Utility (Outside CA)

Response	Out of State
Rebate programs	37%
SPC programs	17%
Business energy audits	54%
Informational or Education programs	58%
# Respondents	*59*

Table 6-83
Contractors: Use of Rebate Program
for Sales, of Those Aware (Outside CA)

Response	Out of State
Used it	62%
Considered, not used	8%
Not considered	30%
# Respondents	*24*
Note that sample sizes are too small to be statistically valid.	

Table 6-84
Contractors: Use of SPC-Type Programs
for Sales, of Those Aware (Outside CA)

Response	Out of State
Used it	11%
Considered, not used	6%
Not considered	83%
# Respondents	*9*
Note that sample sizes are too small for statistically valid comparisons.	

Table 6-85
Contractors: Use of Energy Audit
Programs for Sales, of Those Aware (Outside CA)

Response	Out of State
Used it	55%
Considered, not used	6%
Not considered	39%
# Respondents	*33*

Table 6-86
Contractors: Use of Information Programs
for Sales, of Those Aware (Outside CA)

Response	Out of State
Used it	56%
Considered, not used	7%
Not considered	37%
# Respondents	*34*

6.2.4 Use of Internet in Business

This subsection explores whether and how contractors use the Internet in their businesses. Table 6-87 shows that 86 percent of California contractors and 79 percent of OOS contractors use the Internet. About one-fourth of the respondents that use the Internet use it moderately orextensively for business, as shown in Table 6-88.

Table 6-87
Contractors: Does Firm Use Internet?

Response	CA	Out of State
Yes	86%	79%
No	14%	21%
Don't know/refused	1%	0%
# Respondents	*100*	*59*

Table 6-88
Contractors: How Much Is Internet Used for Business?

Response	CA	Out of State
Non-existent	8%	9%
Minimal	63%	65%
Moderate	22%	26%
Extensive	7%	0%
# Respondents	*87*	*48*

Table 6-89 shows the type of information contractors seek through the Internet. Information on manufacturers was mentioned most often by contractors. The second most often mentioned response was information on wholesalers and vendors.

Thirty-nine percent of California contractors were aware of the energy efficiency section on their utility's web site, as shown in Table 6-90, while Table 6-91 shows that of those that were aware of the energy-efficiency section, 42 percent looked at that part of the utility web site. Seventy two percent of those that looked at the energy efficiency section found the information on programs, equipment and vendors to be useful, as shown in Table 6-92.

Table 6-93 shows that 21 percent of OOS contractors have visited a utility web site.

When asked if their utility's web site provided information on energy-efficient equipment, 69 percent of the OOS contractors responded yes, as shown in Table 6-94. Sixty-percent of the OOS contractors indicated that information on energy-efficiency programs was on their utility's web site, as shown in Table 6-95. Table 6-96 shows that 19 percent of the OOS contractors report that their utility's web site contains information on energy-efficiency providers.

Table 6-89
Contractors: Types of Information Sought on the Internet

Response	CA	Out of State
Manufacturers	36%	42%
Wholesalers/vendors	30%	0%
Other	22%	21%
Product information	14%	21%
Plans/specifications	10%	0%
Communication with customers	6%	0%
Utilities	4%	0%
Competitors	0%	10%
Don't know	8%	38%
# Respondents	*28*	*8*
Note that sample sizes are too small for statistically valid comparisons.		

Table 6-90
Contractors: Aware of Energy Efficiency
Section on Utility Web Site (of those who use Internet)

Response	CA
Yes	39%
No	61%
# Respondents	*78*

Table 6-91
Contractors: Looked in Energy-Efficiency
Section of Web Site (of those aware of utility site)

Response	CA
Yes	42%
No	58%
# Respondents	*31*

Table 6-92
Contractors: Found Energy Efficiency
Information on Web Site Useful (of those using EE part of site)

Response	CA
Yes	72%
No	4%
Don't know/refused	24%
# Respondents	*11*
Note that sample sizes are too small for statistically valid comparisons.	

Table 6-93
Contractors: Have You Visited a
Utility Web Site (Outside CA), of those who use Internet

Response	Out of State
Yes	21%
No	79%
# Respondents	*44*

Table 6-94
Contractors: Energy Efficient Equipment Information
On Utility Web Site (Outside CA), of those visiting utility site

Response	Out of State
Yes	69%
No	20%
Don't know/refused	11%
# Respondents	*10*
Note that sample sizes are too small for statistically valid comparisons.	

Table 6-95
Contractors: Energy Efficiency Programs on
Utility Web Site (Outside CA), of those visiting utility site

Response	Out of State
Yes	60%
No	34%
Don't know/refused	5%
# Respondents	*10*
Note that sample sizes are too small for statistically valid comparisons.	

Table 6-96
Contractors: Energy Efficiency Providers on
Utility Web Site (Outside CA), of those visiting utility site

Response	Out of State
Yes	19%
No	50%
Don't know/refused	31%
# Respondents	*10*
Note that sample sizes are too small for statistically valid comparisons.	

6.2.5 Comments and Recommendations

Contractors were asked how they thought energy-efficiency programs could be improved. Table 6-97 shows that California contractors identified rebates and/or financing as the major areas for improvement, followed by more promotion/awareness program. OOS contractors listed more education and information, and rebates and financing as the major ways to improve energy-efficiency programs.

Table 6-97
Contractors: Energy-Efficiency Program Improvements

Response	CA	Out of State
Rebates/financing	31%	29%
More promotion/awareness	24%	14%
Education	14%	57%
More contact with reps	5%	0%
Lower costs	3%	0%
Reduced hassle	3%	0%
Information	0%	29%
Don't know	32%	14%
# Respondents	*37*	*7*
Note that sample sizes are too small for statistically valid comparisons.		

7 EXPRESS EFFICIENCY INTERVIEWS

In this section, we present responses to a set of structured telephone interviews we conducted with a representative sample of customers who participated in the 1999 Express Efficiency Program. These interviews were conducted during February and March 2000. The following topics are covered in this section:

- General Characteristics of the Participant Customer Sample (Section 7.1)
- Characteristics of Interview Participants (Section 7.2)
- Customer Participation in the Program (Section 7.3)
- Customer Satisfaction with the Program (Section 7.4)
- Program-Related Decisions (Section 7.5)
- Attitudes and Behavior Toward Energy Efficiency (Section 7.6)
- Net Efficiency Effects Due to the Program (Section 7.7)
- Program Participant Experience with Third-Party Firms (Section 7.8)

7.1 GENERAL CHARACTERISTICS OF THE PARTICIPANT CUSTOMER SAMPLE

The discussion below presents weighted results as well as unweighted results for all participating customers. Results for individual utilities are discussed only where there is a substantial difference between the utilities. Within each utility, the weighted results were calculated by weighting each interviewee's response by the rebate amount for the project in question. Responses were weighted across utilities based on each utility's relative contribution to the total statewide rebates. For example, Pacific Gas and Electric Company (PG&E) had the highest level of participation; therefore, the participants interviewed in the PG&E area represented a larger proportion in the weighted results than in the unweighted results. Also, participants with greater energy savings were weighted more heavily than participants with small savings.

7.2 CHARACTERISTICS OF INTERVIEW PARTICIPANTS

Interviews were conducted with 209 customers who participated in the 1999 Express Efficiency (Express) Program. The customers were proportionally distributed among the service areas of the participating utilities as shown in Table 7-1. The table also shows the total value of the rebates associated with the interviewees' projects.

Table 7-2 shows the proportions of each utility's program participants that we interviewed, based on the number of interviewees and the amount of rebates they received. The smallest proportion of utility area participants interviewed was in the PG&E area and the largest was in the Southern California Edison (SCE) area.

Table 7-1
Number of Interviewees and
Rebate Amount by Utility

Utility	Number Interviewed	Rebates for Sample
PG&E	63	$163,030
SCE	55	$82,362
SCG	35	$68,069
SDG&E	56	$146,183
Total	209	$459,643

Table 7-2
Percentages of Interviewees by Utility

Utility	% of Group Interviewed**	% of Total Rebate for Group
PG&E	4%	3%
SCE	12%	13%
SCG	11%	13%
SDG&E	7%	8%
Total	6%	6%

**These percentages are based on unique sites.

7.2.1 Size of Operations and Electricity Billing Status

As seen in Table 7-3,[1] the *unweighted* data show that most customers fell into the smaller categories in terms of the number of employees. Forty percent of the customers interviewed had 10 or fewer employees, 37 percent had from 11 to 50 employees, and 32 percent had over 50 employees. The PG&E (32 percent) and SCE (37 percent) service areas had the highest concentrations of larger firms (over 50 employees).

As would be expected because the weighting is correlated with the customer size, the *weighted* results produce a distribution with a larger share of customers with more employees. The *weighted* results show that approximately 30 percent of the rebates were for customers that had 10 or fewer employees, 26 percent for customers that had between 10 and 50, and 44 percent for customers that had over 50 employees.

The distribution of the square footage of the facilities for the customers interviewed was similar to the distribution of the number of employees (see Table 7-4). The *unweighted* results show that 41 percent of the customers had facilities less than 10,000 square feet in size. Another 34

[1] In this and subsequent tables, the headings usually refer to the question number in the interview instrument.

Table 7-3
Number of Employees (at participating site)

Response	Weighted	Unweighted
1 to 5	13%	30%
6 to 10	17%	10%
11 to 20	14%	17%
21 to 50	12%	20%
51 to 100	12%	10%
over 100	32%	12%
Don't know/refused	<1%	<1%
# Respondents	*209*	*209*

percent had facilities ranging from 10,000 and 50,000 square feet, and 20 percent had facilities over 50,000 square feet. As with the number of employees, customers in the PG&E and SCE service areas had the greatest concentration of large facilities (over 50,000 square feet). When viewing weighted results, 28 percent had facilities under 10,000 square feet, 42 percent had facilities between 10,000 and 100,000 square feet, and 25 percent had facilities over 100,000 square feet.

Table 7-4
Total Square Footage (at participating site)

Response	Weighted	Unweighted
Less than 5,000 square feet	5%	19%
5,000 to 10,000 square feet	23%	22%
10,000 to 20,000 square feet	9%	16%
20,000 to 50,000 square feet	22%	18%
50,000 & 100,000 square feet	11%	11%
Over 100,000 square feet	25%	9%
Don't know/refused	4%	4%
# Respondents	*209*	*209*

Of the 209 customers interviewed, 68 percent owned their facility. Another 30 percent leased or rented their facility, all of whom were responsible for their own electricity bills. The remaining 2 percent of the customers interviewed were unable to answer questions regarding ownership and electricity bill responsibility.

7.2.2 Equipment Installed under the Program for Sampled Customers

Table 7-5 shows the equipment installed by the customers interviewed. Based on the *unweighted* data, one-third of the customers installed more than one measure under the program; 9 percent installed five or more measures. Lighting equipment, such as T-8 fluorescent lamps, electronic ballasts, or compact fluorescent lamps (CFLs) were the most common measures installed. On an *unweighted* basis, 55 percent of the customers interviewed installed T-8 fluorescent lamps, and 26 percent installed CFLs. Two-thirds installed only one type of lighting equipment, and 7

percent installed lighting equipment plus other types of measures, such as window film or insulation.

Overall, HVAC equipment, such as a packaged air conditioning (A/C) system, programmable thermostat, or variable-speed drive for the HVAC fan or air handler, were not widely installed. Those that were installed were almost exclusively found in the PG&E area. Only 6 percent of the customers installed a packaged A/C system, and another 2 percent installed programmable or setback thermostats. Eighty-three percent of the customers in the Southern California Gas (SCG) area installed water heaters; another 11 percent installed insulation. As mentioned earlier, results broken out by utility can be found in Appendixes B (unweighted) and C (weighted).

The *weighted* results also indicate that lighting equipment was the most common type of measure installed. Over three-fourths of the customers installed T-8 fluorescent lamps, 42 percent installed electronic ballasts, and 39 percent installed CFLs. Other common lighting measures were occupancy sensors (31 percent) and reflectors (20 percent). Less than one percent installed window film or insulation. The customers in the SCG area were most likely to have installed water heaters.

Table 7-5
Equipment Installed under 1999 Express

Response	Weighted	Unweighted
T-8 fluorescent lamps	76%	55%
Reflectors (with delamping)	20%	4%
Compact fluorescent lamps (CFLs)	39%	26%
Light occupancy sensors	31%	10%
Energy-efficient air conditioning/HVAC	5%	6%
Set-back/programmable thermostat	4%	2%
Adjustable speed drives for HVAC	<1%	<1%
Window film/treatment	<1%	2%
Water heater	6%	14%
Insulation	<1%	2%
Electronic ballasts	42%	10%
LED/exit signs	4%	4%
Other	6%	6%
# Respondents	*209*	*209*

As Table 7-6 indicates, approximately 60 percent of the customers had already received their rebate at the time of the interview. However, only 14 percent of the customers interviewed in the SDG&E service area had received their rebate at the time of the interview, but were more likely (23 percent) to say that their contractor was to receive the rebate. Viewing *weighted* results does not significantly alter the findings.

Table 7-6
Status of Rebate Check

Response	Weighted	Unweighted
Received rebate	59%	62%
Not received rebate (yet)	21%	14%
Received some, but not all of rebate yet	1%	<1%
Don't recall/didn't know about rebate	4%	5%
Contractor received rebate	8%	11%
Don't know/refused	8%	8%
# Respondents	*209*	*209*

7.2.3 Renovations

Approximately 44 percent of the participating customers interviewed (*unweighted*) had remodeled their facility since January 1997. When the results are *weighted*, the figure increases to 61 percent of the participants. Of the 92 customers who had remodeled in the prior two years, the most common measures replaced or installed overall were lighting, HVAC equipment, and insulation. As Table 7-7 illustrates, the weighted and unweighted figures for sites that had remodeled produced somewhat different findings for specific types of equipment, with HVAC equipment the most common (79 percent) efficiency measure installed on a *weighted* basis but lighting most common (66 percent) on an *unweighted* basis.

Table 7-7
What Was Replaced/Installed in Remodel

Response	Weighted	Unweighted
Significant portion overhead lights	62%	66%
Heating or ventilation equipment	79%	53%
Roof, ceiling, or wall insulation	50%	50%
Windows or window film	26%	37%
None of the above	3%	9%
Don't know	4%	2%
# Respondents	*92*	*92*

7.3 CUSTOMER PARTICIPATION IN THE PROGRAM

This subsection presents information about customers' participation in the program and their awareness.

7.3.1 Reasons for Participating in the Program

Table 7-8 reports the reasons customers gave for participating in the 1999 Express Efficiency Program. It presents results for all reasons given in the middle column and for the most important reason in the rightmost column.

When asked for all reasons for participating, the *weighted* results showed the following:

- The most common reason (56 percent) was to save money on electric bills. This was consistent with prior studies.
- Other common reasons included to obtain a rebate (21 percent), to acquire the latest technology (18 percent), and to improve measure performance (17 percent).
- Only 6 percent reported that a recommendation by a contractor was a reason and only 1 percent of the customers reported a recommendation by a utility account representative as a reason for participating in the program.
- While the responses among customers in different utility service areas were relatively consistent, 27 percent of the customers in the PG&E area mentioned to acquire the latest technology, whereas only about 2 percent gave this reason in the other areas.

Table 7-8
Reasons Why Customer Participated in 1999 Express

	All Reasons Given		Most Important Reason	
Response	**Weighted**	**Unweighted**	**Weighted**	**Unweighted**
Acquire the latest technology	18%	3%	2%	<1%
Save money on electric bills	56%	57%	36%	48%
Obtain a rebate	21%	27%	10%	16%
Replace old or broken equipment	8%	11%	3%	7%
Knew program was sponsored by utility	<1%	<1%	<1%	<1%
Improve measure performance	17%	11%	15%	7%
Help to protect the environment	1%	2%	<1%	1%
Previous experience with other programs	1%	1%	<1%	<1%
Recommended by utility account rep	1%	2%	<1%	1%
Recommended by contractors	6%	5%	4%	4%
Participated in previous years	2%	1%	-	-
Part of office remodeling/renovation	1%	3%	1%	1%
No cost to participate/free bulbs	2%	3%	1%	1%
Save energy/energy efficiency	6%	7%	6%	7%
Other	21%	5%	20%	4%
# Respondents	*209*	*209*	*209*	*209*

Generally, the *unweighted* results were similar to the *weighted* results. To save money on utility bills was the most common reason in both cases. The *unweighted* results, however, showed a much smaller proportion (3 percent) of customers who gave the response "to acquire the latest technology" as a reason they participated in the program.

The following were noteworthy results when customers were asked to give the most important reason for participating:

- To save money on electric bills was mentioned most frequently as the most important reason (36 percent of the *weighted* and 48 percent of the *unweighted* results).
- The other reasons mentioned most often as being the most important included to improve measure performance, and to obtain a rebate.
- To acquire the latest technology was mentioned very rarely as the most important reason for participation.

As indicated by the *weighted* results in Table 7-9, a large share of the customers, 74 percent, used the program to upgrade existing equipment that was fully functional. This is consistent with the fact that lighting measures accounted for most of the activity. Another 22 percent replaced existing equipment that was experiencing problems, including 46 percent of the customers in the SCG area. Only 2 percent of the customers installed new equipment that had not been present previously. Differences in the *unweighted* results included a lower percentage of customers that replaced fully functional equipment, and a higher share that were installing new equipment.

Table 7-9
Condition of Replaced Equipment

Response	Weighted	Unweighted
New equipment installed	2%	6%
Existing equipment was fully functional	74%	60%
Existing equipment had problems	22%	26%
Existing equipment did not function	3%	7%
Don't know/refused	<1%	1%
# Respondents	*209*	*209*

7.3.2 Awareness of Other Programs

When asked without prompting, approximately 80 percent of the customers interviewed could not recall any other programs available for energy-efficient equipment (see Table 7-10). Customers who could recall other programs were most likely to recall the SPC Programs (either small or large) or energy audits for businesses (approximately 7 percent). However, when customers who did not mention the SPC Programs were asked if they were aware of the programs, 26 percent (*weighted*) replied affirmatively. Overall, when the prompted and unprompted responses were combined, 32 percent (*weighted*) of the customers interviewed said that they were aware that at least one of the SPC Programs was available in 1999.

Table 7-10
Awareness of Other Programs
Available (Volunteered)

Response	Weighted	Unweighted
SPC Program (small or large)	8%	7%
Business energy audits	6%	7%
Distributor incentives	<1%	<1%
Not aware of any programs	83%	79%
HVAC programs	2%	2%
Other	3%	5%
Don't know/ Refused	2%	4%
# Respondents	*209*	*209*

As Table 7-11 demonstrates, only about 4 percent (*weighted*) said that they had participated in another program in 1999.

Table 7-11
Participated in Other Programs in 1999

Response	Weighted	Unweighted
SPC Program (small or large)	1%	1%
Energy audit	<1%	<1%
Other program	<1%	1%
Did not participate in other programs	96%	91%
No, but applied for SPC	2%	5%
Don't know	2%	1%
# Respondents	*209*	*209*

Although few of the customers interviewed had participated in other programs in 1999, Table 7-12 shows that over 40 percent (*weighted*) had participated in one or more programs between 1996 and 1998. The majority had participated in the Express Efficiency Program (or its precedents). In the PG&E service area, 51 percent said that they had participated in the program in the past. The difference between the weighted and unweighted results suggests that customers receiving the largest rebates in 1999 were more likely to have participated in prior programs.

7.3.3 Sources of Information on Express

Table 7-13 presents data about how customers first learned about the program. Most customers mentioned only one way. Based on the *weighted* results in Table 7-13, the most common ways

Table 7-12
Participated in Other Programs in 1996-98

Response	Weighted	Unweighted
Express Efficiency	34%	10%
SPC Program in previous years	<1%	<1%
Energy audit in previous years	13%	1%
Did not participate in previous years	56%	75%
Other	3%	6%
Don't know/ Refused	6%	10%
# Respondents	*209*	*209*

mentioned were through utility account representatives (16 percent), through ESCOs or other third parties (30 percent), or from prior program participation (36 percent). Customers in the SCG territory were significantly more likely (57 percent) to have been contacted by a utility account representative than customers from the other utility service areas. About 60 percent of customers in the SDG&E territory mentioned being contacted by an ESCO or other third party. Fifty-five percent of the customers interviewed in the PG&E area and 9 percent in the SDG&E area mentioned participation in previous years. Only customers in the PG&E and SCE areas reported receiving a utility brochure in the mail.

Consistent with the results presented above, the difference between the weighted and unweighted results suggests that customers receiving the largest rebates in 1999 were more likely to have participated in the Express Efficiency Program in earlier years.

Table 7-13
How First Learned of 1999 Express

	All Sources Given		Most Influential Source	
Response	**Weighted**	**Unweighted**	**Weighted**	**Unweighted**
Approached contractor/ESCO/3rd party	<1%	1%	<1%	1%
Approached utility about other matter	6%	9%	5%	9%
Contacted by utility account rep	16%	20%	16%	20%
Contacted by contractor/ESCO/3rd party	30%	42%	29%	41%
Utility brochure in mail	5%	10%	5%	9%
Insert in utility bill	1%	4%	<1%	3%
Word-of-mouth-person within company	1%	4%	1%	4%
Word-of-mouth- person outside company	2%	4%	2%	4%
Television, radio, or newspaper ad	1%	<1%	-	-
Participated in previous years	36%	5%	36%	5%
Manufacturer information/suggestion	1%	<1%	1%	<1%
Seminar	4%	2%	4%	2%
Other	2%	1%	<1%	1%
Don't know/ Refused	<1%	1%	<1%	1%
# Respondents	*209*	*209*	*209*	*209*

7.4 CUSTOMER SATISFACTION WITH THE PROGRAM

Most customers indicated that they were very satisfied with the program overall. As illustrated in Table 7-14, only 1 percent in the *weighted* sample reported that they were very dissatisfied with the program overall.

Table 7-14
Overall Satisfaction with Program

Response	Weighted	Unweighted
Very dissatisfied (0-3)	1%	3%
In the middle (4-7)	30%	21%
Very satisfied (8-10)	68%	75%
Don't know/Refused	<1%	1%
# Respondents	*209*	*209*

Customers were also asked for the reasons for their overall satisfaction rating. Consistent with the general satisfaction level, there were twice as many positive responses recorded than negative ones. As Table 7-15 demonstrates, the most common positive responses involved overall process or project management, things going according to expectations, or the program leading to a good payback.

On the negative side, 17 percent of the *weighted* sample reported that there were unexpected or hidden costs associated with the program or equipment. Another 7 percent mentioned poor measure performance as a problem. Only 3 percent complained of insufficient savings or low value. The difference between the weighted and unweighted results for unexpected or hidden costs suggest that this was more of an issue with the larger projects.

7.4.1 Satisfaction with Utility

Consistent with customer views on the program as a whole, 97 percent (*weighted*) of the customers reported that their overall experience with their utility in the program was about what they expected or better (see Table 7-16).

7.4.2 Satisfaction with Provider

For the 67 percent of customers (*unweighted*) (81 percent *weighted*) that used outside providers, the overwhelming majority were satisfied with their provider (approximately 93 percent *weighted* and *unweighted*). As Table 7-17 illustrates, only about 5 percent (*weighted*) reported that their experience was somewhat or much worse than they had expected.

Table 7-15
Reasons for Overall Satisfaction
Rating for Program (All responses recorded)

Response	Weighted	Unweighted
Good measure performance	6%	10%
Good communication with vendor/utility	4%	5%
Installer/vendor professionalism	1%	4%
Positive-process/project management	13%	12%
As expected/no surprises	19%	10%
Good savings/payback	11%	16%
Low cost/lower than expected	1%	1%
Efficient/timely process	14%	14%
Positive-miscellaneous	6%	7%
Poor measure performance	7%	10%
Negative-communication/information	4%	7%
Lack of vendor product knowledge	1%	3%
Installation was not professional	<1%	1%
Negative-process/project (hassle)	<1%	<1%
Unexpected or hidden costs, maintenance	17%	5%
No or minimal savings, low value	1%	1%
Cost too high, low value	2%	2%
Timing issues	5%	4%
Negative-miscellaneous	1%	<1%
Bulbs burnt out quickly	2%	3%
Other	5%	10%
# Respondents	*207*	*207*
Negative responses are shaded.		

Table 7-16
Overall Experience with Utility

Response	Weighted	Unweighted
Much better than expected	19%	34%
Somewhat better than expected	24%	23%
About as expected	54%	36%
Somewhat worse than expected	1%	2%
Much worse than expected	<1%	2%
Don't know/refused	1%	2%
# Respondents	*209*	*209*

Table 7-17
Overall Experience with Provider

Response	Weighted	Unweighted
Much better than expected	34%	29%
Somewhat better than expected	33%	18%
About as expected	26%	45%
Somewhat worse than expected	5%	4%
Much worse than expected	<1%	4%
Don't know/refused	1%	1%
# Respondents	*141*	*141*

When asked the reason for rating their provider the way they did, only 5 percent of the total number of reasons recorded were negative. However, customers could list more than one reason (see Table 7-18) and the most common reasons given, in terms of the *weighted* results, were positive comments relating to the installer generally (25 percent), the smoothness of the paperwork (27 percent), the efficiency of the process (25 percent), and the project cost (19 percent). The most common negative responses, at 4 percent each, concerned the installer professionalism or the overall paperwork.

7.4.3 Satisfaction with Equipment

Overall, customers were satisfied with the equipment as well, although the satisfaction level was lower than for the program as a whole. As seen in the *weighted* results in Table 7-19, 80 percent of the customers said that the equipment performed as well or better than they expected. However, almost 20 percent said that the equipment had performed somewhat or much worse than expected. Interestingly, the *unweighted* numbers showed that only 4 percent said that the equipment had performed somewhat or much worse than expected; thus, dissatisfaction appeared to be higher with projects involving larger rebates.

Table 7-18
Reasons for Overall Experience Rating for Provider
(All responses recorded)

Response	Weighted	Unweighted
No big deal/easy job	2%	3%
Had no expectations	1%	2%
Did what I expected	9%	11%
Worked with installer/contractor before	5%	8%
Worked with utility or program before	<1%	1%
Did what they promised	9%	7%
Positive-installation process	10%	8%
Positive-timeliness/efficiency	25%	21%
Positive-process/management/paperwork	27%	9%
Positive-project cost	19%	3%
Positive-installer professionalism	5%	11%
Positive-installer/ESCO generally	27%	16%
Positive-utility generally	2%	2%
Positive-miscellaneous	2%	4%
Did not do as promised	<1%	1%
Negative-installation process	<1%	1%
Negative-timeliness/efficiency	3%	4%
Negative-process/management/paperwork	4%	1%
Negative-project cost	<1%	1%
Negative-installer professionalism	4%	4%
Negative-installer/ESCO generally	1%	1%
Negative- miscellaneous	2%	4%
Other	2%	5%
Don't know/ Refused	<1%	1%
# Respondents	*140*	*140*
Negative responses are shaded.		

Table 7-19
Performance of New v. Old Equipment

Response	Weighted	Unweighted
Much better than expected	37%	32%
Somewhat better than expected	16%	19%
About as expected	27%	39%
Somewhat worse than expected	19%	3%
Much worse than expected	<1%	1%
No previous equipment installed	1%	2%
Don't know/refused	1%	5%
# Respondents	*209*	*209*

7.5 PROGRAM-RELATED DECISIONS

Table 7-20 shows that 70 percent (*weighted*) of the customers interviewed found out about the program before or at the same time as the decision was made to purchase the equipment installed under the program. Table 7-21 indicates that 59 percent of the *weighted* sample said that they were aware of the program before shopping for the equipment. Forty percent (*weighted*) had already begun to shop for the equipment before learning of the program, but only 28 percent (*weighted*) said that they found out about the program after their decision to purchase the equipment.

Table 7-20
When Became Aware of Program Relative to Purchase Decision

Response	Weighted	Unweighted
Before	56%	57%
At the same time as purchase	14%	21%
After	28%	21%
Don't know/refused	2%	1%
# Respondents	*209*	*209*

Table 7-21
Aware of Program before Shopping for Equipment?

Response	Weighted	Unweighted
Yes	59%	37%
No	40%	62%
Don't know/refused	<1%	1%
# Respondents	*209*	*209*

As indicated in Table 7-22, without the program about 40 percent of the customers (*weighted*) would not have replaced the old equipment or installed new equipment within a year or more, and half of these said that they would not have replaced the equipment at all. These proportions were higher in the *unweighted* data, suggesting that the more costly replacements were more likely to have occurred soon without the program.

As seen in Table 7-23, approximately one-fourth of the customers (*weighted*) had not considered installing the equipment before hearing of the program. Half of the customers either had plans to install the equipment at some indefinite time in the future or more than one year later. The remaining fourth already had plans to install the equipment within one year before becoming aware of the program. The *unweighted* results suggest as above that the larger projects were more likely to have occurred relatively soon without the program.

Table 7-22
Time before Replacement Without Program

Response	Weighted	Unweighted
At the same time	49%	33%
Within 1 year	10%	16%
One year or more	19%	22%
Not replaced at all	21%	28%
Don't know/refused	1%	2%
# Respondents	*209*	*209*

Table 7-23
Installation Plans before Awareness of Program

Response	Weighted	Unweighted
Hadn't considered installing new equipment	26%	36%
Interested in installing new equipment	15%	26%
Install HE equipment, over 1 year later	35%	25%
Install HE equipment, within 1 year	24%	13%
# Respondents	*209*	*209*
Note: HE indicates high efficiency.		

When asked which statement best describes the actions their firm would have undertaken in the absence of the program, 55 percent (*weighted*) of the customers said that they would have bought equipment of a standard efficiency or would not have changed the existing equipment at all (see Table 7-24). Forty-three percent said they would have bought high-efficiency equipment without the program. However, Table 7-25 shows that 39 percent of these respondents said that their firm had no plans to install high-efficiency equipment in the absence of the program. This apparent contradiction needs to be investigated further. For those who said that they had plans to install high-efficiency equipment more than one year later, the average time span was 2.4 years (*weighted*).

Table 7-24
Actions That Would Have Been Undertaken in the Absence of Program

Response	Weighted	Unweighted
Would have bought HE equipment	43%	41%
Would have bought standard efficiency	25%	18%
Wouldn't have changed existing equipment	30%	38%
Don't know/refused	2%	3%
# Respondents	*209*	*209*
Note: HE indicates high efficiency.		

Table 7-25
Plans to Install Energy-Efficient
Equipment in the Absence of Program

Response	Weighted	Unweighted
Install HE equipment at the same time	42%	51%
Install HE equipment within 1 year	13%	30%
Install HE equipment-not within 1 year	7%	15%
Would not have installed HE equipment	39%	3%
# Respondents	*86*	*86*
Note: HE indicates high efficiency.		

The results above are key inputs to the free rider analysis presented in Section 7.7.

7.6 ATTITUDES AND BEHAVIOR TOWARD ENERGY EFFICIENCY

This subsection discusses responses to questions related to energy efficiency and efficient equipment. It also discusses the role of the program.

7.6.1 Impact of the Program and Incentives

The evidence supports the hypothesis that the program is helping to change attitudes and behavior regarding energy efficiency. As shown in Table 7-26, almost half of the *weighted* sample said that participation in the program had increased their confidence in energy efficiency. The *unweighted* figure was even higher at 64 percent. Two-thirds of the customers (*weighted*) said that the program was very important in influencing their consideration of energy efficiency. Another 30 percent said that the program was somewhat important. (See Table 4-27.)

Table 7-26
Program Impact on Confidence in Energy Efficiency

Response	Weighted	Unweighted
Increase	48%	64%
Decrease	16%	2%
No impact	36%	29%
Don't know/Refused	3%	5%
# Respondents	*209*	*209*

Table 7-27
Program Impact on
Consideration of Energy Efficiency

Response	Weighted	Unweighted
Not important	2%	3%
Somewhat important	30%	19%
Very important	67%	78%
# Respondents	*209*	*209*

When customers were asked how important the rebate was in overcoming the cost barrier to purchasing energy-efficient equipment, about 70 percent reported that it was very important. This is somewhat surprising, given the relatively modest rebate levels for lighting.[2] Another 14 percent (*weighted*) said that the rebate was somewhat important in overcoming the cost barrier. As indicated in Table 7-28, three-fourths of the customers (*weighted*) said that the rebate by itself was very or somewhat important in increasing their confidence in energy-efficient equipment they had installed.

Table 7-28
Importance of Rebate

	Overcoming the Cost Barrier		Confidence in EE Equipment	
Response	**Weighted**	**Unweighted**	**Weighted**	**Unweighted**
Not important	13%	13%	24%	11%
Somewhat important	14%	15%	26%	27%
Very important	72%	69%	48%	58%
Don't know/refused	1%	3%	2%	4%
# Respondents	*198*	*198*	*198*	*198*

7.6.2 Attitudes toward Energy-Efficiency Investments

To gauge attitudes toward investments in energy efficiency, the customers were asked to use a 10-point scale to indicate their agreement with the following questions:

1. When considering a new energy-efficiency investment, I am concerned that the actual bill savings will be less than what is estimated.
2. It takes too much time and hassle to get enough information to make an informed decision about energy-efficient investments.
3. I feel uncertain about the reliability of information provided by non-utility firms proposing energy-efficient investments for my business.

[2] As reported in Section 3.1.2, rebate levels for the dominant lighting measures were generally in the 3-to-5-cents/kWh-saved range. For a customer with a bundled rate of 10 cents/kWh, this equates to a one-third to half-year reduction in payback period.

4. There are energy-efficient investments that I am interested in making, but they always seem to fall below other priorities.
5. Investments in energy equipment are complicated for my firm because we don't always have control over those decisions.
6. Energy-efficient equipment like cooling and lighting will perform as well as equipment that is not energy efficient.
7. There are important practical benefits that come with energy-efficient investments, apart from saving money.
8. In general, energy-efficient investments are easy to understand and use.

The *weighted* results, reported in Table 7-29, indicate that over half of the customers were highly concerned that the bill savings would be less than estimated. Just over one-third were highly uncertain about information received from third parties regarding energy efficiency. Only 13 percent agreed strongly that it took too much time and hassle to get information to make informed decisions.

In terms of decision-making, 31 percent agreed strongly with the statement that they "are interested in energy-efficient investments, but they always seem to fall below other priorities." Only 15 percent indicated strongly that lack of control over decision-making was an issue.

In terms of usage of energy-efficient equipment, half of the customers agreed strongly with the statement that "energy-efficient equipment would perform as well as other equipment." Seventy-six percent of those interviewed felt strongly that energy-efficient investments were easy to understand and use. However, only 26 percent believed strongly that there were practical benefits to energy-efficiency investments besides saving money. The only results that differed substantially between the weighted and unweighted results were regarding this last issue. The proportion of customers who felt strongly that there were significant benefits other than saving money was much higher in the *unweighted* results than in the *weighted* results. This would suggest that customers who did the larger projects were more likely to be motivated primarily by dollar savings.

All of the customers interviewed said that they would be somewhat or very likely to consider energy efficiency in future purchases. Over 85 percent said that they would be very likely (see Table 7-30).

As Table 7-32 demonstrates, two-thirds of the customers (*weighted*) interviewed said that they strongly agreed with a statement saying that they "actively advocate energy-efficient practices." And 85 percent (*weighted*) said that they were somewhat or very knowledgeable about energy-efficient products available (see Table 7-32).

Table 7-29
Attitudes and Perceptions Regarding Energy-Efficiency (EE) Investments

Statement:	Strongly Disagree (0-3)		Moderately Disagree or Agree (4-7)		Strongly Agree (8-10)		Don't Know	
	(weighted)	(unw.)	(weighted)	(unw.)	(weighted)	(unw.)	(weighted)	(unw.)
Concerned actual bill savings will be less than estimated	16%	20%	31%	37%	52%	40%	1%	2%
Too much time and hassle to get information	49%	46%	38%	32%	13%	22%	-	-
Uncertain about information provided by non-utility firms	17%	28%	47%	39%	35%	33%	1%	<1%
EE usually falls below other priorities	18%	20%	50%	47%	31%	31%	1%	2%
Don't always control decisions about EE	42%	49%	43%	28%	15%	22%	-	-
EE equipment performs as well as non-EE equipment	22%	32%	28%	22%	50%	44%	1%	1%
Practical benefits of EE Investments besides money	4%	10%	70%	45%	26%	45%	<1%	<1%
EE Investments are easy to understand and use	2%	5%	22%	30%	76%	65%	<1%	<1%

Table 7-30
Likelihood of Considering Energy Efficiency In Future Purchases

Response	Weighted	Unweighted
Somewhat likely	12%	15%
Very likely	88%	85%
# Respondents	*209*	*209*

Table 7-31
Actively Advocate Energy-Efficient Practices

Response	Weighted	Unweighted
Do not agree (0-3)	9%	15%
Moderately disagree or agree (4-7)	24%	30%
Agree (8-10)	67%	56%
# Respondents	*209*	*209*

Table 7-32
Knowledge about Energy-Efficient Products

Response	Weighted	Unweighted
Not knowledgeable (0-3)	14%	21%
Somewhat knowledgeable (4-7)	55%	57%
Very knowledgeable (8-10)	30%	22%
# Respondents	*209*	*209*

7.6.3 Equipment Decision-Making

As Table 7-33 indicates, 81 percent of the customers (*weighted*) interviewed said that energy efficiency was somewhat or very important to the decision-makers in their firm. Just over half (*weighted*) had one or more persons assigned the responsibility of monitoring energy use, while only 34 percent had a formal policy for the purchase of high-efficiency equipment (not shown in tables). Of the 66 customers who had a policy, 18 percent said that the policy was developed after they learned about the Express Efficiency Program.

Table 7-33
Importance of Energy Efficiency to Decision-makers

Response	Weighted	Unweighted
Very important	47%	50%
Somewhat important	34%	46%
Not very important	19%	2%
Not at all important	<1%	1%
# Respondents	*209*	*209*

Sixty-five percent (*weighted*) of the customers interviewed said that they applied some type of investment analysis to equipment purchases. For those who did, the most common form of analysis, at 80 percent (*weighted*), was the use of a payback period. (See Table 7-34.) The payback periods allowed ranged from 1 to 10 years and averaged 3.7 years (*weighted*). Interestingly, the use of a life-cycle-cost criterion was more common based on the unweighted results, suggesting that the firms doing the larger projects were less likely to use this criterion.

As Table 7-35 shows, when those who leased their space were asked how active a role their business takes in making lighting and climate-control equipment decisions, 79 percent (*weighted*) said that their business was very active, for example, being involved in all phases and having veto power. Only 15 percent said that they were only slightly active or not active at all in those decisions. It is important to note here that 68 percent of the customers (*weighted*) interviewed owned their facility, and all were responsible for the electric bill for the facility.

Table 7-34
Primary Investment Criterion for Those Who Apply Investment Analysis

Response	Weighted	Unweighted
Payback period	80%	58%
Life cycle costing analysis	11%	23%
Internal rate of return	5%	8%
Other	2%	4%
Don't know/refused	2%	7%
# Respondents	*103*	*103*

Table 7-35
How Active Is Business in Lighting/HVAC Equipment Selection?

Response	Weighted	Unweighted
Very active	79%	52%
Somewhat active	6%	20%
Slightly active	13%	24%
Not active at all	2%	5%
# Respondents	*66*	*66*

7.7 NET EFFICIENCY EFFECTS DUE TO THE PROGRAM

The following discussion explains the method employed to calculate "self-report" estimates of free ridership among Express Efficiency Program participants as a way to assess the net effects of the program. Definitions used for free ridership and net participation among the participant population are presented. This subsection concludes with a presentation of the free ridership results, along with a discussion of how the results compared to studies conducted in previous years.

7.7.1 Overview of Methodology and Definitions

Data used to calculate the self-report free ridership estimates were collected during the telephone interviews of 209 program participants. Respondents were asked specifically about their likely retrofit behavior in the absence of the program and then were classified into one of the following four categories, depending on the actions they would have taken without the program:

1. In the absence of the program, the participant would not have installed any new equipment.
2. In the absence of the program, the participant would have installed standard-efficiency equipment.

3. In the absence of the program, the participant would have installed high-efficiency equipment, but not as soon (more than one year later).
4. In the absence of the program, the participant would have installed high-efficiency equipment at the same time (within the year).

Customers who fall into the first two categories can be considered net program participants. Customers who fall into the fourth category should be considered free riders. Customer who fall into the third category are considered to be "deferred free riders" and are given a partial score towards net participation as described later. The term "deferred free riders" refers to those participants who indicated that, had the program not existed, they would have installed high-efficiency equipment, but not within the year.

When estimating the portion of the retrofit that should be attributed to free ridership, we considered a five-year horizon. We considered customers to be net participants if they would have waited more than five years to install the equipment in the absence of the program. For each year between one and five years, we assumed a linear increase of 20 percent that was attributable to net participation. Therefore, if the customer would have installed the equipment at the same time or within one year, the customer was classified as a free rider. If the customer would have installed the equipment one year later, the customer was counted as 80 percent of a free rider and 20 percent of a net participant. This linear relationship was used up to the fifth year, at which point all customers were classified as net participants.

The survey questions used to classify responses directly reflected the definitions of net participation and free ridership presented above. Respondents were asked what they would have done in the absence of the program. They were asked whether or not they would have adopted high-efficiency equipment, and if so, when they would have installed that equipment. Generally, the answers to both of these questions allowed the responses to be classified based on the categories described above.

We weighted the raw results from the self-report free-ridership estimates based on the rebate amount, as described earlier. Results of the weighted self-report free ridership estimates were then calculated for each utility. Results are presented at the utility level (thus allowing differences in free ridership rates by utility to be examined) and overall at the statewide level.

Note that the self-report method presented here has been used in a number of previous impact evaluation studies.

7.7.2 Results

Our estimated free ridership across all the utilities was 34 percent. The overall free-ridership rate appeared to be reasonably consistent with estimates from recent utility impact studies, given the relative mix of measures in the 1999 Express Program.

7.8 PROGRAM PARTICIPANT EXPERIENCE WITH THIRD-PARTY FIRMS

As Table 7-36 illustrates, 19 percent of the customers in *weighted* terms (33 percent, *unweighted*) did not use an external service provider to install the equipment under the 1999 Express Program. These results suggest that customers with larger projects were more likely to use an outside provider.

Of those that used an external provider, a general or specialty contractor was most common. Only 5 percent used some type of energy services firm or ESCO. Almost half of those that used an external provider had previous experience with the provider chosen to perform the installation.

Table 7-36
Who Actually Installed Measures

Response	Weighted	Unweighted
Contractor	71%	59%
Engineering firm	4%	1%
Energy services firm	3%	5%
Did not use external service provider	19%	33%
Other	<1%	<1%
Don't know/refused	3%	1%
# Respondents	*209*	*209*

The *weighted* results presented in Table 7-37 show that over half the customers who used third-party providers received from two to four quotes or proposals for the equipment installed under the program, and only about one-fourth received one or no quotes.[3] The *unweighted* results, however, were notably different—almost 60 percent received one or no quotes. This suggested the reasonable finding that fewer bids were associated with smaller projects, consistent with the findings discussed above. Only large customers located in the PG&E area were likely to have received five or more quotes.

For those customers who chose between multiple quotes or proposals, lower up-front cost was the most frequently mentioned factor influencing the selection (85 percent of the *weighted* results). As Table 7-38 also shows, customer-contractor compatibility issues such as reputation, prior experience with, or ease of working with the contractor accounted for another 28 percent of the *weighted* results. Neither the equipment reputation nor the higher efficiency level of the equipment proposed was commonly mentioned as an important factor in the proposal choice.

[3] Although we did not probe on this, it is possible that customers who said they received zero quotes or proposals had the third party under contract to provide other types of services, of which the efficiency project was a component.

Table 7-37
Number of Quotes or Proposals Received
If a Third-Party Was Used

Response	All (weighted)	All (unweighted)
0-1 quotes	27%	58%
2-4 quotes	51%	37%
5 or more quotes	20%	2%
Don't know/refused	3%	4%
# Respondents	*141*	*141*

Table 7-38
Important Factors in Choice of Proposal

Response	Weighted	Unweighted
Needed urgent or immediate replacement	3%	3%
Timeliness of response (not urgent)	4%	5%
Lower price or up-front cost	85%	71%
Lower maintenance cost	2%	2%
Ability to get rebate or incentive	4%	3%
Prior experience with contractor	9%	15%
Contractor was easy to do business with	7%	10%
Contractor reputation or referral	12%	14%
Equipment reputation or recommendation	1%	5%
Higher efficiency level	1%	5%
Other	1%	3%
Don't know/ Refused	2%	3%
# Respondents (includes all who received multiple proposals or replied "don't know")	*59*	*59*

7.8.1 Importance of EESP in Decision-Making

The *weighted* values shown in Table 7-39 indicated that over 65 percent of the customers who used a third party felt that the EESP was at least somewhat important in their decision to participate in the program. The percentage was even higher (82 percent) for the *unweighted* results.

Table 7-39
Importance of EESP in Participation Decision

Response	Weighted	Unweighted
Not important (0-3)	33%	18%
Somewhat important (4-7)	17%	26%
Very important (8-10)	50%	56%
# Respondents	*141*	*141*

For those customers who used an external service provider, 64 percent (*weighted*) reviewed different efficiency levels available for the equipment installed under the program (see Table 4-41). As Table 7-41 indicates, for those customers who reviewed different efficiency levels, 97 percent (*weighted*) reported that the EESP was somewhat or very important in the choice of the efficiency level actually used.

Table 7-40
Reviewed Different Efficiency Levels?

Response	All (weighted)	All (unweighted)
Yes	64%	44%
No	35%	54%
Don't know/refused	1%	2%
# Respondents	*141*	*141*

Table 7-41
Importance of EESP in Equipment Choice

Response	Weighted	Unweighted
Not important (0-3)	3%	6%
Somewhat important (4-7)	47%	35%
Very important (8-10)	50%	58%
# Respondents	*62*	*62*

8 SBSPC INTERVIEWS

This section presents information gathered through interviews of SBSPC Program participants. The focus of the interviews was on process-related issues; however, complementary data and information related to assessing near-term market effects were collected and are also summarized here.

Note that the results presented are based on unweighted data (except as noted). We chose to present the results unweighted primarily because we wanted to convey observations based on the Program participants as a whole. In addition, the SBSPC interviews were intended to be more qualitative than quantitative in nature. Our customer and EESP samples were designed to ensure that the market actors receiving a range of incentives were well represented. If the results had been weighted by the incentives applying to specific customers or EESPs, we felt that they would have been dominated by the largest recipients. If, on the other hand, the results were weighted by the number of participants in certain categories, they would have been dominated by customers that participated in large numbers even if their energy impacts were not very significant. Our approach was to select a sample that was fairly well balanced in terms of the types of participants represented and their project sizes.

Results in the section are first presented for participating customers, followed by those for participating EESP sponsors.

8.1 PARTICIPATING CUSTOMERS

In this subsection, we present responses to a set of structured interviews we conducted with a representative sample of customers who participated in the 1999 SBSPC Program. These interviews were conducted in March 2000. Readers should note that some of the key Program milestones such as Detailed Project Application (DPA) submittal and approval had not yet been reached when these interviews were conducted. The following topics are covered in this subsection.

- General Characteristics of the Participant Customer Sample (Section 8.1.1)
- Characteristics of Participants and Interviewees (Section 8.1.2)
- Customer Participation in the Program (Section 8.1.3)
- Program Procedure and Process Issues (Section 8.1.4
- Program-Related Decisions (Section 8.1.5)
- Energy-Efficiency Activity (Section 8.1.6)
- Net Effects of the Program on Energy Efficiency (Section 8.1.7)

- Program Participant Experience with Third Parties (Section 0)

8.1.1 General Characteristics of the Participant Customer Sample

Over 180 applications were received under the SBSPC Program in 1999. The applications received were aggregated to represent 133 unique customers who participated in 1999.[1] The 133 unique customers were then stratified into 3 categories, based on the level of incentives reserved. Tier 1 consists of the top 10 customers, which account for 40 percent of the incentives; tier 2 contains 38 customers accounting for 34 percent of funds; and tier 3 includes the remaining 85 customers and accounts for 26 percent. The distribution of top 10 customers by utility service area is presented in Table 8-1. Applications were submitted on behalf of one customer to all three participating electric utilities.

Table 8-1
Distribution of Top 10 Customers by Utility

Territory	Frequency
PG&E	5
SCE	3
SDGE	1
All three utilities	1

Eighteen in-depth interviews were conducted with participating customers. Interviews were successfully completed with three of the statewide top 10 customers. Also, at least 3 of the top 10 customers for each utility, in terms of amount of incentives received, were successfully contacted and interviewed, including those on the list of the statewide top 10 customers. Seven of the tier 2 and eight of the tier 3 customers were interviewed as well. Fifty-three percent of the participating customers in the tier 2 and 3 incentive levels were dairies in central California, falling exclusively in the Pacific Gas and Electric (PG&E) and Southern California Edison (SCE) service territories. Therefore, other commercial and industrial business types were oversampled to ensure inclusion of a wider range of businesses than would have been obtained using simple proportional sampling. Table 8-2 presents the breakdown of the unique customers participating in the program and those successfully interviewed.

8.1.2 Characteristics of Participants and Interviewees

There are several patterns worth noting among the SBSPC Program participants. The first is the large number of participants that were dairies, driven by the large shares in the PG&E (67 percent) and SCE (57 percent) territories. No applications for dairies were submitted to San

[1] It is important to note that one application can cover multiple locations.

Table 8-2
Breakdown of Statewide Participant
Population and Those Interviewed

Business Type	Percentage of SBSPC Participants	Percentage of Those Interviewed
Commercial	23%	38%
Property Management	*3%*	*6%*
Institutional	10%	11%
Industrial	3%	11%
Agricultural (Dairies)	51%	38%
Unknown	14%	0%

Total Unique SBSPC Participants=133; Number Interviewed=18

Diego Gas and Electric (SDG&E). Five of the top 10 customers in terms of reserved incentives, ranging from $26,352 to $127,119, were chains doing upgrades on multiple sites at the same time, such as gasoline service stations and convenience stores, fast food restaurants, or grocery stores. Other top 10 customers included a large resort, a retirement residence, and a commercial property management company.

Institutions, including school districts and city governments, represented 10 percent of the participants statewide, but in the SDG&E service territory they represented 27 percent of the participants. There were between four and six property management companies that participated in the program who usually coordinated improvements on properties they owned or managed. These companies were distributed fairly evenly over the three tiers we defined.

Of the 18 customers interviewed, 13 applications covered single sites and 5 covered multiple sites, all of which were large chain stores or franchises. For example, 1 fast food chain received over $115,000 in incentives to make improvements to 119 sites.

Over 70 percent of the customers interviewed had already completed the DPA and had received approval; several had already installed and were either in the measurement and verification (M&V) process or had received their checks.

Table 8-3 illustrates the categories of measures installed by the customers interviewed. A breakdown of measures in the population of SBSPC participants is provided in Section 3.

Table 8-3
Measures Installed under SBSPC Program by Customers Interviewed

Measures	Number of Customers
VSDs on vacuum pumps (all for dairies)	7
Overhead lighting	5
Energy Management System for HVAC	3
Injection molding machine	2
LED lighting for traffic lights (city)	1
Water source heat pumps	1
Anti-sweat heaters on case doors	1
Note: (Total exceeds 18 because some customers installed multiple measures)	

All customers interviewed were responsible for their own utility bills, including four who leased space from a third party. Monthly bills for electricity averaged $7,421 across the sample, ranging from $800 for a dairy to $75,000 for a resort. The sites ranged in size from a 98-square-foot gas station to a 450,000-square-foot resort, and averaged 86,279 square feet. The dairies had no conditioned space that could be included in this average.

8.1.3 Customer Participation in the Program

Over 75 percent (14 of 18) of the interviewed customers stated that reducing energy costs was the primary reason for participating in the program. Other important factors included the opportunity to obtain a rebate, the need to replace equipment, and the ability to acquire the latest technology. Reasons customers participated in the SBSPC Program are detailed in Table 8-4 (all reasons) and Table 8-5 (most important reason cited).

Table 8-4
All Reasons Customers Gave for Participating in the SBSPC Program

Reason	Frequency
Saving money on electric bills	18
Obtaining a rebate	8
Acquiring the latest technology	4
Replacing old or broken equipment	4
Helping protect the environment	3
Improving measure performance for employees and/or customers	2
Recommended by contractors	2
Part of broader remodeling/renovation	1
Other: safety	1
Other: city council member promoted	1
Note: Responses exceed 18 because all volunteered responses were recorded.	

Table 8-5
Most Important Reason Customers Gave for Participating in the SBSPC Program

Reasons	Frequency
Saving money on electric bills	14
Acquiring the latest technology	1
Replacing old or broken equipment	1
Helping protect the environment	1
Improving measure performance for employees and/or customers	1

As shown in Table 8-6, one third of the customers initially heard about the energy-efficient technology(ies) installed through friends or professional connections such as a colleague, professional association meeting, or trade show. Another 23 percent heard about it from product or service providers including EESPs, vendors, or architect/engineering firms.

Table 8-6
Initial Source of Information on Energy-Efficiency Measure(s) Installed

Source	Percentage
Friend, colleague, professional association or tradeshow	33%
Trade publications, other non-utility literature	11%
EESP/ESCO	11%
Utility representative or Program literature	11%
Parent company/organization	11%
Vendor	6%
Architect/Engineer	6%
Previous installation	6%
Other: CEC auditing program	6%

N=18

As indicated in Table 8-7, participants were equally likely to have heard about the SBSPC Program through their utility representative or utility literature (33 percent) or from a product or service provider (EESP, ESCO, or vendor) (33 percent). Other important sources included friends and professional connections (22 percent).

Table 8-7
Initial Source of Information on SBSPC Program

Source	Percentage
Utility representative or Program literature	33%
Friend, colleague, professional association or tradeshow	22%
Vendor	22%
EESP/ESCO	11%
Parent company/organization	11%
Other: City council meeting	6%

N=18

8.1.4 Program Procedure and Process Issues

This subsection discusses customer perceptions of the program. It presents strengths, weaknesses, and suggestions for improving the program.

Program Strengths

Most customers commented that they liked the program because the incentive was helpful, and several noted that it allowed them to pursue measures they would not otherwise have been able to install. A few also commented that they thought the program helped get the word out about

available energy-efficiency measures. One particularly appreciated the fact that the program gave them "…the ability to make a decision without doing a lot of research; it was a package deal."

The customers relied heavily on the EESPs to deal with the program requirements, including answering questions, filling out the paperwork, and handling the M&V. Overall, half of those interviewed thought that the forms were reasonable and the documentation clear to the extent that these customers were familiar with them. It should be noted that most customers did very little of the paperwork themselves and, consequently, were unfamiliar with and could not comment on the details of the process.

Program Weaknesses

Although customers did identify some important program weaknesses or problems, it is important to note that 7 (39 percent) of the 18 customers interviewed did not identify any when asked what they viewed as program weaknesses. For the customers who identified weaknesses, they centered on paperwork and timing issues. To the extent that customers dealt with the forms, several felt that there was too much paperwork, and that it was too complicated. Five customers specifically mentioned that the paperwork was too complicated or cumbersome; one added that the paperwork was not well designed for a multi-site or multi-utility application, particularly due to duplicate M&V requirements. One customer said that "[Customers] just don't understand it—they need examples..." Another complained that the follow-through by the utility was weak. Finally, one said that a weakness of the program was that it was not more widespread in usage.

Timing was an issue as well. Two customers complained that it was taking too long to receive their money. When asked about the time period between the Basic Project Applications (BPA) and Detailed Project Application (DPA), 8 (44 percent) of the 18 customers interviewed were dissatisfied with the timing between the two steps, saying that the process took too long. Another five (28 percent) felt that the timing was appropriate, while three said they did not know. When asked about the payment procedures and timing overall, half felt that the payment procedures and timing were not reasonable, saying that the process was too long. Three (17 percent) felt that the payment procedures and timing were reasonable, while the remaining six said they didn't know.

Half the customers interviewed felt they could not comment on the M&V requirements because they either hadn't progressed that far in the process or their contractor was handling M&V for them. For those who did comment, most thought that the requirements were excessive. One who submitted applications under all three utility programs was particularly frustrated because the requirements were different for each, and there was no way to combine the M&V requirements required by each utility to reduce the total number of sites or points required for M&V. Another felt that the M&V requirements "eat up savings," presumably because of the extra effort required on relatively small projects. However, one customer noted that he liked the M&V feedback because it showed that he was actually saving money.

Suggestions for Improving the Program

Customer suggestions for improving the program echoed those of the EESPs (discussed in Section 8.2.2), focusing on three areas:

1. Streamlining the process (including simplifying the forms and shortening the time to payment)
2. Increasing the advertising
3. Providing examples of success stories. One suggested a simplified brochure for facility managers suitable for presenting to administrative decision-makers.

8.1.5 Program-Related Decisions

As Table 8-8 illustrates, 95 percent of the customers learned about the SBSPC Program before they first began thinking about installing the energy-efficient equipment or after they began thinking about it, but before they made their decision. Only 1 of the 18 customers learned of the program after he had already decided to install the equipment.

Table 8-8
When Customers Learned about the SBSPC Program

Found out about Program...	Percent
Before first began thinking about installing	56%
After first thought about installing, but before decision	39%
After decision to install	6%

N=18

As shown in Table 8-9, 8 of the 18 (44 percent) customers said that they had developed the idea of installing the efficiency products themselves, and 3 of these 8 said that a third party had convinced them to do the installation. The most common scenario (39 percent of customers) was that a third party presented the customer with the idea to install the equipment and the third party convinced the customer to do the installation. Table 8-10 shows that 8 of the 18 heard about the equipment and the program from the same type of source. In the "other" category, two of the customers were franchises who heard about both the equipment and the program from their parent organization. The third customer was a city that had heard of the equipment through a California Energy Commission audit program, but heard about the SBSPC program from someone at a city council meeting.

Table 8-9
Process of Deciding to Pursue Installation

Description of process	Percent
Developed the idea ourselves and decided solely on our own to pursue installation	28%
Developed the idea ourselves but were convinced by a third party to pursue installation	17%
Received the idea from a third party and were also convinced by this party to pursue installation	39%
Received the idea from a third party but decided solely on our own to pursue installation	17%

N=18

Table 8-10
Information Source for Equipment and Program

Heard about equipment from...	Heard about SBSPC Program from...			
	EESP	Utility	Friend/Trade	Other
EESP	2	2		
Utility (rep or by mail)	1	1		
Friend/Colleague/Trade	2	1	3	
Literature (non utility)	1		1	
Other		1		3

N=18

Of the six customers who heard about the SBSPC Program from an EESP (including vendors and contractors), three said that they had been convinced by the third party to pursue installation. In contrast, two others who had heard about the program from an EESP said that they developed the idea themselves and decided solely on their own to pursue installation.

The five customers who had heard about the program from their utility all said that they had developed the idea to install the equipment themselves. Only two said that they were convinced by a third party to do the installation (note that we did not determine whether this third party was the utility or the EESP).

As illustrated in Table 8-11, both the program incentive and EESP services were significant factors in customers' decisions to pursue installation of the equipment through the program. Customers were more likely to rate the incentive as very or extremely significant. However, it is important to note that two customers rated the incentive as insignificant but rated the EESP services as very or extremely significant. Only one customer, a dairy, indicated that both the incentive and EESP services were insignificant in his decision-making. He had been convinced to install a variable-speed drive by another dairy that had already installed the equipment under

the SBSPC Program and had seen significant savings (see Section 0 for a discussion of the unique case of dairies).

Table 8-11
SBSPC Program Influence on Customer Decision-Making

	Significance of incentive	Significance of EESP services
Insignificant	17%	17%
Somewhat significant	22%	39%
Very significant	44%	33%
Extremely significant	17%	11%

N=18

As Table 8-12 illustrates, only 5 (28 percent) of the 18 customers interviewed said that they would have installed equipment with the same level of efficiency within one year of the actual installation date without the SBSPC Program. (See Section 8.1.7 for a discussion of net-to-gross energy effects.)

Table 8-12
Customer Behavior in the Absence of SBSPC Program

Without the Program incentives, customers would have installed...	Frequency
No equipment	6
Less efficient equipment	6
within one year	*4*
more than one year later	*2*
Same high-efficiency equipment	6
within one year	*5*
more than one year later	*1*

8.1.6 Energy-Efficiency Activity

Forty-four percent (8 of 18) of the customers interviewed had undertaken energy-efficiency improvements in the prior 2 years that were not in connection with any utility or government programs, and 2 of these customers (11 percent of all customers) also had participated in other utility programs. The most common efficiency improvement involved installing more efficient lighting. Other improvements included adjustments to or replacement of motors, new chillers, and new fan systems.

Of the customers interviewed, five (28 percent) had participated in some kind of energy-efficiency program offered through a utility, government, or nonprofit entity in the past two years, most commonly an audit or rebate program. One municipality interviewed had received funds from the Petroleum Violation Escrow Account through the State of California.

While only one-third of the customers interviewed had formally designated a staff member or outside contractor to manage energy costs, 22 percent (4 of 18) additional small business owners mentioned that they paid attention to energy costs, but the job was not formalized. Half had developed a policy for the selection of high-efficiency, rather than standard-efficiency, versions of energy-using equipment and just over 60 percent (11 of 18) applied long-term investment analyses to energy-equipment selections.

8.1.7 Net Effects of the Program on Energy-Efficiency

In this subsection we present results of estimated free ridership for the 1999 SBSPC. The free-ridership data can be used to provide an estimate of the percentage of the immediate, gross first-year savings that would have occurred in the absence of the SBSPC Program. The method used to calculate these ratios is based on self-reported information provided by participating customers. This method has been used extensively as part of previous utility program impact evaluations for programs that require site-specific free-ridership and net-to-gross calculations.[2]

The free-ridership estimates were developed by first calculating the net-to-gross ratios on both a weighted and unweighted basis. The weighting was done to adjust for the effect of the incentive levels of different projects. The three information sources used to make the customer-specific estimates were the customer's responses to the *significance of program incentives* and *EESP services* and *likelihood of installing anyway* questions. Initial net-to-gross values were assigned for each of these questions, as shown in Table 8-13.

The program leveraged market changes by both providing the financial incentives and encouraging EESPs to deliver the project services. The customers frequently differed in their significance rating of these two factors. For example, seven customers rated one component as somewhat significant or insignificant but rated the other as very or extremely significant, and the simple correlation between responses to the two questions was a relatively small value (0.24). Based on these data and the interview responses, it appeared that many customers were influenced significantly through one mechanism of the program (incentive or EESP involvement), but to a lesser extent through the other. This appeared to be reasonable, given that EESPs were likely to vary in how much information they provided to customers about the incentives and that the EESPs were likely to stress the incentive less if they provided more comprehensive services to the customers.

[2] For a discussion of issues related to estimating net-to-gross ratios and free ridership using participant self-reports see *Quality Assurance Guidelines for Statistical, Engineering, and Self-Report Methods for Estimating DSM Impacts*, prepared for the California Demand Side Management Advisory Committee: The Subcommittee on Modeling Standards for End Use Consumption and Load Impact Models, April 1998.

Table 8-13
Assignment of Net-to-Gross Values

Likelihood of Installing Anyway	Assigned Value	Significance of Incentive	Assigned Value	Significance of EESP services	Assigned Value
Definitely would not have installed	1.0	Extremely significant	1.0	Extremely significant	1.0
Probably would not have installed	0.677	Very significant	0.677	Very significant	0.677
Probably would have installed	0.333	Somewhat significant	0.333	Somewhat significant	0.333
Definitely would have installed	0.0	Insignificant	0.0	Insignificant	0.0

As a result of the above observations and in the interest of being conservative in our estimates, we determined the maximum value of the response to questions about the *significance of incentive* or the *significance of EESP services* and used that in our analysis to represent the significance of the program to the customer. This value was then averaged with the value of the *likelihood of installing anyway* question. Other, more minor adjustments were made to account for partial effects, if necessary, based on responses to other questions.

Both the weighted (taking into account the incentive amount) and unweighted estimates involved averaging across individual customer values that were calculated for each unique customer in the sample. The *unweighted* free-ridership values calculated across the sampled customers ranged from 0.88 (high free ridership) to 0.08 (low free ridership). Of the 18 customers interviewed, 8 had free ridership values greater than 0.5, and 10 had values lower than 0.5. Since the value for none of the customers reached 1.0, the program had at least a *partial* effect on customers' decisions. This follows from the fact that the majority of respondents fell into the middle of both the significance and likelihood questions and sometimes did so in an inconsistent manner. For example, one customer reported that the incentive was extremely significant and the EESP services were very significant, yet reported that he would probably have installed the equipment anyway. Another customer said that the incentive was only somewhat significant and the EESP services were insignificant, but he probably would not have installed the equipment in absence of the program.

The unweighted and weighted average free ridership values for the SBSPC are shown in Table 8-14. The *unweighted* average is 0.47, while the *weighted* estimate, which takes into account the size of the incentive in relation to the sampled customers, is 0.38.[3] Thus, it appears that between 38 percent (*weighted*) and 47 percent (*unweighted*) of the projects associated with the SBSPC Program were likely to have occurred in the absence of the program. The difference between the

[3] The 95% confidence intervals are ±0.08.

weighted and unweighted values suggests that the larger projects were more likely to have been motivated by the program.

It is useful to note that the results presented earlier, based strictly on customers' statements about whether they would have installed the efficiency measures without the program, indicated that only 28 percent said that they would have. As mentioned previously, these results should not be confused with whether or not sustainable changes in EESP or customer behavior are occurring as a result of the program.[4]

Table 8-14
Overall Free-Ridership Values

Estimate	Free Ridership Value (n=18)
Weighted	0.38
Unweighted	0.47

8.1.8 Program Participant Experience with Third Parties

This subsection discusses issues related to customer interactions with third parties, particularly EESPs and the utilities. The reader should note that the sample sizes are quite small when the customers are disaggregated, so the following results should be interpreted as only indicative of relationships, not statistically reliable estimates.

Contracting with Third Parties

Of the 18 customers interviewed, 7 (39 percent) had heard of the term "Energy Performance Contracting" before participating in the program. Six of them had been approached by a company offering an energy performance contract before they participated in the SBSPC; however, only one stated that he had entered into an energy performance contract prior to participation in the SBSPC Program.

Table 8-15 shows how customers defined their contract arrangement under the SBSPC and the distribution of the program incentive. The contracting arrangement between EESPs and customers was rarely described as an energy performance contract by customers—only 13 percent (2 of the 16 customers who provided classifiable responses) described the contract as such. Both of these customers reported that they expected to receive all of the measure incentive. None of the other customers described their contract arrangement as a performance contract, but most were aware of the utility incentive. Fourteen (87 percent) of the customers described the

[4] Note that this trend, even if substantiated with further research, does not answer the question of whether the change observed is sustainable in the absence of incentives. For example, positive attribution of the effect of the program incentives does not bear on whether EESPs will be able to continue inducing more energy-efficiency projects in the absence of SPC incentives.

arrangement as a fee-for-service contract, with the customer receiving all or part of the incentive when it became available.

Across both contracting-type groups of responses, 56 percent said that they had shared the incentive with the EESP. The remaining 44 percent said that they had an agreement to receive all of the incentive. Over three-fourths (14 of 18) of the customers were aware that the EESP received a separate participation incentive from the utility as part of their participation in the SBSPC Program.

Table 8-15
Customer-Third Party Contract Types

Distribution of Incentive	Contract Type	
	Fee-for-service	Performance
Customer only	31%	13%
EESP only	-	-
Shared	56%	-

N=16. One customer responded "don't know" and one defined their contract in other terms

As Table 8-16 illustrates, customers who were familiar with energy performance contracting before participating in the SBSPC were more likely to have entered into an SBSPC contract where they received 100 percent of the incentive.

Table 8-16
Customer Familiarity with Performance Contracting v. Distribution of SBSPC Incentives

Distribution of incentive	Heard of energy performance contracting before Program	Had not heard of energy performance contracting before Program
Customer receive 100%	57%	30%
Customer/EESP share	29%	70%
EESP receive 100%	14%	-
	N=7	*N=10*

Table 8-17 shows that customers who had heard of performance contracting before participating in the program were more likely to describe their SBSPC contract as a performance contract.

Table 8-17
Customer Familiar with Performance Contracting vs. Type of SBSPC Contract

Type of Contract	Heard of energy performance contracting before Program	Had not heard of energy performance contracting before Program
Performance	29%	10%
Fee-for-service/equipment	71%	90%
	N=7	*N=10*

Seven (39 percent) of the 18 customers interviewed had obtained multiple bids for the work eventually conducted under the SBSPC Program. Customers who had multiple bids were most likely to have received two or three, except for government entities, which had to send out an RFP and could have received many more. One customer was frustrated that each salesperson he spoke with described the program and breakdown of the incentives differently, thus provoking his distrust. For those that selected from multiple bids, lower price or up-front cost was the most frequently mentioned reason for selecting the one they chose ultimately. Table 8-18 reports the reasons given for selecting the winning bid.

Table 8-18
Reasons for Selecting Winning Contract from Multiple Bids

Reason	Frequency
Lower price/up-front cost	5
Equipment reputation/recommendation	2
Better non-energy performance	2
Timeliness of response	1
Ability to get rebate/incentive	1
Prior experience with contractor	1
Contractor seemed easier to do business with	1
Higher efficiency level offered	1
Other: short lead time for equipment	1
N=7, all reasons given were recorded	

Customer Satisfaction

This subsection presents information about how satisfied customers participating in the SBSPC were with their experiences with the EESPs and utilities.

EESPs

Overall, customers were satisfied with their experiences with their EESP. Sixteen (89 percent) of the 18 interviewed rated their experience as "good" or "excellent," while only one rated the experience as "very poor." Customers who commented said that EESPs helped them make their decision to participate in the program by performing return-on-investment calculations and researching the program and measures available.

Eight (44 percent) of the customers said that they were receiving other services from the EESP concurrently with the measures covered under the SBSPC Program. The most common service was an energy audit or analysis. Other services included commodity supply, maintenance, and additional machinery purchases.

Half of the customers had prior experience with the EESP they used under the SBSPC Program. Twelve (67 percent) said that they expected to use the EESP in the future for other energy-efficiency-related services. Table 8-19 compares past experience with the EESP with the customer's expectation to use the EESP again in the future. Of those who did not plan to use the EESP in the future, only one declined because of poor experience with the EESP, while others doubted other services would be appropriate or necessary.

Table 8-19
Customer Prior Experience with SBSPC EESP v. Future Expectations

Prior experience/ Future expectation	Percent
Worked with before/ Would again	39%
Not worked with before/Would again	28%
Worked with before/ Would not again	11%
Note worked with before/Would not again	11%
Don't know/missing	11%

N=18

Utilities

Most customers had no contact with their respective utilities in relation to this program, but were inclined to rate their experience with the utility as "acceptable" or "good" overall anyway. While no customers rated the experience as "poor," one customer who had applications submitted under all three utility programs added that his experience with two of the utilities was good but was poor with the other due to delays in processing, excessiveness of M&V requirements, and lack of responsiveness to questions.

The Unique Case of Dairies

It is important to note the unique story of the dairies that participated. As mentioned earlier, dairies accounted for a surprisingly large proportion (51 percent) of the SBSPC customers. Based on customer interviews, this significant participation proportion was due in large part to the initiative of an innovative third party.

After hearing about the program, an accounting firm recruited several dairy equipment suppliers to serve as contractors, resulting in variable-speed drive installations in at least 47 separate dairies in the PG&E and SCE service territories. Customers for whom the accounting firm had submitted applications dealt directly with the dairy equipment supply firm and were unlikely to be aware of the third-party accounting firm's involvement.

For all seven dairies included in our study, variable-speed drives were installed on the vacuum pump motors. Once a few prominent dairies installed them in the area, the idea spread rapidly to other dairies in the Central Valley of California. A few cited the example of witnessing another dairy get measurable savings from variable-speed drives as a major factor in their decision to install them at their dairies. One mentioned that the Farm Bureau had provided information on the equipment and the program after being contacted by an EESP. The data suggested that information about the program or the technologies was communicated primarily by word of mouth through this particular customer group, although a sizable minority of the customers received information from an EESP first.

8.2 PARTICIPATING EESPS

This subsection presents findings from our interviews with EESPs that participated in the SBSPC Program.

8.2.1 Interview Participants

In-depth interviews were conducted with 13 EESP representatives out of a total of 37 who served as program sponsors under the 1999 SBSPC Program. The EESP representatives we interviewed had submitted 108 applications out of the 181 applications submitted under the program. The EESPs interviewed averaged 8 applications each, ranging from 1 to 47. Interviews were successfully completed with 6 of the top 10 EESPs in terms of total incentives received. As Table 8-20 illustrates, 8 of the 13 representatives interviewed were active in at least 2 of the major utility service territories (PG&E, SCE, and SDG&E) administering the program; 2 were active in all 3 territories. In total, there were eight EESP representatives active in PG&E's service territory, seven active in SCE's territory, and six active in SDG&E's territory.

The EESPs interviewed represented the following range of businesses: four ESCOs; three specialty contractors (such as contractors for HVAC or lighting); two dairy equipment distributors; two consulting firms; one injection molding machine distributor; and one certified public accountant (CPA). As illustrated in Table 8-21, the extent of the firms' presence in California and focus on small businesses varied widely.

8.2.2 EESP Results

This subsection discusses the EESPs' responses provided to questions related to the SBSPC.

Program Process and Procedures

Knowledge and Opinion of the Program

All 13 EESPs were questioned about how knowledgeable they were about the SBSPC and their opinion regarding the program. All reported that they were somewhat or very familiar with various aspects of the program, such as the application requirements, incentive levels, and M&V requirements. A few commented that they were very familiar with the program as it related to the measures they were installing but were less familiar with the program generally.

Table 8-20
EESPs Interviewed by Utility Service Territory

Utility Service Territory	Number of EESPs in Population	Number of EESPs Interviewed
One Territory		
PG&E	13	2
SCE	12	1
SDG&E	4	4
Two Territories		
PG&E and SCE	4	4
PG&E and SDG&E	1	
SCE and SDG&E	1	
All Territories		
PG&E, SCE, SDG&E	2	2
Total	*37*	*13*
Total Submitting within Each Territory		
PG&E	20	8
SCE	19	7
SDG&E	8	5

Table 8-21
EESP Characteristics (in 1999)

	Minimum	Mean	Maximum
Annual Sales in California	$70,000	$3.3 Million	$17 Million
Number of Employees	1	22	150
Percentage of Business serving Small Customers	5%	65%	100%

Note: Small business was defined as < 500 kW demand or < 100,000 sq. ft. of floor area.

EESPs were asked an open-ended question regarding their firm's experiences with the SBSPC Program generally. Four of the 13 had completely positive responses, 2 of which also said that they were very early in the process, but their experience was favorable so far. Six expressed positive responses but qualified them with criticisms most frequently regarding the paperwork or M&V. For example, one EESP said that his experience was "favorable, but [he was] hoping that M&V would be less stringent. It is more intense than necessary." One gave a neutral response, saying it was "new, it's a learning experience." Finally, one EESP said the experience was "frustrating," but that he had not "given up yet." Three (17 percent) EESPs specifically mentioned here or in general comments at the conclusion of the survey that their utility program manager had been particularly helpful.

Strengths of the Program

Ten of the 13 mentioned the incentives specifically as a strength of the program, some saying that they allowed clients to do projects or think about energy efficiency when they wouldn't have otherwise, and others saying that the incentive encouraged contractors to promote the program and covered measures. A few felt that a major strength was that it protected the customer from risk or that it helped to give customers confidence when installing the measures. One EESP noted that the program had reduced application requirements compared to the LNSPC, but offered a higher incentive. Another appreciated the flexibility with the measures. All 13 agreed to some extent that it was beneficial for the EESPs/ESCOs to participate in the program.

EESPs were more satisfied with some utilities' overall performance than they were with others. Two of the six who interacted with one specific utility mentioned that their experience with that particular utility was worse than with the other utility(ies). The negative responses appeared to be due largely to this utilities' difficulties in working through an accumulated backlog of applications, which delayed the timetables on many of the projects. Staffing levels and work management systems have since been expanded and improved at this utility.

Weaknesses of the Program

The weaknesses and criticisms of the program by the EESPs centered on three areas: paperwork, M&V requirements, and advertising. Eleven (85 percent) of the 13 reported that the paperwork was unnecessarily complicated, cumbersome, or involved too many steps. Three commented

specifically on difficulty with the Excel spreadsheet. One said he was not computer-oriented enough to use it; another said that it came up with unrealistic estimates or M&V requirements; and another said it was too inflexible.

Only 2 of the 13 interviewed felt that the M&V requirements were fine as they were. Nine (69 percent) of the 13 EESPs felt that the M&V requirements were unnecessarily stringent, either in length of time or in number of points required for the sample. Three EESPs reported that the M&V requirements were uneven across different measures, with some being very lenient, and others very restrictive. Four thought that there should be more flexibility with the M&V. Three also mentioned that it took too long to receive the incentive due to the M&V period requirements, and that this dampened customer enthusiasm for the project. One commented that the inspector was not specialized enough in his field.

When asked how much they agreed or disagreed with the statement, “The program is well advertised,” using a 5-point scale, 10 (77 percent) disagreed somewhat or significantly. Several EESPs offered suggestions for improving marketing that are discussed in more detail below.

Other specific comments not directly addressing the themes mentioned above included the following:

- "...[The] procedures are cumbersome; the response time is slow; it is difficult to get questions answered or calls returned by [Utility X]...some incentive levels are poorly matched with measures, they are either too high or too low, [the incentives are] not always consistent with actual cost/ savings...this aggravates the free ridership problem.”
- "[The incentive] favors larger projects."
- "[M&V is] somewhat excessive in some areas; we have to do M&V at 32 sites of 200 identical sites. Why so many?...It would be better if we had one point of contact for customer for client that spans territories...[Utility X] is not timely. [Utilities Y and Z] are great."
- "Too much irrelevant data was requested, particularly on the DPA, I had to go back to the site to get more irrelevant information for DPA...they wanted practically the whole equipment label...why do they need the frame size?"

EESPs’ Experience with the Program

The SBSPC Program appears to be helping EESPs develop new business as a means to transform the market. EESPs reported that an average of 44 percent of the small businesses they approached with an SBSPC Program bid were an existing or referred customer, but the other 56 percent were cold calls to entirely new customers. They reported an average of 56 percent of the projects completed under the program would have been done anyway without the SBSPC Program, which implies a lower NTGR than the estimates presented earlier based on customer data.

EESPs reported that they were twice as likely to use performance contracts in their SBSPC Program-related contracts with customers (43 percent) than with all other customer contracts (22 percent). However, when weighted by the number of applications actually submitted under the program, the percentage of performance contracts under the SBSPC Program rose to approximately two-thirds. About 70 percent of the EESPs felt that the program had some positive effect on the use of performance contracting, although most felt that the effect was limited.

Of the seven EESPs who reported entering into at least some fee-for-service contracts with their clients under the SPSPC Program, two EESPs said they passed on 100 percent of the incentive to the customer, and five split the incentive, but with approximately 70 percent of the incentive going to the customer. EESPs reported on the average that 77 percent of the incentive was passed through to customers.

EESPs reported that the total cost of participating in the program represented an average of 28 percent of the incentives, ranging from 5 percent to 70 percent. However, when the percentage of the incentives expended on program costs was adjusted by the number of applications submitted, the average rose to 48 percent. The percent of costs was dependent on the type of measure installed. Two EESPs mentioned that they had to spend several thousand dollars on specialized testing equipment and computer software, but expected those costs to be recovered over time. Four EESPs specifically mentioned that they were not billing the entirety of their time spent on the paperwork because they attributed a large percentage of the time to the learning process. For example, one EESP who had completed three applications said that he was billing the paperwork at approximately 3 percent of the incentive, but estimated that the actual cost was closer to 40 percent.

The average reported amount of the incentive expended on M&V was approximately 21 percent, ranging from 0 percent to 60 percent. The average percentage of the incentive expended on paperwork was 19 percent, with a range from 1 percent to 40 percent.

As Table 8-22 illustrates, EESPs reported that the top challenges they faced in gaining customer acceptance for any type of energy-efficiency services were meeting the customer's financial criteria for return on investment (46 percent), customer doubts about the credibility of the offer or service provider (46 percent), and customer doubts about the validity of claims for energy savings (31 percent).

Program Effects on EESP Business

This subsection describes how the EESPs felt the SBSPC had affected or was affecting their market and business.

Impact on the Marketplace

All thirteen EESPs believed that the program would have a positive impact on the marketplace. Eleven mentioned specifically that it would increase awareness and market penetration of energy-efficient measures because customers would do projects or add measures with longer paybacks

that they wouldn't undertake otherwise. Two mentioned that the impact could be significant if the program were more widely advertised.

Table 8-22
Challenges to Gaining Acceptance for Energy-Efficiency Services
(All volunteered responses recorded)

Challenge	Frequency
Meeting customers' financial criteria for payback	6
Customer doubt about the credibility of offer/service provider	6
Customer doubt about the validity of energy savings claim	4
Higher first cost	3
Lack of technical understanding	1
Monitoring and verification requirements	1
Reluctance to "buy into" new technologies	1
Speed of program application process	1
Won't invest if ownership in transition	1

Impact on Business Strategies

Eleven of the 13 EESPs said that, overall, the program had helped their energy-efficiency services business. Five EESPs said that the program had provided new revenue opportunities or potential customers, but another five said that the program had had no impact on their business development activities. Eight EESPs specifically mentioned that the program gave them an additional tool to use when promoting energy-efficiency products and services. Two of the 13 had completely changed their business and marketing strategies to take advantage of the program, one of whom said that he had quadrupled his focus on marketing energy-efficiency projects. All EESPs stated that they were very likely to or were already participating in the SBSPC Program in 2000. The main reason given for ongoing participation was that it was a good opportunity for additional revenue.

One EESP noted that he felt the payment delays could be a drain on the business of service providers.

Three of the 13 EESPs said that the program had led them to improve their overall M&V strategy. For example, one EESP mentioned that he now sought to optimize the performance of all the equipment he installed in terms of energy efficiency in addition to mechanical performance.

EESP Recommendations for Improving the Program

The most frequent suggestions from the EESPs for improving the program were to simplify the process, especially the M&V; reduce the time from initial application to payment; and increase the advertising. Specific suggestions included the following:

- Revisit the incentive levels to make them more consistent with actual cost vs. savings
- Standardize the calculations for M&V for common measures (especially lighting)
- Reduce the amount of irrelevant data requested on application forms, especially the DPA
- Combine the BPA and DPA steps
- Follow the timeline guidelines for paperwork (utilities)
- Have one point of contact for projects that span multiple service territories
- Require fewer points in the sample for M&V for multiple, similar sites
- Eliminate the deposit requirement but keep the participation fee
- Help out with start-up costs, such as the purchase of specialized monitoring equipment, possibly by loaning required equipment
- Increase the limit on incentives per customer, so that installing one piece of large equipment did not preclude the possibility of other projects for that customer for the entire year.

General suggestions for improving short-term programs offered by utilities to promote market transformation offered by the EESPs included the following:

- Show the percentage of utility bills that goes to pay for efficiency programs to encourage customers to “get some back” by participating in programs
- Publish a list of ESCOs/EESPs
- Have marketing representatives make presentations to industry meetings, trade associations, and chambers of commerce; sponsor seminars for customers and contractors showcasing energy-efficient product vendors
- Send a list of programs along with the monthly utility bill
- Provide assistance, or “hand-holding,” to walk people through the process
- Provide successful examples that highlight energy-efficient products and applications.

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