Market Assessment and Evaluation of California's 1999 Small and Medium Nonresidential Energy Efficiency Programs

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ABSTRACT

This paper presents selected results from a comprehensive market assessment and evaluation study of energy efficiency programs targeted at small- and medium-sized nonresidential customers that were implemented in 1999 by the three major investor-owned electric utilities in California. In the early to mid-1990s, California's demand-side management programs generally were proven successes when viewed from a resource acquisition perspective,[1] as evidenced by the large body of impact evaluation studies conducted in the State during this period. This success, however, was largely driven by high levels of program penetration in certain sectors, primarily, large Institutional, Chain Retail, Owner-occupied Office, and large Industrial. Research leading up to the study reported on in this paper clearly showed the need for intensified efforts to increase the adoption of energy-efficiency measures and practices among the small and medium nonresidential segments. This paper presents the results of a multi-phase assessment of California's 1999 incentive targeted at small/medium customers and presents the authors' opinions on whether current efforts are adequate to transform this difficult to reach market.

Introduction and Background

In 1996, California State Assembly Bill 1890 established a uniform funding mechanism for ratepayer funded energy efficiency programs and charged the California Public Utility Commission (CPUC) with overseeing the mechanism. In addition, CPUC Decision 95-12-063 called for public spending to shift towards activities that would transform the energy market (Eto et al. 1996). The CPUC authorized PG&E to use Public Goods Charge ("PGC") funds to perform statewide studies to assess the development and delivery of market transformation programs. As part of this process, a set of statewide market assessment and evaluation (MA&E) studies were developed for the 1999 program year (hereafter, "PY"). These studies were generally organized by market rather than by program. The study presented in this paper (hereafter, the "study") focused on small and medium nonresidential customers, defined as having electricity demand less than 500 kW.

The overall Study consists of three major components: 1) an early, Phase I, process assessment of the Statewide Small Business Standard Performance Contract (SBSPC)

[1] These program also had some important market effects, particularly with respect to commercial lighting technologies (see XENERGY 1999 and Peters, et al., 1999).

program and Statewide Express Efficiency rebate program; 2) a later, Phase II, process and near-term market effects assessment of these same programs; and 3) a market assessment of the baseline characteristics of the small/medium nonresidential market.

One of the intents of this Study was to provide as timely input as possible to program managers, policy makers, and other stakeholders for the PY2000 and PY2001 program planning processes. It was for this reason that the study was segmented into three phases. Phase I was to be conducted rapidly, over a one-month period, in order to inform the PY2000 plans, and was completed in August 1999. Phase II was to be completed quickly after the 1999 program year and was completed in May 2000. Phase III was completed in June 2000. Phases II and III will provide important input to the utilities' PY2001 planning processes. This paper includes results from the Phase I and Phase II efforts only.

Program Descriptions and Context

The principal program interventions assessed in the study and reported on in this paper are the SBSPC and Express Efficiency programs. The SBSPC program was implemented for the first time in 1999 (see Sterrett et al. 2000 for program details). It was created during the 1999 planning process to increase the participation of smaller customers in the overall Nonresidential SPC program (XENERGY 1999a). The 1999 SBSPC program was implemented on a statewide basis by Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas and Electric Company (SDG&E). To move toward consistent, statewide programs, the Express Efficiency program was also implemented on a statewide basis for the first time in 1999 and was based largely on PG&E's 1998 Express Efficiency program. All three electric utilities implemented the Express Efficiency program in 1999. In addition, each utility offered energy audits to small/medium nonresidential customers in 1999. Table 1 summarizes the 1999 program budgets for the electric utilities.

Table 1. Summary of 1999 Program Budgets, $ Million*

Utility	Express	Small SPC	Audits	Total
PG&E	8.3	5.7	3.2	17.2
SCE	2.0	2.5	2.9	7.4
SDG&E	2.0	1.6	0.6	4.2
Total	12.3	9.8	6.7	28.8

**These figures include budgets for both incentives and administration costs.*

Express Efficiency Program. Express Efficiency is a statewide rebate program targeted to high-efficiency measures among businesses with electric demand less than 500 kW. Prior to 1999, all three utilities offered some form of nonresidential customer incentives programs. The 1999 Express Efficiency program, however, was designed to encourage market transformation and, in some utility areas, includes both downstream (customer) and upstream (vendor) components. Under the 1999 Express Efficiency Program, small/medium

businesses could receive rebates for a number of high-efficiency HVAC, lighting, refrigeration, and other measures.[2]

Small Business Standard Performance Contract Program. The SBSPC is a statewide program in which third-party (i.e., non-end user) project sponsors are paid for measured, verified savings, based on a fixed schedule. End users cannot self-sponsor projects. A minimum savings of 20,000 kWh per year is required for an application. Aggregation of like customers is allowed and encouraged. A standard contract between the program administrator (utilities) and third-party sponsor specifies incentives, simplified performance measurement and verification (M&V) options and protocols, payment terms, and other operating rules. Sponsors are responsible for M&V. Incentives (specified amounts per kWh saved) are paid to project sponsors, with 40% after installation and 60% after one year, based on verified savings. The project sponsor incentive includes a fixed "participation incentive" of $1,000 for lighting projects, $2,500 for HVAC projects, and $1,500 for motors/other.[3]

Audit Programs. California utilities also employ one or more of the following auditing approaches: a) in-person, on-site; b) mail-out/mail-back "do-it-yourself" (DIY) audits; and c) telephone audits. Although an important part of the portfolio of small/medium programs, results from the 1999 audit programs are not included in the scope of results presented in this paper.

Competing programs, competing factions? In some respects, the Express Efficiency and SBSPC programs were set up to compete with each other in the 1999 program year. This competition between programs also reflected a competition between different program design camps in California. Some members of the California Board for Energy Efficiency (CBEE),[4] some program staff at the utilities, and some ESCOs wanted to continue a shift away from what they perceived as traditional, DSM-type rebate programs, which they considered Express Efficiency; and toward what they believed could be more market transformation-oriented approaches, which they believed the SBSPC embodied. In the other camp were other CBEE members, other utility program staff, and a group of lighting contractors.[5] This group's position was that the Express Efficiency Program had a long, well proven track record and had been well-tailored over the years to the small/medium nonresidential market. This group also contended that the SBSPC was too complex and cumbersome for the small/medium market and created confusion among trade allies and customers because customers had to choose between it and the Express Program.

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[2] Additional information on Express Efficiency program details and requirements is available at each of the utilities' websites, see, for example, www.pge.com/smarterenergy.

[3] Additional SBSPC information on program details and requirements is available at each of the utilities' websites, see, for example, www.scespc.com.

[4] Although the CBEE is now defunct, it played the key role in the 1999 and 2000 program planning processes. As such, it is referred to in this historic context throughout this paper.

[5] CALEP, the California Lighting Energy Professionals, was created explicitly to represent lighting contractors in the CBEE's planning process and to counterbalance what the group perceived to be an undue influence of NAESCO, the National Association of Energy Service Companies.

Phase II Program Results (Spring 2000)

Participation Levels

1999 SBSPC participation. As shown in Table 2, during 1999, there were a total of 181 applications representing 133 unique customers and 37 unique energy efficiency service providers. The total reserved funds were almost two million dollars, of which SCE accounted for approximately half of the total. The approximate total available budget for SBSPC incentives was close to $10 million dollars; thus, the actual reserved funds for 1999 are less than a fifth of the available funds. According to Sterrett et al. 2000, there are 19 GWh of projected energy savings associated with the 1999 SBSPC program funds reserved.

Table 2. Basic Program Data Summary for 1999 California SBSPC Program*

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	$1,702,263.00	133	37

**Notes: These figures are based on data received by the authors from the utilities in early 2000 and are not official figures. Final official participation figures for 1999 will likely differ slightly from those reported here.*

1999 Express Efficiency participation. As shown in Table 3, the 1999 Express Efficiency Program had roughly three thousand customer participants. Close to eight million dollars in rebates were applied for, representing the majority of funds available. First-year energy savings for the Express Program are estimated to be roughly 132 GWh.

Table 3. Basic Program Data Summary for 1999 California Express Efficiency Program*

Utility	Customer Sites	Applications	Total Incentives	GWh Savings
PG&E	1,712	1,960	$4,701,106	80
SCE	445	552	$610,487	23
SDG&E	830	901	$1,769,982	29
Total	2,987	3,413	$7,599,173	132

**Notes: These figures are based on data received by the authors from the utilities in early 2000 and are not official figures. Final official participation figures for 1999 will likely differ slightly from those reported here.*

Nonresidential Small/Medium California Population

Presentation of the baseline results of this study are beyond the scope of this paper, but will be published separately in the future. Summaries of our previous baseline work related to small/medium customers can be found in Rufo 1999, Lee et al. 1999, and XENERGY 1999a and 1999b. It is important, however, to at least appreciate within the context of this paper, the sheer size of the target population of nonresidential customers with peak demand less than 500 kW in the combined service territories of the three major electric

IOUs in California. There are a total of approximately *one million* small/medium accounts among the three electric IOUs. The vast majority of these, over 80 percent, are customers with less than 20 kW of peak demand. Total energy consumption for all customers with peak demand less than 500 kW is approximately 53,000 GWh per year. Energy usage, however, is fairly evenly distributed among three sub-groups: those with peak demand less than 20 kW, those with peak demand between 20 to 99 kW, and those with peak demand between 100 to 499 kW.

Evaluation Results

Phase I Data Collection (August 1999)

Phase I of this Study was focused on providing a rapid assessment of the market and program process issues that might be addressed to increase participation in 2000. The full results of the Phase I effort are presented elsewhere in Lee et al. 1999 and XENERGY 1999d. Phase I was a quick-turnaround effort focused on providing input as rapidly as possible to the PY2000 planning process, which occurred in August and September 1999. The Phase I effort was completed in one month's time. The specific activities conducted included group interviews with key utility program staff, four focus groups with lighting and HVAC contractors, and telephone interviews with 10 energy-efficiency service providers (EESPs).

Phase II Data Collection (Spring 2000)

A quantitative survey approach was employed to interview the Express Efficiency participants and a qualitative approach was used for the SBSPC participants. This was for two reasons. First, as noted above, there are many times more participants in the Express Efficiency program than in the SBSPC program. Second, the Express Efficiency program has been implemented in similar form by PG&E for many years and is relatively well studied (see, for example, XENERGY 1999b). As part of the Phase II research effort, 209 end user participants in the 1999 Express Efficiency Program were surveyed statewide. For the SBSPC Program, an in-depth interviewing process was employed. In-depth interviews were completed with 13 EESPs who participated as sponsors in the SBSPC Program. A total of 37 EESPs participated in the 1999 Program. Eighteen in-depth interviews with customers who participated in the program were completed as well. The interviewed customers represent diverse business types from dairies to plastics manufacturers to property management companies. Dairies represented the most common business type by far, due to the fact that a handful of EESPs targeted a specific measure (VSDs) to that industry specifically.

Summary of Results

Over half the *Express Efficiency customer* participants stated that they participated in the Program because they wanted to save money on their electric bills. An even larger share of *SBSPC customer* participants stated that reducing energy costs was their primary reason for participating. Eighty three percent of the SBSPC customers said that EESP services were at least a *somewhat* significant factor in their decision to participate.

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. Customers were almost universally satisfied with their experiences with their product and service providers. Most *SBSPC customer* participants also were satisfied with their Program experiences. The incentive was mentioned most often as the major benefit of the SBSPC Program, allowing customers to install equipment they would have been unable to otherwise. Dissatisfaction with the SBSPC Program was usually related to how long the Program steps took (almost half mentioned the amount of time required was a problem) and the quantity of paperwork. Generally, the EESPs insulated customers from the paperwork and M&V requirements (as explicitly intended by the program design, which does not allow customers to self-sponsor their applications).

EESP participants in the SBSPC also were satisfied with the Program in general. About 80 percent of interviewees noted that the incentives were a strength of the Program and were beneficial to customers. EESPs cited excessive paperwork, excessive M&V requirements, and a lack of advertising as Program weaknesses. The EESPs indicated that their costs associated with participating in the SBSPC consumed a sizable share of the incentives. The SBSPC EESP participants provided some evidence that the Program was helping to affect the market they served. Over half the projects they conducted were with new customers.

Express Efficiency appeared to be influential on customer efficiency attitudes and practices. About half the interviewees said 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 efficiency in the future. Nearly three-fourths said the rebate was very important in overcoming potential cost barriers and about half said the rebate had increased their confidence in the energy-efficient equipment they had installed.

Our free ridership analysis for the *Express Efficiency customers* indicated that the statewide net-to-gross ratio (NTGR) was 66 percent (on a weighted basis). This implied that about one-third of the energy savings would have occurred in the absence of the Program. The comparable NTGR estimate that we estimated for the *SBSPC customer* participants was very similar at 62 percent.[6]

About 80 percent of the *Express Efficiency customer* participants used a third party to install equipment under the Program. Customers were less likely to use a third party on smaller projects. Over 90 percent of the customers were satisfied with their provider. The third-party provider was often influential in the decision to participate in the Express Efficiency program.

SBSPC customer participants generally rated their experience with EESPs as good or excellent. EESPs helped customers to understand the economic benefits and to reach a decision to participate. About half the customers said that they were receiving other services from the EESP. Two-thirds said they expected to use the EESP in similar future projects.

Both *SBSPC customer* participants and *SBSPC EESP* participants provided suggestions on improving the SBSPC Program by 1) simplifying the process and increasing consistency, 2) reducing the time required, and 3) increasing advertising.

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[6] We note that the estimate for the SBSPC Program was based on a small sample of 18 participating customers (which did, however, represent a large share (25%) of the incentives).

Summary and Conclusions to Date

In 1999, the California electric utilities offered two types of incentive programs to the small/medium nonresidential existing construction market: Express Efficiency rebates and Small Business Standard Performance Contract incentives. The Express Efficiency Program was able to reach a majority of its goal for the year, while the SBSPC achieved less than 20 percent of its target. The Express Program reached several thousand customers, while the SBSPC reached less than two hundred. Combined, participants represent less about 0.4 percent of the total population of eligible customers. The combined energy savings for both programs represent roughly 1.5 percent of potential energy savings for small/medium customers (assuming an average per customer savings potential of 20 percent). Both programs received generally positive marks from participants in the programs themselves and induced about two-thirds of end user participants to take actions they would not have otherwise. There also is evidence that both programs have had some positive effects on participants with respect to their future energy-efficiency related intentions.

As evaluators charged with assessing whether these programs are likely to lead to market transformation of the small/medium market, our conclusion to date is that although there are some positive examples of potential market effects among program participants, these effects are extremely modest when viewed with respect to the entire target population. The current programs are simply very small in comparison with the size of the target market. Small and medium nonresidential customers are currently paying much more into public goods charges for energy efficiency than they are taking back through participation in these programs. For example, these customers contribute over $100 million to the energy efficiency component of the California public goods fund, yet participated in program efforts totaling something on the order of $20 million. In addition, we estimate that there are over 10,000 HVAC and lighting contractors that serve the small/medium nonresidential population, a few hundred of which participated in the Express Program and about two dozen in the SBSPC. Though program size is certainly not the central benchmark of market transformation, it is a significant factor if results are desired within a reasonable time frame (e.g., five to ten years). At the present rate of program penetration, it would take over ten years to touch five percent of the end user market. This is important because the bulk of the small/medium programs rely on single contacts with customers and trade allies to move the market in new directions. Broader elements, such as mass market advertising or program branding, have been utilized on a statewide basis on only a limited basis to date (though there was a small upstream HVAC and motors program in 1999). Certainly, based on diffusion-of-innovation theory, it is possible that the small number of initial participants may drive larger numbers of other customers to adopt energy efficiency measures in the future, however, much more study and evidence is needed to demonstrate that this phenomenon is significant within the small/medium nonresidential energy services market.

Participants were somewhat more favorable to the Express Efficiency Program than they were to the SBSPC. This was generally attributable to the fact that participating in the Express Efficiency Program was much easier than participating in the SBSPC Program. This difference in difficulty was explicitly addressed in the CBEE's program planning process by setting higher incentive levels for the SBSPC Program than for Express Efficiency. These higher incentive levels were meant to encourage EESPs to participate in the SBSPC and

compensate them for the extra time and effort required, as well as the delay in payment. The higher incentive levels did not seem to have been enough to induce the levels of participation desired. The lower than expected SBSPC participation levels may also be due to inadequate program outreach efforts. This issue, however, is subject to some debate because of the nature of the SBSPC Program itself and general admonition from the CBEE and CPUC that trade allies rather than utilities take center stage in California's efficiency markets.[7]

In general, the 1999 nonresidential program planning process in California witnessed a great deal of debate over whether traditional rebate programs such as Express Efficiency were capable of "market transformation" or whether the SBSPC program was better suited to this goal. We argued during presentation of our Phase I results to the CBEE nonresidential planning committee that this was a false dichotomy. In the authors' opinion, the complexity of how to achieve market transformation should not digress into an unproductive, generic debate over rebates versus standard performance contracts. Both incentive approaches have theoretical merits and liabilities. The irony of the debate was that the 1999 SBSPC was designed to be much simpler with respect to M&V and other program requirements than was the 1998 NSPC program (which had no customer size limits), so much so, that both supporters and detractors wondered at what point the SBSPC would be "simplified" into a "rebate" program. This merely illustrated, in our opinion, that the dichotomy was indeed false, and that the terms had simply come to represent opposing ends of a continuum.

In addition, we opined that these two end points actually represented only two legs of what must be a three-legged stool needed to support market transformation efforts. The third leg, we pointed out, needed to deal more explicitly with what we call macro-level end user barriers. These are those high-level, prime moving, end user market barriers that cut across technologies, such as, organizational practices, bounded rationality, and split incentives (see Eto et al. 1996 for definitions of market barriers). A conceptual overview of this perspective is shown in Figure 1. As shown in the figure, the three legs are the macro-level end user barriers mentioned above, technology-specific barriers (for example, the reliability of electronic ballasts), and supply-side barriers (e.g., asymmetric information). Prescriptive rebates, like those in the Express Efficiency Program, were used historically throughout the 1990s in California as a technology-specific program strategy in which a handful of technologies were very strongly promoted (although many more technologies were actually covered). As documented in XENERGY 1998 and Rosenberg et al. 1998, this approach actually achieved significant market effects for at least two key technologies: electronic ballasts and T8 lamps.

[7] During California's rebate "boom" in the early and mid-1990s, utility account representatives played an extremely active and effective role in promoting utility rebate programs. In 1998, California utilities were ordered to restructure their programs and eliminate account rep marketing of efficiency programs to large customers (over 500 kW). The question of whether the marketing of the 1999 SBSPC should be left completely to EESPs or aided by utility account reps is an open one, and the utilities appear to have adopted different levels of intensity with respect to this marketing.

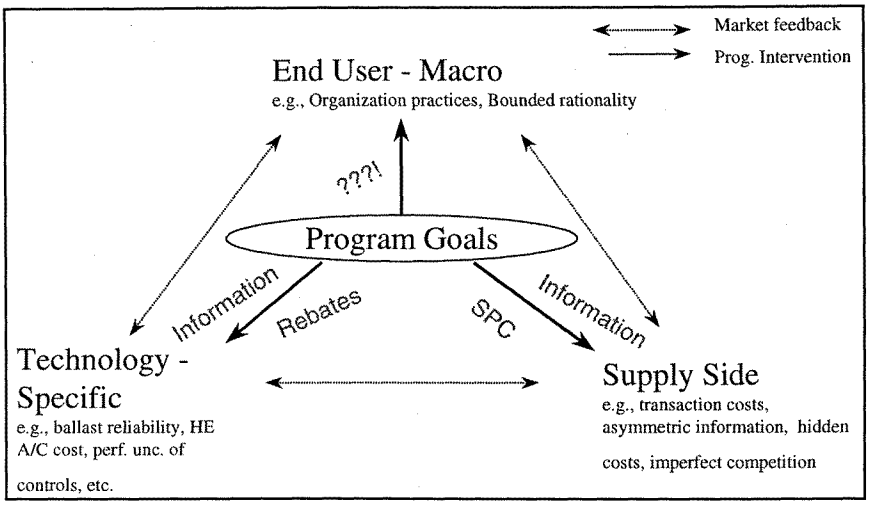

Figure 3. Market transformation's three-legged stool

At the other end of the stool are the supply-side barriers. By these we mean those barriers that affect the ability of supply-side actors to deliver energy-efficiency related products and services at levels that would be expected based on what is cost-effective for end users. A critical supply-side related barrier not addressed by programs prior to the SBSPC is asymmetric information, [8] which often leads end users to, in turn, distrust energy-efficiency service providers.[9] One of the laudable goals of the SPC programs is to increase the perceived credibility of EESPs in the marketplace, in essence, to attempt to transfer some of the halo effect utilities have garnered for themselves through almost 20 years of conservation and DSM programs onto contractors and ESCOs, among others. In addition, the nonresidential SPC program advocates seek to help EESPs to reduce the transaction costs they face in providing efficiency services to small and medium-sized customers, another laudable goal.

Rather than working in isolation or competition, we believe that each of the three legs of the stool is necessary to set in motion the kinds of market effects that have the potential to be self sustaining. In addition, we believe that a much larger share of the public goods funds attributable to the small and medium nonresidential market should be explicitly targeted at this sector of the market. There are numerous barriers to be addressed and an extremely large population to be reached, with potentially very large aggregate energy savings potential. Affecting this market will take a large, concerted, on-going effort. Marshaling $50 to $100 million toward this market effectively is much more likely to lead to changes than the current approach, which we liken to a dripping faucet: *drops* of resources are being expended in what is a large *ocean* of a market.

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[8] As defined in Eto et al. 1996: "The tendency of sellers of energy-efficient products or services to have more and better information about their offerings than do consumers, which, combined with potential incentives to mislead, can lead to sub-optimal purchasing behavior."

[9] Recent advances in the economic theory of intermediation (see Spulber 1999) and the related theory of trust (see Lazaric and Lorenz 1998) provide helpful insights into understanding the role and behavior of ESCOs as energy-efficiency intermediaries and the specific ways in which asymmetric information may be a barrier to customer trust.

In order to reach a final conclusion on whether or how much market transformation can be achieved in the small and medium nonresidential market, an aggressive effort should be mounted: in effect, we urge that regulators, program planners, designers, evaluators, and other energy policy makers should "go down swinging," before giving up on this important group of customers. Elsewhere, we have provided some initial recommendations for more aggressively pursuing this market (see XENERGY 1999d and Lee et al. 1999). These recommendations will be revisited at the completion of this study (scheduled for July 2000).

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