Standard Performance Contracting A Tool for Both Energy Efficiency and Market Transformation?

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ABSTRACT

The California Public Utilities Commission has decided that energy efficiency Public Goods Charges will be used for market transformation programs. During 1998 about 40% of those funds have been allocated to implement Standard Performance Contracting (SPC) projects in the residential and non-residential markets. SPCs are being "sold" as a means of providing energy efficiency services while transforming and strengthening the market for the service providers. The SPC programs offer standardized pay-for-performance agreements between program administrators and Project Sponsors.

This paper reviews the history and design of California SPC programs and evaluates results to date as well as the effectiveness of this program concept. The authors describe features of the SPC as well as options that can make SPCs both market transformation and energy efficiency resource programs. Conclusions and recommendations focus on whether SPCs are effective market transformation tools, in which markets can they be effective, and which design features are of key importance.

Introduction

Background

Assembly Bill 1890 (AB1890), California's landmark electric industry restructuring bill, has dramatically changed the way energy efficiency programs are managed and funded within the state. AB1890 directs Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E) to collect a total of \$872 million from the utilities' existing ratepayers over the 1998 to 2001 time period for "cost-effective energy efficiency and conservation activities." As part of the state's deregulation, the California Public Utilities Commission (CPUC) established the California Board for Energy Efficiency (CBEE), whose mission is to advise the CPUC on developing a new structure for administering these energy efficiency funds in California.¹

In addition, the CPUC's goals for energy efficiency programs have shifted away from "...trying to influence decision makers, as monopoly providers of generation services, to trying to transform the market so that individual customers and suppliers in the future, competitive generation market will be making rational energy service choices." (CPUC 1997a, 81).

¹ To prevent a lag in the delivery of energy-efficiency services while the new administrative structure is being developed, the CBEE has appointed the utilities as "interim administrators" for (at least) calendar year 1998.

Standard Performance Contract Programs (SPCs) have been identified by parts of the Energy Service Company (ESCO)² industry and the CBEE as a preferred mechanism for promoting energy efficiency and market transformation. In 1998, roughly 40% of the energy efficiency dollars collected from the PG&E, SCE, and SDG&E customers will be spent implementing SPC programs in the residential and non-residential markets. The SPC program budgets, totaling over \$45 million for the first nine months of the year, are illustrated in Table 1. As of June, 1998 the CBEE has requested that the CPUC approve additional funding for the last three months of 1998. In addition, Project Sponsors may build on their experiences to access the vastly larger California energy-efficiency market (estimated by some to be in excess of \$5 billion per year) in future years.

Utility	Sector	Total Program Budget	Available Participant Incentives	Administration	Maximum Shareholder Incentive
	Non-Residential	\$11,270	\$9,060	\$2,210	\$2,690
PG&E	Residential	\$4,830	\$4,000	\$830	\$477
	Total	\$16,100	\$13,060	\$3,040	\$3,167
SCE	Non-Residential	\$14,200	\$13,300	\$900	\$2,900
	Residential	\$3,600	\$3,000	\$600	\$206
	Total	\$17,800	\$16,300	\$1,500	\$3,106
SDG&E	Non-Residential	\$8,438	\$6,480	\$1,958	\$1,170
	Residential	\$3,134	\$2,736	\$398	\$500
	Total	\$11,572	\$9,216	\$2,356	\$1,670
Total, All Utilities		\$45,472	\$38,576	\$6,896	\$7,943

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(CPUC 1997b, Attachment 4)

Overview of Standard Performance Contract Programs

California's Standard Performance Contracts (SPCs) are pay-for-performance energy efficiency incentive programs. In an SPC program customers or energy service providers, both of whom are called "Project Sponsors," can sign a contract with the Program Administrator. The contract specifies the financial incentive that will be provided by the Program Administrator when and if the Project Sponsor "delivers" energy savings. The "standard" part of SPC is that there are: (a) one set of fixed

² The term ESCO is commonly defined as a company that is engaged in developing, installing, and financing comprehensive, performance-based projects (typically with contracts of 7 to 10 year durations) that are focused on improving energy efficiency and reducing maintenance costs for facilities owned or operated by customers. (Cudahy & Dreessen 1996). ESCOs include controls manufacturers, contractors and engineering firms, private developers, and utility affiliates.

³ The values shown in this table are nine-month budgets. Additional budgets for the fourth quarter of 1998 are expected to be approved in July of 1998.

incentive prices that are not competitively determined, and (b) standard forms, procedures, and measurement and verification requirements that are the same for all participants. Unlike demand-side bidding programs, in which the utilities selected a specific set of Sponsors that would participate throughout the duration of the program, the number of SPC Project Sponsors is limited only by the availability of incentive funds.

Because roughly 40% of the energy-efficiency public goods charge (PGC) will be spent on SPC programs, they have attracted a great deal of interest from customers, ESCOs, contractors, and other firms in the energy-efficiency industry. Turn-out for utility-sponsored SPC workshops has been impressive: over 300 people attended the non-residential SPC workshops conducted by PG&E, SCE, and SDG&E immediately prior to or after the programs' launching, and residential SPC workshop attendance exceeded 125 people statewide. The Project Sponsors' enthusiasm for the programs are also demonstrated through the number of applications they have submitted to the utilities: the residential SPC programs were fully subscribed from the outset, PG&E's and SDG&E's non-residential programs were fully subscribed within the first four months, and SDG&E's non-residential program was 75% subscribed within the first four months. A discussion of how the limited program funding was allocated to interested Project Sponsors is provided below.

Methodology

SPCs and Market Transformation

Under the direction of the CBEE, its Technical Advisory Committee (TAC), and input from other interested parties in the industry, PG&E, SCE, and SDG&E each developed separate non-residential and residential SPC programs.⁴ While perhaps SPCs cannot be categorized as "market transformation"⁵ programs in and of themselves, they do contain elements that are conducive to transforming the energy efficiency market. Specifically, the California SPC Programs were designed to:

- Bolster increased levels of energy efficiency;
- Foster and enhance relationships between private energy efficiency service providers (EESPs) and customers through financial incentives tied to project performance;
- Promote the entry of additional EESPs and increased activity of existing EESPs through specific outreach activities;
- Reduce traditional market barriers (e.g., lack of knowledge about life-cycle costs, concerns about comfort reductions, etc.) through customer and Project Sponsor education, marketing, and other interactions;
- Promote comprehensive projects in historically under-subscribed markets and technologies that address multiple end uses through pricing signals and program rules;
- Promote energy-efficiency activities that will continue in the absence of program

⁴ The forums for these discussions took the form of public workshops for PG&E's planned SPC Pilot Program, meetings of the CBEE's TAC, and TAC subcommittee meetings. Southern California Gas Company is also offering a residential SPC program in 1998.

⁵ Market transformation is defined as, "...a reduction in market barriers resulting from a market intervention as evidenced by a set of market effects, that lasts after the intervention has been withdrawn, reduced, or changed." (Eto, Prahl & Schlegel 1996, 10). "Market barriers," "market intervention," and "market effects" are defined in this document as well.

incentives, and

• Educate (non-residential) customers about the importance of M&V, with the ultimate goal of transferring M&V oversight activities from the Administrator to the customer in the long term.

Past experience with SPC programs has demonstrated how SPCs can transform the energy efficiency marketplace. An evaluation conducted by Lawrence Berkeley Laboratory for Public Service Electric & Gas' (PSE&G) SPC program found, for example, that the program led to a significant expansion of the local energy efficiency products and services market. (Goldman, Kito & Moezzi 1995).

SPC Program Design

SPC programs involve three primary sets of players: a Program Administrator, Project Sponsors, and utility customers. In their roles as interim administrators in 1998, the utilities are responsible for overseeing program implementation and quality assurance, budgeting, reporting on the programs' progress to the CBEE, and handling financial services (e.g., invoice approval, financial accounting).

The second set of SPC players, the providers—or Project Sponsors—of SPC programs are ESCOs and companies that provide construction services and/or products and want to expand their market by also providing financing. Non-residential Project Sponsors also include utility distribution customers, and residential Project Sponsors include local contractors and air-conditioning and insulation installers. As of this writing, roughly 50% of the non-residential SPC projects are sponsored by customers. Participating non-residential customers have the option of either serving as their own Project Sponsors, or participating in the SPC Program through third party Project Sponsors.

Overview of Non-Residential SPC Procedures

The three utilities' non-residential SPC programs are all very similar and follow the same basic procedures.⁶ It is important to note that the non-residential SPC procedures apply at the *project* level because—unlike demand-side bidding programs, in which successful bidders contracted to provide large undefined blocks of energy and/or capacity savings—each non-residential SPC application is submitted and reviewed on a project-by-project basis.

First, a potential Project Sponsor submits a basic application that provides an overview of the proposed project, the estimated savings, and estimated incentive payment. Upon the basic application's review and approval by the Program Administrator, the potential Project Sponsor must then submit a more detailed application. This second submittal includes information such as that gleaned from energy audits and site surveys, occupancy and equipment operating schedules, a measurement and verification (M&V) plan, and results of any required baseline M&V activities.

Once the Program Administrator has approved the detailed application, the "standard" contract between the Administrator and the Project Sponsor is executed. A Sponsor may install its project only once the contract has been executed. After installation, the Administrator inspects the project to verify

⁶ Detailed procedures, which do vary slightly by utility, are contained in each utility's Procedures Manual. All of the Procedures Manuals were prepared by Schiller Associates and are available through their respective utility websites.

the equipment is operating properly. Assuming the project is found to be operating as described in the contract, the Administrator makes the first incentive payment (the "installation payment").

Once the project has been installed and the installation invoice has been paid, the project Sponsor conducts measurement and verification (M&V) activities and submits periodic M&V reports to document the prior period's energy savings. The Administrator reviews the periodic M&V reports, and uses the approved information to correct (or true up) the previous period's payments.

Overview of Residential SPC Program Procedures

Although there are some slight differences, the procedures of the three utilities' residential SPC programs are all fairly similar to one another.⁷ One minor difference is that SDG&E requires basic and detailed applications, similar to the non-residential procedures. SCE and PG&E, in contrast, require a single, detailed application and then request additional information as needed to supplement or clarify the application. Ultimately, however, roughly comparable data is gathered through these two approaches.

The initial applications for all three residential SPC programs serve as the basis for reserving project funding. After they have received the detailed project application (SDG&E) or the requested supplemental information (SCE and PG&E) the administrators conduct reviews of the proposed projects to determine whether the Project Sponsors are qualified and their proposed projects meet the programs' eligibility requirements. If any applications are rejected for non-compliance, the dollars that had been reserved for these projects are freed up and made available to other applicants.

As part of the application, a residential Project Sponsor is required to provide a detailed marketing plan that explains the approach the Sponsor will use to identify potential customer participants, the measures that will be promoted, the type of customer conflict resolution method that will be employed, and the performance milestones that will be used to track success in achieving the goals set forth in the SPC contract. Project Sponsors receive no marketing assistance from the Administrators and are prohibited from using the Administrator's name and logo in their marketing efforts.

Once the application has been approved, the Administrator and Project Sponsor execute a standard contract. Project Sponsors may begin marketing their projects and installing measures only after the contract has been executed. All three residential SPC programs have one installation year and one performance year.

A residential Project Sponsor may propose either a direct-install or a retail project. Directinstall projects are those in which energy efficiency measures are installed by the Project Sponsor in participating customers' homes. Project Sponsors submit monthly reports during the installation year to detail recent installations and estimate the corresponding incentive payment. The Administrator inspects at least 20% of the measures to verify that the measures have been properly installed, and then adjusts the incentive estimate according to its findings.

Retail projects are those in which energy efficiency measures (e.g., compact fluorescent lamps, energy-efficient refrigerators, and horizontal-axis clothes washers) are sold through retail outlets to customers in the Administrator's service territory. The Administrators inspect retail locations to ensure the Project Sponsor's promotional materials are displayed and the energy-efficient equipment is readily available. The residential retail SPC concept, first introduced by SDG&E, has the potential to provide

⁷ Southern California Gas Company's residential SPC program is not covered by this paper.

savings comparable to those from direct-install programs—and at a lower cost. However, as discussed more fully below, cost-effectiveness was not used to rank the relative attractiveness of the residential SPC applications.

Pricing of Incentives

In response to the CBEE's recommendation that the SPC programs be consistent across the state, the utilities worked with interested industry participants to develop a single set of SPC incentives for the non-residential programs and a second set for the residential programs. With the CPUC's goal of market transformation in mind, the incentives were designed to offer higher prices for technologies or markets that have historically been under-served or hard-to-reach. In order to keep the pricing relatively simple, the incentives were developed based solely on a dollars-per-kilowatt-hour-saved basis. Also for simplicity, neither the non-residential nor the residential incentives vary by time-of-day or season.

Specifically, as shown in Table 2, savings from lighting projects in the non-residential programs receive the lowest incentives, savings from HVAC and refrigeration projects receive the highest incentives, and the incentives for projects in all other end uses fall between the lighting and HVAC/R prices.

Table 2. Non-Residential SPC Incentives

End Use	Incentive
Lighting	\$0.075/kWh saved
Other	\$0.11/kWh saved
HVAC&R	\$0.21/kWh saved

The residential SPC incentives, also developed to encourage activity in specific markets, differ

- Customer segment: multifamily and mobile home projects receive higher incentives than do projects in single family homes;
- Measure lifetime: measures expected to last for more than ten years receive higher incentives than those with shorter lifetimes, and
- SPC program type: direct-install projects receive higher incentives than retail projects.

The residential SPC incentives are shown in Tables 3 and 4.

by:

	Dwelling Type		
End Use Category (based on measure life)	Single Family	Multi-family and Mobile Homes	
	\$0.12 to 0.18/kWh;	\$0.25/kWh;	
Short-life (10 years or less)	\$0.40 to \$0.60/therm	\$0.80/therm	
Long-life (more than 10	\$0.35 to 0.48/kWh;	\$0.36 to \$0.48/kWh;	
years)	\$0.80/therm	\$1.00/therm	

Table 3. Residential Direct-Install SPC Incentives*

* Ranges reflect the variation in incentives between the three utilities

Table 4. Residential Retail SPC Incentives*

	Dwelling Type		
End Use Category		Multi-family and	
(based on measure life)	Single Family	Mobile Homes	
Compact fluorescent lamps	\$0.11/kWh	\$0.11/kWh	
Energy-efficient refrigerators ⁸	\$0.11 to	\$0.11 to	
	0.48/kWh	\$0.48/kWh	
Horizontal-axis clothes	\$0.11/kWh;	\$0.11/kWh;	
washers ⁹	\$0.40/therm	\$0.40/therm	

* Ranges reflect the variation in incentives between the three utilities

Due to concerns about budgetary constraints, the non-residential SPC programs include pricing ceilings: Project Sponsors will be for paid no more than 100% to 110% (the cap varies by utility) of their estimated savings. All residential programs are capped at 100%. Neither the non-residential nor the residential programs include a pricing floor, since the threat of not being paid for savings that are not realized was decided to provide a sufficient performance incentive.

Payment Term and Payment Schedule

California's SPC programs were among the first new programs to become operational after the CBEE- and CPUC-inspired redesign of the utilities older energy efficiency programs. The Programs' payment terms and schedules were largely determined by the time constraints within which the Programs are operating, including:

- All Programs began operation in January or February of 1998;
- Many non-residential projects—especially the more complex HVAC&R projects specifically promoted through the SPCs—require lengthy planning and installation periods;

⁸ SDG&E offers from \$0.36 to \$0.48/kWh depending on the efficiency of the refrigerator. Incentives for energy-efficient refrigerators are not available through SCE's retail residential SPC program.

⁹ Incentives for horizontal-axis clothes washers are available only through PG&E's retail residential SPC program.

- Marketing/customer recruitment efforts for many of the direct-install residential projects are expected to take several months; and
- Public Goods Charge funding for energy-efficiency programs is currently slated to continue only through December 31, 2001.

All non-residential SPC projects have a two-year performance period, and residential projects have a one-year performance period. The payment for all programs is structured so that Project Sponsors receive no incentive until the energy-efficient equipment is installed (or stocked—in the case of residential retail projects). Upon verification of equipment installation and proper operation (i.e., a well-documented prediction of savings) Project Sponsors receive 40% of the total incentive. Payment for the remaining 60% of the incentive is made only once the project savings have been measured and verified after the performance period(s). This second (and third) payment is "trued-up" based on the savings that that are actually achieved.

Both residential and non-residential SPC Project Sponsors are required to submit an installation deposit before the Administrators will grant authorization to begin installing energy efficiency measures (EEMs). The non-residential installation deposits are refunded only once the EEMs are verified as installed and operating according to their design intent. The residential deposits, in contrast, are refunded only if the Project Sponsor achieves 90% of its contracted incentive amount (PG&E and SCE) or 95% of its committed energy savings (SDG&E).

Project Sponsor and Participating Customer Qualifications

Rather than including a strict set of Project Sponsor eligibility criteria, thereby limiting the breadth of potential Project Sponsors, the utilities—at the urging of the ESCO industry and the CBEE—designed the non-residential SPC programs to allow the market to determine which Project Sponsors are and are not qualified. Non-residential SPC Project Sponsors are required only to familiarize themselves with the program rules and procedures, and to properly complete the program submittals with the Programs' timelines. The utilities intentionally incorporated this "buyer beware" element to help realize their market goal of increased interaction between customers and energy service providers.

The residential programs, in contrast, do require potential Project Sponsors to submit information regarding their financial strength, experience with comparable projects, staffing and management plans, California business and vehicle insurance, and references. These qualifications are intended to serve as customer protection mechanisms and thereby limit the potential for customer complaints. As part of the application process, potential residential Project Sponsors must also submit marketing plans. The utilities are using these to assess applicants' understanding of the residential marketplace, business stability, and ability to maintain lasting customer relationships.

Project Eligibility

In order to qualify for the SPC Programs, projects must provide savings from eligible technologies in eligible end uses. The non-residential programs include a broad array of non-mobile equipment (i.e., equipment other than computers, copiers, etc. that can be easily relocated), such as lighting controls, energy-efficient motors, and efficient chillers. A wide range of equipment is also

eligible in the residential programs, including short-life measures such as compact fluorescent lamps, and water heater blankets, and long-life measures such as ceiling and wall insulation, high-efficiency air conditioners, and horizontal-axis clothes washers.

Both the residential and non-residential programs require that the estimated savings from all projects be at least 200,000 kWh. This size criteria was established to limit the administrative burden that could otherwise occur if numerous applications for very small projects were submitted. Project Sponsors are, however, permitted to aggregate load to meet minimum size eligibility requirements.

To ensure the incentive funds would not be entirely consumed by a single Project Sponsor or customer, the programs also include a maximum incentive level for each Project Sponsor, nonresidential customer, and utility affiliate. These caps, which apply separately to each residential and non-residential program, are:

- 30% of total of the total program incentives for each non-utility affiliate Project Sponsor;
- For the non-residential programs, 15% of the total program incentives for each individual customer;¹⁰ and
- 15% of the total program incentives for each utility affiliate that participates in the SPC program within its own service area.

Program / Project Cost-Effectiveness

As part of their 1998 shareholder incentive mechanisms, the three interim utility Administrators must calculate the programs' cost-effectiveness from the Utility Cost test perspective. For the most part, each residential and non-residential program must be cost-effective in aggregate (i.e., across all Sponsors' projects). Only PG&E's residential SPC program requires individual Project Sponsors to demonstrate cost-effectiveness on a project-by-project basis.

Measurement and Verification (M&V) Requirements

After pricing, M&V is the most critical and contentious issue associated with performance contracts. M&V is the basis for payment to Project Sponsors, and is expected to be scrutinized by the CBEE and CPUC to ensure reasonableness.

Given the relative complexity of M&V, the fact that the non-residential SPC program designs are generally consistent across the three utilities, and the likelihood that some Project Sponsors would participate in more than one service area, the utilities decided to develop a single set of M&V guidelines for the three non-residential SPC programs (Schiller Associates 1998).¹¹

Among the key questions that were considered when developing the M&V requirements for the non-residential SPC Programs were 1) who would perform the M&V (e.g., the SPC Administrators, Project Sponsors, or a third party), and 2) who would perform the due-diligence reviews. In deciding who should perform M&V, the program design team weighed the tradeoff between objectivity and cost. While Project Sponsors clearly have an interest in finding actual savings approximately equal to estimated savings, using Project Sponsors to perform M&V is less expensive than using a third party since the Project Sponsor is already on-site for related work. Some utilities have used third-party M&V

¹⁰ Since a customer limit is not relevant to the residential SPC programs, none has been established.

¹¹ This document is available through each of the utilities' SPC websites.

firms in their bidding programs, while others require Project Sponsors to perform their own M&V. In programs where the Project Sponsors have performed M&V, the utilities often conduct their own audits to verify the reported M&V results.

The program design team also gave a great deal of thought to the level of rigor—and associated difficulty and cost—that would be appropriate for the SPC Programs' M&V. The team recognized that the industry has gained a great deal of experience and has well-documented savings information for some energy-efficiency measures, but that this information is lacking for others (e.g., the HVAC&R equipment promoted through the non-residential programs).

The authors relied on sources to establish the non-residential SPC Program M&V requirements, including:

- The International Performance Measurement and Verification Guideline (IPMVP), sponsored by the U.S. DOE;
- The Federal Energy Management Program (FEMP) Measurement and Verification Guideline, and
- The guidelines developed for PG&E's and SCE's DSM bidding programs.

In general, the non-residential SPC M&V requirements incorporate a reduction in rigor from the DSM bidding M&V requirements. For example, a "cookbook" M&V approach for lighting projects, that is based on the wealth of information gleaned from the DSM bidding programs, is included in the SPC M&V Guidelines. In addition, manufacturers' chiller performance curves are allowed, rather than requiring Project Sponsors to develop their own curves using in-situ measurements. The guidelines also include structural improvements that should make the SPC M&V Guidelines easier to use than those developed for the DSM bidding programs several years earlier. As more data from projects becomes available, and as participants acquire field experience with the SPCs' M&V methods, opportunities to further improve the efficiency of the M&V methods are expected to arise. Additional "cookbook" methods and case studies could, for example, be developed for HVAC and other types of equipment.

The residential direct-install SPC programs give Project Sponsors the option of accepting the utilities' "deemed" savings values, or proposing alternative savings values with appropriate supporting documentation. In the deemed savings approach, the Administrator posts energy savings for each measure—and the Project Sponsor accepts these savings values without question. In offering this option, the Administrators made use of the wealth of information available on energy savings from residential measures, and thereby substantially reduced the Sponsor's M&V costs. A measure persistence study may, however, still be required for projects that include short-life measures with deemed savings.

Project Sponsors opting for the "measured" savings approach, in contrast, must estimate energy savings through billing analysis. In PG&E's and SDG&E's programs, billing analysis is performed by the Project Sponsors at their own expense; in SCE's program, SCE conducts the billing analysis and covers all analysis costs. While (except in the SCE program) billing analysis is a more expensive M&V option for Project Sponsors, billing analysis offers Sponsors who believe the deemed values are too low an opportunity to demonstrate—and be paid for—additional energy savings. For residential retail SPC projects, the Administrator inspects each participating retail location to verify that the product is stocked or readily available to customers, and that the Project Sponsor's approved promotional activities have been implemented.

RESULTS

Preliminary Findings

As of this writing in early June, 1998, California's SPC programs have been up and running for just four months. It is too early, therefore, to assess many program metrics, such as whether: customer-Project Sponsor relationships have been strengthened as a result of the programs, energy-efficiency levels have been increased, customers are more savvy about energy-efficiency options, or customers are taking more responsibility for M&V due to the programs' educational efforts.

There are, however, even at this early date, indications that the SPC Programs will be successful in realizing some of their other market transformation goals, and not successful in realizing others. These indicators are enumerated below.

Entry of Additional Project Sponsors and Increased Activity of Existing Sponsors. As of this writing (May, 1998), both the SCE and PG&E non-residential SPC programs are not only fully subscribed, but have a number of applications on waiting lists: SCE has received applications that total 175% of its allocated 9-month incentive budget, and PG&E has received applications for 130% of its allocated 9-month incentive budget. Subscription to SDG&E's non-residential program has occurred more slowly: although the SDG&E non-residential SPC program is already currently 75% subscribed.

Each of the residential SPC Administrators received at least 18 applications, most of which were from larger, energy service companies, and 75% of which requested the maximum allowable incentive payments. The residential Administrators received only a few small (i.e., less than \$100,000) applications from local residential insulation, window and HVAC contractors, and these were mostly for long-life measures. Each of the Administrators received one or more retail project applications.

Due to the overwhelming number of applications submitted to the residential SPC programs, each Administrator accepted applications up to a specified date, and then used a simple random lottery to determine the order in which applications would be reviewed. That is, the selection of projects was based purely on luck—rather than on economic or cost-effectiveness considerations, marketing plans, end uses addressed, or services offered. The result is a set of residential SPC programs with minimal variety in retail and direct-install project types.

In addition, since the first several applications selected through the lottery all requested the maximum incentive, only four Project Sponsors were selected for each residential SPC program. The lottery system, therefore, clearly failed to broaden the range of residential energy efficiency service providers. The failure particularly affected local contractors who should be a focus for the residential SPC programs. As described by one roofing contractor who did not win the lottery, his participation would have given him an excellent opportunity to expand his business and better serve his customers in the community.

Comprehensive Projects in Historically Under-Subscribed Markets; Technologies That Address Multiple End Uses. SPC pricing already appears to have had a considerable effect on specific energyefficiency markets. Of the 28 applications that together fully subscribe PG&E's 9-month incentive funding, for example, 24 (86%) include an HVAC component, 15 (54%) address multiple end uses, and only two address just the lighting end use. This is in stark contrast to PG&E's bidding program, in which the majority of projects address only lighting equipment, and less than 1% include energyefficient HVAC equipment. SCE's non-residential SPC results, though somewhat less dramatic than PG&E's, also indicate that pricing has influenced the type of projects participants have chosen to undertake. Of the 74 total applications that together fully subscribe SCE's 9-month incentive budget, 36 (49%) include energy-efficient HVAC equipment, and 17 (23%) address multiple end uses. In SCE's bidding program, in contrast, only 15% of the projects include high-efficiency HVAC equipment. Pricing therefore appears to be a major factor in helping the non-residential SPC programs to achieve their goal of promoting comprehensive projects that address multiple end uses.

Potential participants in the residential SPC programs have also responded noticeably to pricing signals. Of the projects selected through the lottery, the vast majority target multifamily and mobile home dwellings, for which a greater incentive is offered. Pricing signals have helped the residential programs, too, in accessing hard-to-reach markets and thereby realizing one of the programs' goal.

Given the marked response to both the non-residential and residential incentives, it may be possible to reduce incentives in all customer segment and end use categories in the future without triggering a significant decline in participation.

Promote Energy-Efficiency Activities That Will Continue in the Absence of Program Incentives. One way to assess whether activities conducted through the SPC programs will continue in the absence of SPC funding is customers' willingness to contribute to the cost of energy-efficiency measures. On the non-residential side, it is premature to assess the level of customer contribution since the basic applications received to date do not include this level of detail.

It is not too early, however, to assess this evidence of market transformation for the residential programs. The majority of direct-install residential applications include only short-life measures, and since these are relatively inexpensive, the Project Sponsors are *not* requesting customer contributions. The residential SPC programs are therefore not likely to realize longer-term savings, establish long-term customer relationships, nor influence customers to purchase energy-efficiency equipment once the programs cease to exist. Some options to remedy this situation for future generations of residential SPC programs include: requiring that all direct-install projects include a customer contribution; eliminating incentives for short-life measures; severely restricting the maximum incentive funds available to each Project Sponsor; and reserving a portion of the incentive funding for small contracting firms. The latter two remedies should help develop the ESCO/contractor industry through the support of smaller businesses.

Conclusions

Have the 1998 SPC programs assisted in transforming the market for energy efficiency? With little information available at this early stage of the program, the answer appears to be mixed. In the non-residential sectors, the programs do appear to be influencing the types of equipment promoted by Project Sponsors, increasing the interaction between energy service providers and customers, and helping to introduce new service providers to the energy-efficiency marketplace. It remains to be seen, however, whether these changes will persist in the absence of the program incentives—and tracking persistence may prove to be increasingly difficult in California's deregulated electricity market.

The residential SPC programs, too, appear to be having an effect on the types of equipment promoted, and the market sectors being addressed. Unfortunately, in the residential case, the effects of the SPC programs are unlikely to be long lasting.

There are clearly a number of program design elements that can be improved for 1999. In general, the use of residential SPC programs as an energy-efficiency and market transformation tool must be carefully reviewed and evaluated. If the residential SPC programs are retained in 1999, a priority for the program designers will be to develop an alternative to the programs' use of a lottery for the selection Project Sponsors and perhaps set aside funding for small contracting companies. In addition, retail projects may be eliminated from SPC programs, while still allowing manufacturers or distributors to participate in direct-install projects.

There is also room for improvement in the non-residential programs. Specifically, the programs' M&V procedures and contractor outreach programs should be revisited. While the SPC M&V procedures are somewhat simpler than those use in the DSM bidding programs, further simplifications are likely still possible. By simplifying M&V and thereby lowering its cost, more program resources (both money and effort) can be expended on energy-efficiency equipment, and less can be spent on documenting savings. Revised procedures, however, must still ensure that the energy savings from SPC projects are adequately measured and verified to justify continued PGC funding. Furthermore, since the 1998 programs quickly became fully subscribed, only a modest contractor outreach effort was needed. To broaden the pool of participants in 1999, the program administrators could expand their outreach efforts, and perhaps place a special focus on small mechanical and electrical contractors. These contractors are already providing energy services which could be expanded to include energy efficiency services.

Finally, since the CPUC's focus has shifted away from the acquisition of demand-side resources, and toward market transformation, program designers may want to consider new pricing structures that are explicitly tied to market transformation goals. Incentive payments under this scenario might be tied to the promotion of specific technologies in more targeted market sectors, or the development and retention of energy service providers. To address the medium-sized utility customer market, which has not participated in the 1998 SPC programs, an "SPC-Lite" program could be developed with targeted incentives, reduced application requirements, and perhaps lower M&V requirements.

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