Evolution of a Program: Four Years Evaluating Nonresidential Standard Performance Contracting in California

Alex Marthews, XENERGY, Inc.
Karen Minc, XENERGY, Inc.
Julia Larkin, XENERGY, Inc.
Rick Ridge, XENERGY, Inc.
Mike Rufo, XENERGY, Inc.
Pierre Landry, Southern California Edison

ABSTRACT

This paper presents an overview of the evolution of the Large Nonresidential Standard Performance Contracting (LNSPC) program. It examines how it differs from previous prescriptive rebate and customized incentive programs. It also describes recent changes in the program, and comments briefly on the variety of uses to which energy efficiency service providers (EESPs) and customers put the measurement and verification (M&V) results required by the Program.

The authors have evaluated the LNSPC program since its inception in 1998 (XENERGY 1999, 2001a). Our most recent evaluation includes a broad, statewide process and tracking-data evaluation of the 2000 and 2001 LNSPC Programs (XENERGY 2001b). This focused on interviewing customer and EESP participants in both years, describing how the Program worked, estimating self-report-based net-to-gross ratios for each year, reviewing and integrating the results of utility tracking data. Analysis of potential near-term market effects was not a primary focus, as it had been in the two previous evaluations.

The paper presents the main recommendations developed by the 2000/2001 LNSPC Program evaluation, and examines tracking data trends over the four years of the Program. It contains the following sections:

- Program History
- Overview of Four-Year Program Trends
  - Tracking Data Trends
  - Customer and EESP Participant Survey Data Trends
- Net-to-Gross Ratios (Free-Ridership)
- Comparison of California's SPC Program with Other States
- Recommendations

Program History

The Large Nonresidential Standard Performance Contract (LNSPC) Program is an energy-efficiency program offered by the Utility Program Administrators,[1] under the auspices of the California Public Utilities Commission (CPUC). When it was created in 1998, as the "Nonresidential Standard Performance Contract Program" (NSPC), it was a key element of the CPUC goals of market transformation and the creation of a self-sustaining energy-efficiency services industry (CPUC 1998a). In 1999, the program was split into two separate programs based on customer size. The LNSPC Program was designed to serve end users with peak demand of 500 kW or more, whereas the Small Business Standard Performance Contract (SBSPC) Program served all other end users (XENERGY 2001c). The LNSPC's original market transformation focus has shifted somewhat in recent years, as a result of the energy crisis, towards the resource acquisition model of earlier utility incentive programs like the Customized and Prescriptive Rebate Programs. Its recent incarnations, in 2000 and 2001, are designed to reduce peak demand as well as providing energy savings.

With this program, the utilities offer a fixed-price incentive that varies depending on end use. Applicants can be self-sponsoring customers, or project sponsors such as energy-efficiency service providers (EESPs). The fixed price per annual therm or kWh, performance measurement protocols, payment terms, and other operating rules of the program are specified in a standard contract. Table 1 presents changes to the Program over time:

Overall, in previous years, customers and EESPs have been dissatisfied with the measurement and verification process (Goldman et al. 1998, Schiller et al. 1998 (preliminary assessments); Rufo et al. 1999; XENERGY 2001a). Our most recent evaluation showed that changes to the program requirements and application process had addressed these problems fairly well. The changes have been favorably received among both the customer and the EESP participants, especially the streamlining and standardization of application forms and the introduction of a calculated savings option for M&V for PY2001.

On the whole, customers and EESPs appear to be reasonably aware of, and satisfied with, the changes to the program, and this satisfaction is reflected in the tracking-data trends over the four years of the program.

[1] Southern California Edison (SCE), Pacific Gas & Electric (PG&E), and San Diego Gas & Electric (SDG&E).

Table 1. Program Evolution

Program Details	1998	1999	2000	2001
Program Distribution	Unified Program: NSPC	Separate Programs: LNSPC and SBSPC	Separate Programs: LNSPC and SBSPC	Combined Programs. LNSPC & SBSPC are one program: budgets and incentive levels differ.
Incentive levels				
HVAC ($/kWh)	$0.210	$0.165	$0.165	$0.180 - $0.200*
Lighting ($/kWh)	$0.075	$0.050	$0.050	$0.055 - $0.060*
Process/Other ($/kWh)	$0.110	$0.080	$0.080	$0.090 - $0.100*
Gas ($/therm)	-	$0.270	$0.270	$1.000 - $1.100*
Minimum Project Size	200,000 kWh or 20,000 therms, annually	200,000 kWh or 20,000 therms, annually	100,000 kWh or 10,000 therms, annually	5,000 kWh or 1,000 therms, annually
M&V	Single approach: measured savings	Same as 1998 with some lighting/motor simplifications	Same as 1999 except for some lighting simplifications	2 approaches allowed: calculated and measured
Payout Schedule	2 years in 3 payments: (40/ 30/ 30%)	2 years in 3 payments: (40/ 30/ 30%)	2 years in 3 payments: (40/ 30/ 30%)	1 year for measured savings and 6 months for calculated savings in 2 payments: 60% and 40%

* Note: Incentive levels shown for 2001 are for large customers only; incentives for small customers were slightly higher. Both vary depending on M&V approach (calculated or measured savings).

Overview of Four-Year Program Trends

This section summarizes trends that showed significant change over the four program years.

Two sets of trends are apparent in the basic program statistics, which are shown in Table 2. Most basic indicators, such as number of customers and applications, steadily rise until 2000 and then fall off in the 2001 LNSPC. The dramatic exception to this is that incentives per therm temporarily increased in the 2001 LNSPC, from $0.27 per therm to $1 per therm for calculated savings projects and $1.10 for measured savings projects. This increase raised the proportion of program savings from gas projects at a point prior to the energy crisis where gas prices were unusually high, and where gas savings were therefore temporarily of more immediate concern to the consumer than electricity savings. In the 2002 program, incentives for gas fall back to $0.45 per annual therm.

Most customer participants have been industrial customers. From 1999 to 2001, the proportion of program applicants who are institutional customers (the next largest category) dropped sharply, from 34 percent to 11 percent.

The most common type of firm choosing to sponsor project applications were equipment vendors or distributors, followed by engineering firms. The average number of employees in a sponsor firm rose sharply from 107 to 400 employees between 2001 and 2002, demonstrating industry consolidation.

The number of customers and applications fell between 2000 and 2001, partly because overall LNSPC funding was reduced from $28 to $18 million. The number of third-party EESPs in the program fell by almost half. Incentive commitments for SCE fell by two-thirds; those for PG&E and SDG&E decreased slightly. Expected savings for 2001 are lower than for 2000, reflecting reduced program budgets. This trend is also due to several large gas projects that lack kWh savings. The incentive/kWh figure rises from $0.095 in 2000 to $0.101/kWh in 2001, probably because there are fewer lighting projects in the Program.

We were unable to collect figures giving either the percentage of the customer's total energy usage cut by the program projects, or the percentage of the utilities' load cut by the program projects, because those cannot be assessed with certainty for measured savings projects until the completion of the M&V report process, and cannot be assessed with certainty for calculated savings projects at all. Nevertheless, the overall annual savings figures below provide a reasonable impression of program impacts.

Table 2. Program Statistics, 1998-2001

Activity Level	**1998**	**1999**	**2000**	**2001**
Total unique customers	90	122	201	180
Total number of applications	139	179	252	220
Total unique third-party Energy-Efficiency Service Providers	33	33	52	28
Total incentives funds committed ($ million)	$24.23	$24.24	$28.43	$18.32
Total incentives funds committed – PG&E	*$6.3*	*$9.4*	*$12.3*	*$10.8*
Total incentives funds committed – SCE	*$10.3*	*$11.5*	*$11.5*	*$4.5*
Total incentives funds committed – SDG&E	*$7.5*	*$3.3*	*$4.6*	*$2.5*
Total annual savings from applications (Btu, trillions)*	1.92	3.03	3.63	1.89
Total annual gas savings from applications (annual therms, millions)	*2.57*	*3.46*	*5.62*	*5.92*
Total annual electric savings from applications (GWh)	*162*	*262*	*300*	*126*
Average incentives per kWh	$0.150	$0.093	$0.095	$0.101
Average incentives per annual therm	$0.37	$0.22	$0.27	$0.99
Total incentives funds committed to gas measures ($ million)	$0.95	$0.78	$4.92	$6.28
Total incentives funds committed to electric measures ($ million)	$23.28	$23.46	$23.51	$12.04

* Conversion rates from CEC 2001. Btu calculated using source method.

Tracking Data Trends

There are several more specific trends, which show clear patterns over the past four years. Figure 1 shows that lighting measures as a proportion of GWh savings and of incentives have fallen since 1999. This is partly because, in an effort to increase the net-to-gross ratio exhibited by the program, it was though appropriate to refocus the program on non-lighting projects. Most lighting projects are now handled under the Express Efficiency program.

Figure 1. Lighting Measures - Percentage of Program Incentives and Energy Savings

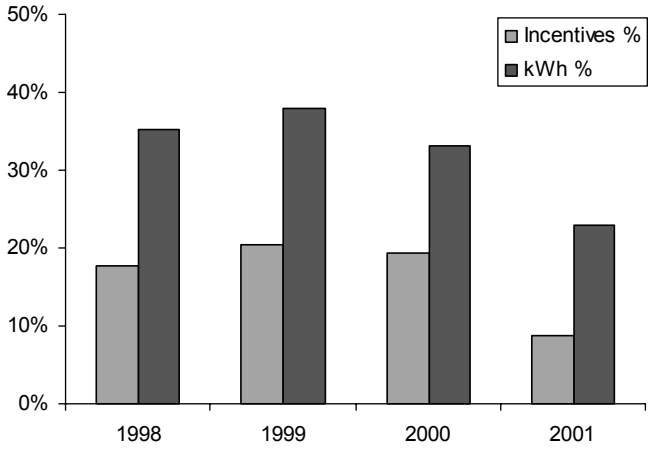
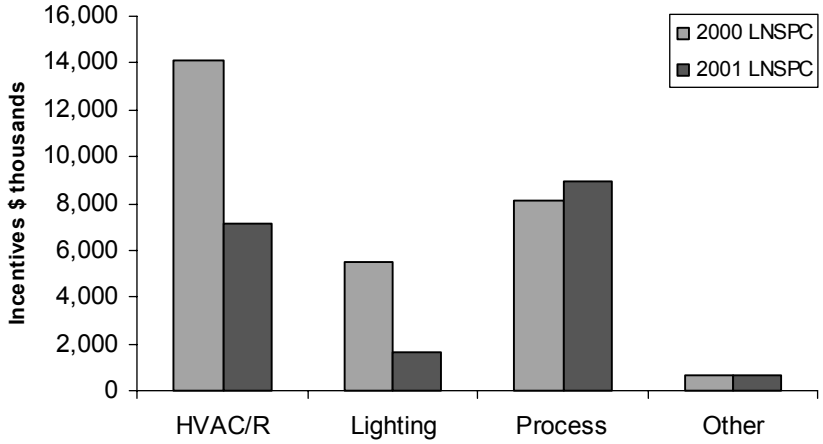


Figure 2 presents estimated incentives by end-use category in the 2000 and 2001 Programs. While HVAC and refrigeration measures dominated in 2000, process measures dominated in 2001, partly because of the short-term focus on reducing gas use. Most process projects involve gas savings, which were paid at a higher incentive level, resulting in a higher level in Figure 2 for process measures. Incentives from lighting measures fell by almost two-thirds between 2000 and 2001, due to changes in program policy.

Figure 2. End Use Category Breakdown of Incentives by Year



The number of EESPs sponsoring applications in the program fell from 52 in the 2000 LNSPC to 28 in the 2001 LNSPC. Several EESPs dominant in 1998-2000 exited the market, reversing a trend towards higher concentration of applications into the hands of a few EESPs. In 1998, the top two firms captured 35 percent of total EESP incentives, rising to 51 percent in 1999 and 52 percent in 2000, then falling to 28 percent in 2001.

Table 3 presents other important four-year trends from the four years of the Program. The profile of the typical LNSPC project changed over time. The 2001 projects were more likely to be smaller and self-sponsored, and to have HVAC or process end uses rather than lighting. They were likely to cover fewer sites but more measures. The average EESP-sponsored customer generally received more incentives, submitted more applications and covered more sites than in prior years. The number of sites per application and the incentives per application fell steadily. Utility representatives report that the vast majority of project applications in 2001 were submitted under the calculated savings approach.

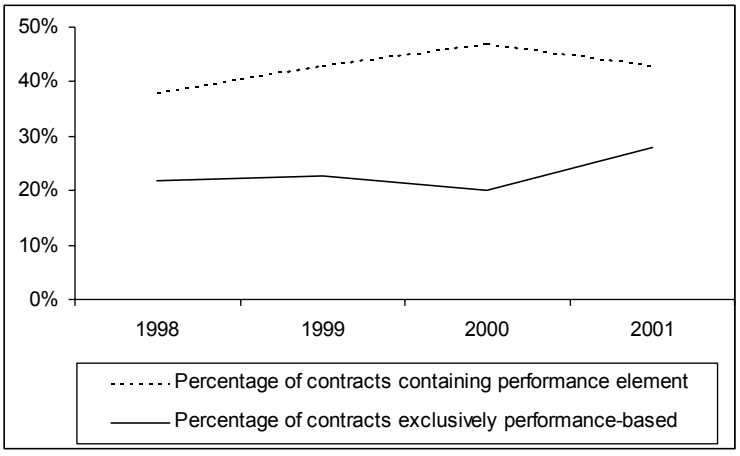
Table 3. Characteristics of Typical LNSPC Projects

Characteristics	1998	1999	2000	2001
# of sites/application	4.0	2.8	1.63	1.23
# of end uses/ application	-	-	1.05	1.02
# of measures/ application	-	-	1.60	2.45
Most common measure	lighting	lighting	lighting	process
M&V approach	measured	measured	measured	calculated
Sponsorship	EESP-sponsored	EESP-sponsored	EESP-sponsored	Self-sponsored
Incentives/application	$174,000	$135,000	$113,000	$83,000

Customer and EESP Participant Survey Data Trends

One original aim of the Program was market transformation, the aim of which was to encourage and promote performance-based contracting between customers and EESPs. Data from the contracts signed under the Program show that there is no clear trend: the proportion of contracts that are partially or wholly performance-based appears to be relatively constant (Figure 3), reaching 28 percent in 2001 for exclusively performance-based contracts, and 40 percent for partially performance-based contracts.

Figure 3. Trends in Performance-Based Contracting, 1998-2001



The effects of the program on customer and EESP participants were diverse. Many customers reported that participation in the program did lead to changes in their decision-making processes related to energy efficiency. On the other hand, as in previous evaluations, most EESPs reported that the program had minimal effects on their business practices. A number of EESPs in the PY2001 program reported that participation had increased their sales, though some attributed the increase to the California energy crisis as well.

The overall number of EESPs fell in PY2001, perhaps owing to the availability of the new, simpler calculated savings approach. Most applicants perceived the costs of the "measured" option to outweigh the 10-percent higher incentive payment it offered. This process was aided by the new ways EESPs are using the M&V results provided by program participation. While EESPs and customers sometimes find the M&V data collection process onerous, they use the data in innovative ways (XENERGY 2001b).

Many EESPs interviewed for a companion Case Study Report (XENERGY 2002) use the results as marketing materials, to show prospective clients how much they might save through program participation and therefore employing the EESP's services. Some use the M&V results to refine their internal analysis tools, or as a proxy for building commissioning.

Some customers use the M&V results to verify the work of contractors, to obtain information on building usage and occupancy, or to sell future projects to management.

Net-to-Gross Ratios

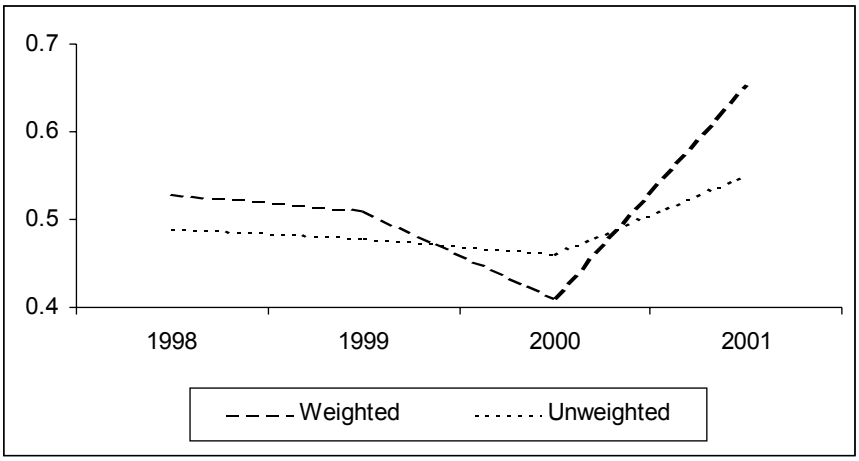
An important measure for evaluating the SPC program is the net-to-gross ratio (NTGR), which aims to measure the proportion of projects that would not otherwise have been undertaken. This approach is common in evaluations of utility-based energy-efficiency programs (Ridge et al., 1994), and follows the guidelines in Appendix J of the Measurement and Evaluation Protocols (CPUC 1998b). The NTGR is calculated by assessing:

- significance to the customer of incentives and EESP services,
- self-reported likelihood of installing anyway in the absence of the program,
- efficiency and number of measures that would have been installed anyway, and
- whether the measures would have been installed anyway, but later.

The net-to-gross estimate for the 2000 LNSPC, weighted by kWh savings, was 0.41.[2] Self-sponsored customers had a lower NTGR than EESP-sponsored customers (0.38 versus 0.45). This was in line with evaluation results for previous years. The overall weighted net-to-gross estimate for the 2001 LNSPC was much higher, at 0.65 (Figure 4). In 2001, unlike in prior years, the net-to-gross estimate for self-sponsored customers was higher than that for EESP-sponsored applications (0.70 versus 0.40). The sharp rise in the NTGR in 2001 may be due to more effective marketing of the program by the utilities, the transfer of lighting projects to the Express Efficiency program, or the introduction of a calculated savings option.

[2] Note that the net-to-gross ratios (NTGRs) reported here are based only on free-ridership; that is, they do not include any adjustments for participant or non-participant spillover (thus, the net-to-gross ratio equals 1 minus the free-ridership rate).

Figure 4. Trends in Net-to-Gross Ratio, 1998-2001



The (unweighted) 2001 LNSPC NTGR of 0.53, which is used to estimate program cost-effectiveness, is probably an underestimate. This is because the NTGR was gained by the self-report based free-ridership method, without adjusting for its downward bias, or addressing the spillover and other market effects associated with program participation.

XENERGY's NTGR report (XENERGY 2001c)[3] recommends that the self-report based NTGR be increased by 0.15 to account for the downward bias of the method, spillover, and the lower proportion of lighting projects.

Comparison of California SPC Program with Other States

The California SPC Program is one of several SPC-type programs implemented around the country over the past five years. These programs include the New York $mart Savings SPC Program, the New Jersey PSE&G Standard Offer Program, and the Wisconsin Shared Savings Program. A good overview of the tracking data for these programs, and a close analysis of the New York program, are available at www.nyserda.org/sbcappa.pdf (GDS 2000).

Recommendations

Our past Program recommendations included attempting to reduce free ridership and the perceived and actual costs of program participation. They also included reassessing the roles of performance contracting and M&V, and the necessity of inducing changes in the EESP market. The utility administrators have made substantial progress in all of these areas in ways that have encouraged program participation and increased program satisfaction.

[3] This report discusses broader issues associated with whether self-reported estimates of free-ridership should be adjusted rather than used directly for cost-effectiveness testing and estimation of net program benefits.

However, utility administrators should continue to strive for a balance between providing technical assistance, which increases customer participation and satisfaction, and allowing EESPs to meet applicant and prospective applicant needs. They should continue to encourage customers to use ESCOs and EESPs as sponsors as much as possible, and to provide technical support for customers who are unwilling or unable to contract with EESPs.

The streamlining of application procedures and M&V appears to have lessened the demand for EESP-sponsorship of applications, though many self-sponsors still hire third-party firms for assistance. With the shift from a market transformation to a resource acquisition focus, the demand for EESP sponsorship has fallen. It now may not be as necessary to promote performance contracting between the customer and the EESP.

The standard performance contract required between the EESP and the utility administrator is viewed positively by end users, and is generally seen as a vote of confidence in EESPs' estimates of savings. Such third-party approval does appear to reduce some customers' perceived risk of moving forward with EESP projects (i.e., it reduces the asymmetric information barrier).

In PY2001, most applicants chose the "calculated" M&V program option (using a look-up table) instead of the "measured" M&V program option (which typically involves on-site measurements or metering). Projects with easily estimated savings should therefore be assigned to the calculated option, and administrators should reserve the measured savings option for projects for which *a priori* estimates are highly uncertain. This approach, if carried out consistently and according to a clear set of protocols and criteria, is likely to appropriately balance the need to accurately estimate program savings and maximizing overall program cost-effectiveness.

The LNSPC fulfills an important role in the portfolio of nonresidential energy-efficiency programs, by promoting large or complex energy-efficiency projects undertaken by large customers. The 2001 Program captures most of the benefits provided by the previous customized rebate program, stimulates private EESP business, and provides a process for increasing the certainty of project savings estimates when necessary.

References

Published Reports

California Energy Commission, *2001 Energy Efficiency Standards for Residential and Non-Residential Buildings*, June 2001. CEC 2001.

California Public Utilities Commission, Recommendations of the California Board for Energy Efficiency on 1999 Programs and Budgets, Institutional and Transitional Issues, and Adopted Policy Rules, October 15, 1998. CPUC 1998a.

California Public Utilities Commission, *Protocols and Procedures for the Verification of Costs, Benefits and Shareholder Earnings from Demand-Side Management Programs*, revised June 1998. CPUC 1998b.

GDS Associates, Inc., *New York Energy $mart Standard Performance Contracting Program Assessment*, prepared for the New York State Energy Research and Development Authority by August 2000. GDS 2000.

XENERGY, Inc., *Evaluation of the 1998 Nonresidential Standard Performance Contract Program*, prepared for the California Board for Energy Efficiency and Southern California Edison, June 18, 1999. XENERGY 1999.

XENERGY, Inc.*, 1999 Nonresidential Large SPC Evaluation Study*, prepared for Southern California Edison, January 10, 2001. XENERGY 2001a.

XENERGY, Inc., *2000 and 2001 Nonresidential Large SPC Evaluation Study*, prepared for Southern California Edison, December 6, 2001. XENERGY 2001b.

XENERGY, Inc., Improving the Standard Performance Contracting Program: An Examination of the Historical Evidence and Directions for the Future, prepared for Southern California Edison, December 2001. XENERGY 2001c.

XENERGY, Inc., *Nonresidential SPC M&V Case Study Report*, draft, prepared for Southern California Edison Company, January 25, 2002. XENERGY 2002.

Printed Proceedings

Goldman, Charles A., "California's Nonresidential Standard Performance Contract Program", presented at the ACEEE 1998 Summer Study on Energy Efficiency in Buildings, Washington DC, August 1998. Goldman et al., 1998.

Goldman, Charles A., "Role of Third Parties in Energy Efficiency Programs: A Review of Alternative Approaches and Experiences", prepared for Connecticut Light and Power, December 2000. Goldman 2000.

Rufo M., R. Prahl, and P. Landry, "Evaluation of the 1998 California Non-ResidentialStandard Performance Contracting Program: A Theory-Driven Approach", presented at the 1999 IEE Conference, Denver, CO. Rufo et al., 1999.

Schiller, et al., "Standard Performance Contracting: A Tool for Both Energy Efficiency and Market Transformation", presented at the ACEEE 1998 Summer Study on Energy Efficiency in Buildings, Washington DC, August 1998. Schiller et al., 1998.