

Rethinking Performance-Based Measurement: Implications for Market Transformation Programs

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ABSTRACT

Performance-based measurement programs, such as the Residential and Non-Residential Standard Performance Contract Programs play an important role in the new California market transformation initiatives. Because these programs are supposed to be market transformation driven, the authors question the logic of using the traditional definition of performance, the acquisition of kWhs and kW, for designing these programs and determining the incentives given to participants. The paper suggests that if performance is to be rewarded, then the definition must conform to a new meaning of performance that incorporates the concepts of measuring consumer purchasing behavior, market innovation, and business development. The paper discusses how these principles are emerging in the incentive structure for the PY99 Residential Contractor Program.

Introduction

Beginning in 1998, the public policy directives for energy efficiency in California shifted dramatically away from traditional resource procurement objectives and toward long-term transformation of markets for energy efficiency products and services. And yet, within this fundamental shift, policymakers and program designers alike have nevertheless maintained performance-based requirements in the form of demonstrated energy savings. In practice, performance-based measurement has remained an integral component in the way the California Board for Energy Efficiency (CBEE) has conceived of, and implemented, two of its largest market transformation initiatives. While the CBEE programs maintain a focus on performance-based measurement, we would argue that the continued use of such performance-based requirements, either in the context of individual program delivery or even at a portfolio level, is perhaps the wrong focus for programs that seek to effect lasting changes in the marketplace. We would suggest that the emphasis of performance-based measurement invoked in these programs is perhaps fundamentally incompatible with, and indeed unworkable under, the revised policy objectives in California.

In this paper, we first explore the historical roots of performance-based measurement in energy efficiency policy, and highlight the continued central role that this concept plays in current policies and programs implemented by the CBEE. Based upon program experiences in the California marketplace, we suggest an alternative framework for developing market intervention strategies and a movement away from performance-based measurement in program design. Finally, we highlight recent developments that suggest the new and revised CBEE programs may already be moving in this direction.

Historical Roots of Performance-Based Measurement

The energy efficiency industry has historically desired performance-based payments, and yet the changing needs of the industry may in fact call for a change in that definition. Let us look briefly at the history of performance-based payments. Performance-based measurement has been used in at least two different fashions during the implementation of energy policy initiatives, including (1) regulatory accountability and the design of demand-side management (DSM) programs, and (2) performance-based contracting for energy efficiency.

Regulatory Accountability of DSM Programs

In the early 1980s era of implementing the Public Utilities Regulatory Policies Act of 1978, Qualifying Facilities (QFs) were paid for "what they produced" -- a relatively easy-to-meter total of kWh produced.¹ In the late-1980s and early-1990s era of regulatory-mandated DSM plans, this pay-for-performance concept was extended into the realm of shareholder incentives designed to encourage utilities to maximize the performance of their DSM initiatives. Under the rubric of "nega-watts", utilities were again paid for "what they produced." At this point, however, the measurement of "what they produced" became relatively nebulous and, importantly, extremely difficult and costly to measure. In fact, as some have argued, the kWh savings cannot ever be measured but instead can only be estimated. Nevertheless, measurement protocols were developed that included very tight precision levels (initially based upon NERC-required load-forecasting precision-requirements). These requirements, in turn, necessitated that considerable resources be devoted toward measurement -- for surveys, metering, and analyses to "prove" that ratepayer monies were well spent and resulted in actual savings of energy that was attributable to DSM programs. Importantly, these requirements turned out to be quite costly, raising the overall cost of energy efficiency resources.

Resulting, in part, from the regulatory accountability imposed upon utilities, customer incentives have historically been linked directly or indirectly to performance-based measurement. Where large incentives were at stake, elaborate monitoring and verification plans were put in place for individual customers. Where smaller incentives were at stake, incentive levels were typically linked to the present value of energy savings (using forecasts of future avoided energy and capacity costs) that were expected to result from the installation of a specific measure or set of measures. In extreme cases, customers could be paid for the entire cost of a measure because the savings were so high.

Performance-based Contracting for Energy Efficiency

A specific business model that has been built around the concept of performance measurement is that of "performance contracting." This business model has been put forth for many years as a potential strategy by which contractual arrangements and payments are made between energy customers and energy efficiency contractors. Performance contracting has been relatively successful in the institutional sector -- hospitals, universities, and government facilities. Customer interest in the broader commercial and industrial sectors has been more limited. Within the residential sector, there have been some instances of performance contracting arrangements, but these have typically been within utility-sponsored energy-efficiency programs and have not developed as a significant model for private sector

¹ For the larger systems, there was a demand component that also needed to be monitored.

transactions. The difficulties in collecting and analyzing residential performance data are well understood by attendees to these evaluation conferences. It is therefore not surprising that programs designed to compensate for services based on the results of this type of analysis are not well received. Yet many in the energy industry still have a strong desire to rely upon performance-based compensation even though research has repeatedly shown that residential customers fundamentally are not very interested in a long-term performance-based arrangement (Wirtshafter et. al. 1998). While advocates of this approach remain, the stable of skeptics is increasing, and many of the firms offering services in the commercial and industrial sectors now prefer contracts that are based on services rendered rather than on the basis of measured energy savings (Dayton et. al. 1998).

Performance-Based Measurement under Recent CBEE Policy

CBEE Policy Rules and the Public Purpose Test

Performance-based measurement has continued as a requirement under current CBEE policy. The CBEE policy rules state that Public Good Charges² (PGC)-funded programs must be cost-effective.

Cost effectiveness must be demonstrated for the entire portfolio of PGC-funded programs and activities both prospectively (rule IV-1) and on an on-going basis (rule IV-3). The CBEE also expects that the cost-effectiveness of individual programs will be calculated and considered as an important, but not the only, criteria in approving program funding and reviewing program performance (rules IV-4 and V-5). (Eto et. al. 1998).

The new rules modify the definition of the test of cost-effectiveness by specifying the use of the Public Purpose Test (PPT). This test is a refinement of the earlier tests defined by the California Public Utility Commission and the California Energy Commission in the 1980s. As with previous cost-effectiveness tests, energy and demand impacts are included within the benefit side of this calculation. Importantly, however, the PPT broadens the definition of cost-effectiveness to include non-energy impacts and market transformation impacts in the calculation of benefits. This provides, in theory, a mechanism by which market transformation programs may be determined to be cost-effective even though the near-term resource acquisition value of a program may not be very great.

In theory, the refinements in cost-effectiveness calculations make it possible for the CBEE to implement program designs that have a relatively long time horizon. Moreover, the revised PPT criteria enable the inclusion of non-energy benefits for consideration in the assessment of market transformation initiatives. In practice, however, the quantification of non-energy benefits is a concept with which program planners are not entirely comfortable and the CBEE has not provided a significant amount of direction in this regard. As a result, the assessment of cost-effectiveness has remained largely dependent upon the estimated value of avoided energy and demand that results from program implementation. There also remains, therefore, a general tendency within the program planning process to link incentive designs to these same energy savings in order to maximize the possibility of program- and portfolio-level cost-effectiveness from a resource procurement perspective.

² Public Good Charges are the non-bypassable funds collected from each utility customer.

PY98 CBEE Nonresidential SPC Programs

The Nonresidential Standard Performance Contract (NRSPC) program, the CBEE's largest budget program in 1998, is based fundamentally upon performance-based measurement. In this program, financial incentives are provided to participating energy efficiency service providers (EESPs), or large Commercial / Industrial (C/I) customers, based directly upon a performance contracting model.

The Nonresidential SPC program provides incentives that are linked explicitly with the resource acquisition value of the demonstrated energy savings. Although a portion of the incentive is paid upon measure installation, the remaining amount is paid out over a two-year period. A summary of these incentives (for the 1998 program year) is provided below in Table 1. Incentives for lighting were generally smaller than were incentives for HVAC and refrigeration measures. The rationale for this was, in part, related to the higher installation costs of HVAC and refrigeration measures *as well as* the potentially greater M&V costs that were likely to be incurred to document resulting energy savings.

Table 1: Summary of 1998 CBEE Nonresidential SPC Incentives

Electric Technology	Price
Lighting	\$.075 per verified annual kWh savings (over 2 years)
HVAC & Refrigeration	\$.21 per verified annual kWh savings (over 2 years)
Other	\$.11 per verified annual kWh savings (over 2 years)

Extensive monitoring and verification (M&V) plans are required, the implementation of which is required to "prove" that estimated savings are achieved. In early evaluation research for this program, however, EESPs reported that these M&V efforts are quite costly to implement and are not typically consistent with, or useful for, the tracking of savings as contracted between the EESP and the customer (Xenergy 1998). The M&V requirements therefore serve primarily as a means of allocating incentive payments and ensuring program-level cost-effectiveness.

While contracts between EESPs and program administrators are performance-based, evidence suggests that very few contracts between EESPs and customers are strict performance-based arrangements where payments from the customer to the EESP are based primarily upon the level of documented savings produced. And while some projects have involved "guarantees" of energy savings, there are indications that such "guarantees" are typically based upon relatively conservative savings estimates. In some cases, EESPs contend that the level of incentive payments covers the level of effort required for the M&V, with little left over for the customer. As a result, there have been suggestions to simplify the M&V requirements and, indeed, this is perhaps one of the most contentious issues associated with the program.

PY98 CBEE Residential SPC Programs

The CBEE also implemented in 1998 the Residential Standard Performance Contract (RSPC) program. Modeled in large part upon the NRSPC program, the RSPC again sought to rely upon performance-based measurement and invoked a performance-contracting model for payments between the program administrators and participating EESPs. Unlike the nonresidential SPC program, however, the residential SPC program provided an alternative and more streamlined route for participation. Under this option, EESPs could opt for incentives that were based upon "deemed savings" (savings pre-specified per unit installed that are based on a predetermined savings level) estimates, rather than

performance-based measurement, and required much less effort for M&V. These incentives, a summary of which is provided below in Table 2, effectively provided for the payment of incentives in one lump sum shortly following installation. The range in incentive levels reported within each category reflects the variation in the specific offers across utilities. Higher amounts were generally offered for measures with longer useful lives and hence greater lifetime savings.

Table 2: Summary of 1998 CBEE Residential SPC Program Incentives³

Measure	Incentive
Lighting	\$.18-.25/kwh
Showerheads	\$.12-.18/kwh
Refrigerators	\$.35-.36/kwh

Although the RSPC program offered a performance contracting arrangement under which EESPs would be paid for performance-based measurement, *none* of the participating EESPs selected this approach. When given an alternative path for payment, all participants opted for the alternative path. This preference for incentive payments based upon deemed savings rather than "measured" energy savings resulted from two related factors: (1) the perceived cost and logistical constraints associated with M&V requirements, and the relative attractiveness of the deemed savings incentives, and (2) the more immediate payment of incentives following installation.

Importantly, since the incentive levels were defined on the basis of resource acquisition planning rather than on the basis of adjusting market barriers, the incentives provided under the deemed savings approach were in some cases exceptionally attractive relative to the cost of the measures installed -- especially for several low-cost measures. As an example, a summary of incentives for low flow showerheads, based upon deemed savings, is provided below in Table 3.

Table 3: Effective Deemed Savings Incentives for Low Flow Showerheads (Messenger 1998)

Utility	Electric water heating	Gas water heating
PG&E	\$61	\$14
SCE	\$28-40	\$16
SDGE	\$23	\$10

A variety of factors contributed to the variation in incentive levels at each of the utilities, including climate zones and resulting impacts upon energy savings calculations as well as differences in approaches used to calculate savings estimates. Note that, because the incentive size for many of these items was high relative to their actual costs, EESPs were inclined to favor these items in the basket of provided services. In fact, as shown in Table 4, below, much of the activity proposed for the RSPC PY1998 program was low-cost items such as CFLs and showerheads.

³ For simplicity and consistency in table structure, the incentive levels summarized in Table 2 are limited to those offered for direct install projects involving electric measures in single family dwellings.

Table 4: Measures Proposed by Accepted Bidders in the PY98 RSPC Program

	Percentage of Funds	Percentage of kWh proposed
Lighting	42 %	60 %
Low flow showerheads	17 %	9 % ¹
Water heating measures (mostly controllers)	6 %	1 % ¹
Heating cooling measures (mostly thermostats and AC conversions)	16 %	12 %
Appliances	10 %	11 %
Infiltration and pipe wrap	8 %	5 % ¹

¹ Does not include gas savings estimate

In favoring these measures, EESP marketing costs were also reduced substantially since the measures could be given away at no cost to homeowners and without the requirement of any co-payment. Early interviews with program stakeholders, including CBEE Board members, revealed a major disappointment with the focus of the RSPC program reflected by the mix of measures as proposed in the EESP bids submitted (what the market brought forth). Most of the parties did not believe that a program concentrating on delivery of these measures was consistent with the market transformation policies of the CBEE. Most felt that funds should be used to promote newer and less fully commercialized products and services. Many observers were also disturbed by the fact that many of the EESPs were offering the measures at no cost to the customer, and that such a practice would not be sustainable after PGC funds were exhausted.

Moving Away from Performance-Based Measurement

Applicability of Performance-based Measurement in a Market Transformation Oriented Policy Environment

While the precise definition of "market transformation" is somewhat elusive, there is general consensus that such a policy approach requires more of a "business development" perspective. While the desired end result is increased energy efficiency (and, indeed, kW and kWh savings), policymakers are more interested in the end-result in terms of the capability of private industry to provide these services in a sustainable business model, rather than the specific levels of "savings" that may be achieved on the path to this end. The term "performance," as used within a market transformation framework, therefore takes on an important temporal distinction. Specifically, public policies are not so much focused on near-term energy savings, but rather long-term structural changes in the marketplace that result in sustained market-driven increases in energy efficiency. While there remains a long-term interest in the level of energy savings achieved, and the cost-effectiveness with which these savings are achieved, there is less concern with the near term cost-effectiveness of program efforts and specific measure installations.

Within a market transformation context, program incentives should be designed to push the edge of the market. Such incentives should encourage firms to develop new products or take business into areas not already served. However, if energy savings determine the absolute level of incentive amounts in the near term, this type of market development may not be promoted. In fact, it can be argued that the current incentives retard market development by inducing service providers to focus heavily on low

cost measures that are already well accepted in the marketplace. This focus on low cost, high incentive measures displaces resources that could have been better applied to less mature products (and probably creates lost opportunities among participating households).

As we move away from resource procurement as a policy objective, the definitional needs of performance-based measurement are clearly changing. And yet we cling to this old concept of pay-for-performance. Under the new set of objectives, what is the "performance" that we seek to measure and/or reward? If we are not paying for kWh, but rather paying for marketing transformation, then we need to re-examine the assumption that we need to require costly measurement and precision levels. The idea of precision has new meaning -- not in terms of load impacts, but rather in terms of measuring consumer purchasing behavior, market innovation, and business development.

A New Framework for Incentives

One objective of this paper is to break the assumed link between the PPT and the setting of incentives. We will illustrate the need to treat the two decisions as independent by using a purely hypothetical example. Let us assume that a hypothetical PPT finds that it is cost-effective to use PGC funds to promote the manufacturing and installation of a new energy-efficient window. A program that introduces 10 million of these new windows over the next ten years will have a positive net present value of the energy savings benefit of \$40 million. The traditional process for setting incentives would have determined that we could pay up to \$4 per window as an incentive.

A market transformation perspective would address the market development of the program as a process. That process requires product development, sales and installation capabilities, as well as consumer demand. Careful analysis in this vein might determine that support of manufacturing and/or advertising would be more cost effective than other options. This analysis might also conclude that front-loading resources to provide higher first-year incentives would be a better strategy than offering uniform rebates over the life of the offer. Accordingly, it might be decided (again, hypothetically) to offer rebates of \$35 per window *for the first year only* to generate greater near-term changes in demand and procurement practices. Strategies for supporting this market in subsequent years might then place greater emphasis on non-rebate mechanisms to build upon the initial gains in product availability and retailer product familiarity.

This type of market transformation approach uses the PPT to establish priorities for which products and services to pursue and sets limits on the PGC funds that can be made available in developing that product or service, but breaks from past practice in refraining from using that test as the primary means for setting actual incentives. The essential feature of this approach is its incorporation of market-based considerations in specifying the features of the program interventions, tailoring incentive types, levels, and timing to identified barriers and market dynamics relevant to the program.

Examples of Incentives to Promote Market Activities

As energy policy evolves in California, and in other states throughout the country, similar questions will arise regarding the future role and applicability of performance-based measurement of energy savings and, more generally, the types of incentive designs which are appropriate within a market transformation context. We suggest a movement away from fixed rebates permanently attached to a product or service, and generally based on potential energy savings. If programs are intended to encourage market transformation, we would then suggest that incentives and, more broadly, program

interventions should be tied to discrete market activities that serve to build a long term market. The ideal mix of incentives and interventions will vary from case to case just as the mix of market actors, interactions, feedback loops, and barriers varies. In some circumstances the needs may be more financial in nature, linked to capital constraints among service providers or target consumer groups. In other cases, the greater obstacles may be non-financial in nature. And, in a great number of cases, there will exist multiple, inter-linked market barriers, which may encompass both types of issues. Intervention strategies, then, will ideally be developed in a fashion that allows for customization to individual program markets and their requirements.

We provide, below, several examples of alternative intervention strategies, identifying circumstances in which each might be applied.

- ← *To promote participation among new types of enterprises*, provide a financial "award" and recognition for the first unique participant (e.g., "the first" fast food chain or public transportation facility). Augment the value of the award to its recipient by publicizing the event locally or at a state level.
- ← *To encourage new types of technology applications*, provide "design awards" (similar to architectural competitions) that showcase innovative applications.
- ← *To encourage activity in specific geographic areas*: provide incentives allocated by region or metropolitan area. These incentives might be graduated such that the earliest installations in a region receive an added "early market entry" bonus, particularly in the first year or two of a program. Other options could include higher incentives for more rural areas where higher costs for product distribution and service calls might otherwise retard market development.
- ← *To encourage specific types of transactions*, such as performance contracting: provide incentives "per standard performance contract" that is executed (rather than the savings associated with each contract).
- ← *To overcome start-up costs and business risk*, provide or facilitate low-interest financing for the purchase of diagnostic equipment or other specialized tools and materials.
- ← *To encourage the development of private-sector training and certification programs*, and to encourage attendance at training seminars, provide "scholarships" for training that would compensate contractors or their employers for the costs of employee training. Alternatively, provide a coupon for equipment purchase to contractors who attend an approved training seminar.
- ← *To encourage consumers to seek out certified contractors*, develop relevant educational materials, including a website with links to certifying organizations and local trade associations
- ← *To stimulate the use of specific technologies*, consider rebates that are tied to "first cost" or "simple payback" rather than the value of avoided energy/demand.
- ← *To encourage new entrants*, only offer rebates for first time applicants. Only one rebate would be allowed for firms with multiple buildings or EESPs that have already received a rebate for that type of business.
- ← *To encourage energy efficiency marketing*, sponsor marketing trade shows, workshops, or consultations linking marketing professionals with energy efficiency providers.
- ← *To encourage marketing of high efficiency products* - follow the example of manufacturers and offer salesperson incentives for qualifying products for a finite promotional period.
- ← *To support private sector infrastructure*, provide financial assistance in the development of relevant trade associations. The trade association's activities could support policy objectives such as promoting standards for industry activity, providing market intelligence to member contractors,

aiding members is developing business and marketing skills for new markets, etc. Such an association is also likely to fill a role in aiding consumers in identifying contractors providing services of interest.

- ← *To assist in selling energy efficiency*, increase customer awareness of associated non-energy benefits by creating, sponsoring, or co-funding information resources or advertising materials.
- ← *To assist manufacturers in product design and product distribution decisions* - sponsor or co-fund market research addressing consumer reaction to existing and proposed products, bundling or unbundling of product features, convenient or trustworthy distribution and marketing channels, or other key issues

Where rebates are used, they should be set according to their marketing value, that is whether they will accelerate market action. All rebates should be offered only for an announced, finite period. Importantly, none of the above-described "incentives" is defined on the basis of demonstrated performance or documented energy savings. And yet, such a set of creatively-designed incentives may be used very effectively to build a market which achieves policy objectives which ultimately are defined in energy savings terms.

The Evolution of Incentive Designs in CBEE PY99 Programs

Reflecting the concerns of program planners and policymakers with the PY98 RSPC program, the CBEE programs for PY99 were significantly modified to include an initiative labeled the Residential Contractor Program (RCP) that is intended to replace the RSPC Program. Incentives for single-family homes in this program are linked less explicitly with performance-based savings, and more with their perceived market transformation values. For example, incentives for diagnostic services are high, to encourage market development of these types of services. Incentives for CFLs are still available, but only when installed as part of a package of services, and then at a much lower incentive level. In contrast, incentives for multi-family homes are still modeled after the NRSPC program. Single-family incentives for the PY99 Residential Contractor Program are summarized in Table 5.

Table 5: Selected Incentives for Single Family Measures in the PY99 Residential Contractors Program

Single-Family Measure	Unit	Climate Zones 1-10, 16	Climate Zones 11-15
Basic HVAC Diagnostic Tune-up	\$/site	\$75	\$75
Duct Testing and Sealing	\$/site	\$200	\$200
Energy Star Gas Furnace/Heat Pump	\$/site	\$250/\$225	\$250/\$225
Energy Star Air Conditioner	\$/site	--	\$225
Attic Insulation/Wall Insulation	\$/sf	\$0.15/\$0.14	\$0.15/\$0.14
High Performance Windows	S/sf	\$1	\$1
2.5 gpm showerhead	\$/unit	\$7	\$7
Screw-in CFLs	\$/unit	\$2	\$2
Hardwired Fluorescent Fixtures	\$/unit	\$15	\$15

The NRSPC program, as well as the multi-family component of the RCP, continue to provide financial incentives that are based upon the old resource acquisition framework. Although the NRSPC operates more smoothly than did its residential counterpart, and although the program provides an incentive that

is small relative to the total investment being made, it is not yet clear that the program is transforming the market for energy services in a manner that is sustainable without PGC funds. Nor is it clear that the performance contracting business model is going to be the predominant method for procuring efficiency. We suspect that a revamping of incentives away from the old resource acquisition model, and toward intervention strategies that are more consistent with market transformation principles, may serve to better meet the CBEE's long-term objectives.

Conclusions

Early efforts at market transformation programs in California have produced an array of new programs established to address a set of ambitious policy goals. As discussed in this paper, it is our observation that these programs have struggled to some degree under a policy framework which is a hybrid of new objectives and policy directions applied in combination with some of the "standard operating procedures" of the previous efficiency program tradition. The carry-over framework has exerted influences in unintended and, at times, perhaps counterproductive ways. In the cases of the Nonresidential Standard Performance Contract (NRSPC) and the Residential Standard Performance Contract and (RSPC) programs, this has led to promotion of performance contracting as a business model, the implementation of rigorous measurement and verification requirements, delaying of full payments to EESPs until verification requirements were fulfilled, and setting deemed savings incentives on the basis of expected lifetime measure savings. To recap, first year experience showed:

- Several participating EESPs in the NRSPC program suggest that the measurement and verification requirements are quite costly and provide somewhat limited value to customers.
- Few, if any, of the NRSPC projects use performance contracting as the basis of the customer-EESP contract,
- Participants in RSPC are not using performance contracts as the basis for either the customer-contractor relationship or (since there is a deemed savings option) in the contractor-utility relationship,
- Key stakeholders and policymakers were disappointed by the market's response to the RSPC program in the selection of measures used
- Initial estimates of free-ridership are quite high for both programs and there is not yet very strong evidence of early market effects or market transformation.

These responses raised the question as to the role that performance-based measurement can play in a market transformation framework. There are strong indications that the older model of performance contracting based on straight measurement of energy savings has lost its relevance. EESPs and their clients have recognized this and are moving to redefine the meaning of performance within their contractual relationship. The CBEE, too, may need to develop a new definition of performance that reflects its market transformation goals. This may involve the elimination of long-term rebates that are based on energy savings and placing greater emphasis on efforts to support market development. It appears that these changes are already beginning to be tested in the residential arena, out of necessity because the existing market structure was not adequately developed to support even the old performance-contracting model. We suspect that the CBEE will eventually need to redesign the incentives for the non-residential program as well, if they want market transformation to truly flourish in this sector.

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