Applying a Theory-Based Approach to California's Nonresidential Standard Performance Contract Program: Lessons Learned

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ABSTRACT

California's public goods charge-funded energy efficiency programs rely heavily on standard performance contracting (SPC) to both achieve energy savings and reduce customer barriers to implementing energy efficiency measures. This paper reports on an application of theory-based evaluation of the nonresidential SPC program, and how the lack of an initial theory-based approach from the outset led to problems that should have been anticipated. The paper then explores how new social science related to the role of trust in intermediary relationships like EESPs, could be exploited to develop an enhanced NSPC program theory, and develops concepts that should be pilot tested in future NSPC programs. The paper concludes with a discussion of the lessons learned, especially related to the institutional conditions that hinder theory-based program learning and innovation.

Introduction

California's Nonresidential Standard Performance Contract program continues a trend toward non-utility DSM program implementation aimed at the development of the energy efficiency service provider (EESP) industry. Standard performance contracting attempts to overcome perceived shortcomings of, its predecessor, DSM bidding programs, in which EESPs were required to bid quantities of savings prior to identifying customers whose sites would be the ultimate source of those savings (Goldman et al. 1998). As a result, EESPs in bidding programs sometimes had trouble delivering the savings they had contracted to deliver.

Standard performance contracts try to address this drawback by posting fixed prices for savings and then paying for them on a first-come, first-serve basis, based on pre-specified M&V (monitoring and verification) procedures (Goldman, Kito, and Moezzi 1995). This method of payment allows EESPs and other project developers to receive payments on a project-by-project basis, which was meant to be more consistent with the ways in which they do business. The intended result was both acquiring measurable savings, as well as fostering the development of the EESP industry.

Some stakeholders perceive the program to be successful, and the utilities were directed to significantly increase funding for the year 1999. The program, thus, continues to account for a significant portion of the roughly $250 million per year of public goods funds spent on energy efficiency in California.

This paper reports on the initial evaluation of the 1998 NSPC program that was done very early in the program implementation process. Despite the fact that a theory-based approach had not been used to develop the program, the evaluation contractor (XENERGY Inc. 1999) proposed that a theory-based evaluation be conducted to facilitate measurement and analysis of near-term market effects, and to provide important feedback to those involved in the program planning process for the 1999 efficiency programs. This paper reports on those initial evaluation results, extends them using the theory-based approach to program learning, and discusses lessons learned about improving use of the theory-based approach in the future.

Overview of the 1998 NSPC Program[1]

Under the 1998 NSPC program, the program administrators (California's three major electric investor-owned utilities) offered a fixed price incentive to energy efficiency service providers (EESPs)[2] for measured kWh energy savings achieved by the installation of an energy efficiency project. The fixed price per kWh, performance measurement protocols, payment terms, and all other operating rules of the program were specified in a standard contract. The role of the program administrator was to manage the program in a fair and nondiscriminatory manner, promote the program, educate customers and EESPs on the program, and enter into contracts with applicants to pay for measured energy savings.

The 1998 NSPC was a "pay-for-performance" program. With traditional utility rebate programs, the utility pays an incentive directly to its customer based on an estimate of annual savings from a project. However, with the pay-for-performance NSPC program, the utility pays a variable incentive amount to a third-party EESP, or to a customer acting without a third-party EESP, based on measured energy savings. The NSPC was also different from traditional utility rebate programs in that the total incentive is paid over a two year performance period. During the performance period, the EESP must measure and verify the energy savings actually achieved using a mutually agreed upon measurement protocol.

However, while it requires the EESP to have a standard performance contract with the program administrator, the NSPC program, it is important to note, has no requirement for a third party EESP to use such a contract with its customers. Thus, an EESP may decide to use other kinds of contracts with their customers that may not involve performance verification.

Incentives were paid by end use ranging from 7.5 cents per first-year kWh saved for lighting measures to 21 cents for HVAC and refrigeration ("other" measures were paid at 11 cents per kWh saved). According to program records available in October 1998 (at which point the program was fully subscribed), $34 million in incentives were reserved.

[1] The program description provided in this paper is extremely brief. The program has a number of detailed requirements. Interested readers should refer to the full NSPC evaluation report (XENERGY 1999), or www.scespc.com.

[2] In the context of the program, an EESP can be any company, organization or individual that contracts with the administrator to receive payment for measured energy savings resulting from an energy efficiency project. In the 1998 SPC Program, a customer can act as an EESP by contracting directly with their utility and installing and measuring savings from an energy efficiency project at their own facility. Within the context of this paper, however, we refer separately to self-sponsoring customers and EESPs. Our references to EESPs in the remainder of this paper refer to third-party firms, not customers.

Approximately 56 percent of these incentives were applied for by EESPs, while the remainder went to customers who sponsored their own applications. There were 26 unique EESPs and 92 unique customers.[3]

Stakeholder Positions and Political Context

There were a number of stakeholders involved in the development of the 1998 NSPC and subsequent planning process for the 1999 programs.[4] Major stakeholders included the utility program administrators, individual and representative organizations of EESPs,[5] end users (principally government), environmental groups, and regulatory agencies. The principal forum in which stakeholders operated was the nonresidential committee meetings of the California Board for Energy Efficiency (CBEE), which was created by the California Public Utilities Commission (CPUC) to oversee the program. There was a wide disparity of opinions on the goals and objectives of the program among these stakeholders. These included a range of short and long term objectives:

- Reducing utilities role in the delivery of nonresidential energy efficiency services
- Reducing the need for administratively-set shareholder incentives.
- Building a self-sustaining energy efficiency service provider industry.
- Achieving near-term energy savings.
- Replacing traditional rebate and DSM bidding programs with "pay-for-performance" programs.

In addition, the administrative and regulatory structure within which stakeholders sought to advance their positions was unstable. At its inception, the CBEE was charged with overseeing a dramatic shift in California away from utility and toward competitively bid administration of energy efficiency programs. The CBEE itself was an entirely new entity whose role and authority were continuously questioned by several parties. In the end, many regulatory decisions were made that subsequently were never implemented. Most importantly, uncertainty about whether the utilities would continue to administer programs may have contributed to a lack of clarity with respect to who had final responsibility for setting the policy objectives of the program. No institutional party ever clearly and definitively articulated the goals and objectives of the program. Similarly, no party was identified as the entity where the "buck stopped" with respect to prioritizing the program's goals and objectives.

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[3] No more recent figures on the final disposition of the 1998 NSPC Program are available. These figures are likely to be available soon through activities performed on a follow-up evaluation of the 1999 and 1998 nonresidential SPC programs currently being conducted.

[4] Note that the program was bifurcated in 1999 into the Small Business SPC (SBSPC) and Large Nonresidential SPC (LNSPC) Programs.

[5] During the Program's formation in late 1997 and throughout much of 1998, the principal EESP stakeholder was the National Association of Energy Service Companies (NAESCO). In late 1998 and throughout much of 1999, a new EESP stakeholder group emerged, the California Association of Lighting Energy Professionals (CALEP). The new group's self-expressed purpose was to represent the position of a group of lighting contractors who favored prescriptive rebates over the SPC approach and to counterbalance the positions of NAESCO with which they disagreed.

Thumbnail of the Original Program Theory[6]

The theory-based approach requires an iterative process of program design, evaluation, and redesign based on the lessons learned from the initial program. As discussed in Blumstein, et al., 2000, a theory-based approach to program design requires the following:

> "During the design phase each program must have a plausible program theory. This means establishing a well-reasoned basis (the program theory) for believing that the proposed...initiative will lead to the improvement in performance. All of the program assumptions need to be *explicitly* (emphasis added) identified and assessed. The *ex ante* 'arm chair' plausibility test should be eclectic, drawing on all available sources of relevant intelligence including (a) the normally tacit knowledge of experienced program operators and market actors, (b) the available literature, both theoretical and empirical, from all those disciplines...that can contribute to our understanding of the market...and the plausibility of the proposed program assumptions."

In our opinion, the underlying causal theories upon which the NSPC program design was based were not developed fully by program planners, designers, and policy makers prior to the program roll-out in 1998. The evaluators found no program theory in writing at the outset of their evaluation. Although each major stakeholder had an opinion on the purpose of the program they did *not necessarily* have a causal theory of how the intervention would lead to their desired outcomes.

The lack of consensus among stakeholders and the absence of clear administrative decisions regarding objectives made it difficult for the evaluation team to develop an *ex post* program theory. As a result, the program theory tended towards a general "umbrella theory" that did not specify all the detailed causal mechanisms and that, as we elaborate below, underutilized some important "tacit knowledge" of program operators and market actors.

The *ex post* program theory explored the ways in which the NSPC might lead to self-sustaining changes in the marketplace. The evaluation team noted that a self-sustaining marketplace for energy-efficient products and services requires agreement between suppliers and customers on their value. Products and services must be available, vendors must be aware and knowledgeable about them, and stock, promote, and specify them in their interactions with customers. It is equally critical that customers be aware and knowledgeable about the energy efficiency products and services, and that they trust the claims made by EESPs regarding their benefits. Customers must have confidence that the incremental costs associated with their purchases will not exceed the value of the energy savings, plus any other non-energy benefits. It is unlikely that enough demand for products and services will be created if customers' investment criteria are not met or if they have significant doubts about the quality, reliability, or other characteristics.

At this general level the primary hypothesized effect was that the program would stimulate and reinforce a positive feedback relationship between customers and mid-stream suppliers of energy-efficiency products and services. The use of standardized performance

[6] See Rufo, et.al. 1999, and XENERGY 1999 for more detailed discussions.

verification protocols would increase customer's confidence and trust in EESP claims. Combined with financial incentives this would increase customer demand for efficiency services. This increased demand would then support existing EESPs, encourage new entrants, and lead to greater competition among service providers. The increased competition would reduce costs, improve EESP marketing and sales practices, and lead to innovation in energy-efficiency products and services. These supply-side improvements would then lead to further increases in customer demand for efficiency services, greater confidence in EESPs and measure savings because of verification, and greater awareness and knowledge of efficiency opportunities. Thus, under this theory the Program would create positive feedbacks leading to a *self-sustaining market* for energy-efficiency products and services that captures a greater portion of the cost-effective opportunities in end-user facilities.

However, close inspection of this general program theory reveals several difficulties. Most importantly, the theory does not deal with the unresolved tension between short-term energy savings and long-term sustainable market improvement goals. Thus, according to the program theory standardized performance verification will increase customer confidence in EESP claims. But the program does not require that EESPs provide standardized verification for customers; only for the program administrator. The original theory does not explain how such verification of short-term savings for the *administrator* (and regulator) will assure a *customer* who may neither use or have access to the results of such verification.

A closely related difficulty with the original theory is that it does not explain how the program will use standardized verification plus financial incentives to attract *new* customers that expand and provide for growth in the EESP customer base.

Given the advantage of hindsight, we can now more easily observe that these difficulties with the original program theory are by no means totally due to a lack of relevant knowledge. If anything, these gaps in the theory seem more due to a minimizing and associated failure to adequately incorporate available tacit knowledge. For example, one aspect of tacit knowledge pertains to the current regulatory model which entails a high degree of inherent mistrust between the regulator and utility administrators. Moreover, this mistrust was heightened during a period, as described above, of uncertainty about the future role of utilities. Needless to say, such mistrust places an emphasis on short-term verification of administrator performance; a need that is met by standardized verification of energy savings. Under these circumstances, despite tacit knowledge to the contrary, it was easier to "believe," without the kind of rigorous plausibility testing called for in the theory-based approach, that standardized verification could meet both short and long-term goals.

Similarly there was tension between the program theory that assurances through standardized verification would attract *new* customers (i.e. to increase the EESP customer base) and tacit knowledge about the kind of customer most likely to be attracted. For example, experience suggested that customized incentive programs frequently appeal to large sophisticated customers; the kinds of customers who might be more attracted by the financial incentives than by the desire for performance assurance through standardized verification. This raises questions about whether standardized verification would truly increase the EESP customer base, or merely be tolerated for the sake of receiving a financial incentive. But, as indicated above, the political climate gave even greater weight than usual to those parties who stood to benefit most from financial incentives. Under these circumstances, this kind of

tacit knowledge was minimized and the program theory was never subjected to the rigorous plausibility testing that might have exposed this lurking problem.

Early Results from the 1998 NSPC Evaluation

Under the evaluation team's original theory-based evaluation, it was critical to focus on whether there was any *early* evidence at all for the hypothesized changes in the market. Rather than waiting several years to exhaustively assess whether a program has had any particular market effect, the theory-based approach must utilize **early** and **frequent** evaluations to provide feedback to policy-makers and program designers so that mid-course corrections in program design can be made as necessary. For each of the NSPC market effects hypotheses, the evaluation team created one or more market indicators that could be measured to provide evidence with respect to whether the hypothesis was borne out. They then carried out a systematic analysis of near-term market effects that was organized around the evidence obtained from their primary research activities and the extent to which this evidence supported or refuted their program hypotheses.

The evaluation team concluded that the overall weight of the evidence collected in the 1998 evaluation indicated that the 1998 program was generating few near-term market effects as of the first year. As summarized in Rufo, et al. 1999 and XENERGY 1999, the strength of the evidence in support of the program hypotheses regarding intended market effects was very limited. The supply-side assessment was based primarily on the self-reports of EESP participants, who themselves indicated the program had yet to influence their business practices. In addition, in the one case where the evaluation team rated the strength of the evidence as moderate (for improved M&V capabilities), they were concerned about whether the capabilities developed to meet the program requirements were sustainable, given the level of resistance to the requirements expressed by many EESPs. If EESPs report that the program is not inducing changes in their business practices, then it less likely that the intended market effects will occur, since the latter are hypothesized to follow from a sequence of events that start with the EESP changes.

Besides this absence of evidence supporting intended market effects, there were several other troublesome findings. In particular:

- Customers self-selected into the program based on a previously developed predisposition toward making energy efficiency investments, indicating a high level of free-ridership. This result might have been anticipated, as discussed above, from available "tacit knowledge."
- Early indications were that a very large percentage (roughly half) of the sponsors have been end-users submitting projects on their own behalf, which reduces the ability of the program to develop and grow the EESP industry.[7]
- Many EESPs viewed the M&V requirements as onerous, expensive and overly complex, indicating the program transaction costs were high.

[7] One reason for this may have been that utility rebate programs abruptly ended in 1997, so customers who had planned to take advantage of these programs suddenly only had the choice of the SPC.

In short, it appears that the Program (a) was not producing intended market effects hypothesized as necessary for realization of a self-sustaining EESP industry, and (b) was producing several troublesome effects, such as high free ridership and high transaction costs, that were not adequately accounted for in the original program theory. The question then is, how can we enhance the program theory in ways that build on our tacit knowledge, and incorporate new understanding of how intermediaries like EESPs can flourish?

Enhancing the Original Theory: Role of Intermediaries, Trust and Reputation

As part of the iterative learning process, the theory-based approach calls for drawing eclectically on all available sources of knowledge. As emphasized above, this includes tacit knowledge of experienced program operators and market actions. It also includes advances in knowledge available in the literature (Riggin 1990). Fortuitously, recent advances in the economic theory of intermediation (Spulber 1999) and the related theory of trust (Lazaric and Lorenz 1998) were found useful in enhancing the original NSPC program theory and helping to explain the troublesome findings.

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

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

From this perspective, EESPs are intermediaries who not only compete against each other but also against direct exchange. *In order to compete against direct exchange EESPs must reduce total transaction costs.* This includes reducing the critical customer barriers, identified by XENERGY (1999), associated with energy efficiency goods.

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

Intermediation theory clarifies how information asymmetries about product quality create a role for intermediaries. Because of unobservable product quality, intermediaries can earn returns by investing in technology and expertise needed to test, evaluate, assure, and certify product quality. In so doing they can address and mitigate the problem of opportunism and resulting adverse selection (the market for lemons condition). They are able

to earn returns by performing this function partially because they can realize economies of scale by dealing with a greater number of buyers and sellers. Also because they have a long term time horizon (oriented to future customers) intermediaries have greater incentive to learn from experience, invest in expertise, innovate in transactions (e.g. the kinds of contracts used) and earn returns from building a reputation for truthfulness.

It is further important to note that, once established, a good reputation is a valuable asset that an intermediary can use to reduce marketing and other transaction costs to a broad range of prospective customers. Consistent with this theory about the importance of reputation, XENERGY (1999) found that a "good reputation is one of the most important factors in selecting a supplier."

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

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

Do Intermediation and Trust Theory Lead to a Reassessment of the Current Program Design?

Using intermediation and trust theory to reassess the program, several impacts on short and long-term program goals are evident:

- The standard requirements of SPC/M&V are inappropriate to many of the transactions taking place and therefore raise, not lower costs.
- Because the incentives are so high regardless of whether services of an EESP are used, the program attracts mainly large sophisticated customers who do not need intermediation and would do the investments on their own anyway.
- Less sophisticated energy customers have no way to observe EESP performance and, therefore, have difficulty selecting a provider and trusting the claims.

Applying these new ideas can sharpen the original program theory by establishing two conditions necessary to build good EESP reputations: (1) use of different kinds of standard

performance contracts to both match customer need and reduce the ambiguity of EESP claims; and (2) using M&V results to increase the observability of EESP performance to prospective customers.

Applying the Enhanced Theory to the Program Design

Applying the insights from the original and enhanced program theories, the authors developed two suggestions for consideration or pilot testing:

First, in order to assure that they are used to reduce, rather than increase, transaction costs, PGC funded SPC/M&V services could be made available at the request of any party to any intermediated energy efficiency transaction, regardless of whether any financial incentives are involved. An independent third party would provide these services free of charge to all parties who agree to have their M&V results used to help other customers more easily find reputable trustworthy EESPs. For this purpose the independent third party would incorporate all M&V results into a data base that would be made readily available in an easy to understand format for all prospective EESP customers. This would make it easy for customers to observe EESP compliance with their claims and, thereby encourage investment by EESPs in reputation building and trust-enhancing, as distinct from opportunistic, strategies.

Second, financial incentives would be restructured to both (a) reinforce the barrier reducing benefits provided by unbundled (i.e. separately available) SPC/M&V services, and (b) realize net cost-effective short-term energy savings. In particular, incentives would be targeted on intermediated exchange involving those customers, such as medium size firms, who are less sophisticated in making energy efficiency investments and who have the most to gain for quality-assuring intermediated energy efficiency services. Thus, incentives would be preferentially available, with comparatively small per customer limits of about $100,000 (versus the current site cap of $400,000 and parent cap of $1.5 million), to qualified projects of first-time EESP customers. This redesign of incentives might avoid the current inequitable concentration of incentives for a very small number of large sophisticated customers, substantially reduce free ridership, reduce societally non-cost-effective investments, and most importantly, help expand the size and competitiveness of the intermediated EESP market.

In short, by substantially reducing both free ridership and transaction costs these refinements to NSPC SPC/M&V would increase *net* short-term *societally cost-effective* energy savings. At the same time they would provide a mechanism for the kind of reputation-building/quality-of-service based competition that is needed for the sustainable viability and growth of the EESP industry. That is, when viewed holistically from the perspective of the enhanced program theory, these program design refinements would synergistically improve realization of both short and long-term program goals.

Fostering Theory-Based Learning

This paper has sought to highlight, through example, the importance of using a theory-based approach to evaluating and improving public policy energy programs. The paper has also shown how program theories, like programs themselves, should be dynamic rather than static. In addition, there are three key lessons learned from our experience with the NSPC evaluation as they result to the application and use of program theory for evaluation of market transformation programs.

Lesson 1: Theories Should Be Developed Before, Not After, Programs Are Fielded

Although, as emphasized in the second lesson below, evaluators must go beyond program planners to construct program theories, they should not have to create theories for program designers from scratch on an ex post basis. Ideally, both evaluators and program designers should work together prior to program implementation, during the planning and design phases, to construct the initial program theory. Without commitment to an initial theory and set of specific intermediate and final outcomes, program designers and policy makers may try to dodge theory-based results by equivocating on objectives after the fact. In addition, without a pre-implementation theory, designers and policy makers may simply have an insufficient understanding of how their proposed interventions are logically tied to the outcomes they seek.[8]

Lesson 2: Utilize Experience, Logic and Social Science Theory to Develop Program Theory; Do Not Depend Solely On Program Stakeholders

Despite the admonition above, that program designers develop their own initial program theory, the evaluators working with program designers need to look beyond the program's immediate stakeholders in critiquing and enhancing stakeholder-based theories. In particular, it is critical to use a multi-disciplinary approach that includes social science and economic theory to work through the specific mechanisms by which a program is hypothesized to affect changes in a particular market or set of market actors. Beyond academic theory, however, the use of logic and experience-based tacit knowledge are also critical. For example, it was fairly predictable, based on California utilities' past experience with customized rebate programs, that because customer sophistication is so strongly correlated with customer size, and because the allowable customer incentive for the NSPC was so large, that the program would attract sophisticated, self-sponsoring customers who in many cases would have implemented a significant portion of the measures anyway. Unfortunately, important "tacit knowledge" and previous evaluation experience available to program designers was not adequately utilized.

[8] Of course, this can be difficult to implement in a collaborative regulatory environment which requires the participation of many stakeholders who often do not agree among themselves. Nonetheless, it is of critical importance to program success and accountability.

Lesson 3: Theory-Based Evaluation Requires A Supportive Institutional Environment

The biggest challenge to the use of theory-based evaluation of the NSPC turned out to be much less evaluation-related, and much more a function of the institutional environment surrounding energy efficiency programs in California from 1997 to the present.

As noted previously, the first problem was the uncertainty in the governance, as well as program administration, that accompanied the State's effort to restructure energy efficiency oversight and implementation in the wake of the broader restructuring of the State's electricity market invoked by AB 1890.

With respect to the NSPC programs specifically, no institutional party ever clearly articulated the goals and objectives of the program nor was identified as the entity where the "buck stopped."[9] That is, there was never any resolution to the program objectives debate. This caused a critical problem in the evaluation process, namely, that some stakeholders (who were strong proponents of keeping the program essentially intact) used the lack of consensus and accountability on program objectives as a basis for ignoring the previously noted troublesome findings and their implications. As a result, action on these findings was often deferred even though no party ever marshaled any substantive or empirical objections to their validity.

In addition, like any new, well-funded, public policy program, decision-making around the NSPC program may have been affected by the larger political objectives of stakeholders. Consequently, not all stakeholders in the process appeared to carry equal weight. These differences may have been a function of the stakeholder's relative importance to each other in the larger political environment (in particular, as related to decisions on future energy efficiency program administration and funding). Though understandable, these political alignments may have significantly constrained innovation in the case of the NSPC by favoring the status quo.

Second**,** the evaluation of the 1998 NSPC lacked regulatory teeth. As such the results were often treated as merely "informational" even when findings led to fundamental questioning of program effectiveness. That is, there were essentially no consequences to ignoring or minimizing the importance of the results.

In short, the market transformation-oriented evaluation studies carried out by the CBEE did not enjoy the same kind of consensus with respect to purpose, approach, and consequence as did the previous era's studies. This was in sharp contrast to the success California had achieved previously in creating a highly structured, protocol-based, impact evaluation process for programs implemented between 1992 and 1997.[10]

With the advent of long-term market transformation goals for energy efficiency programs we now need an even more proactive and clearly articulated paradigm for evaluation in the State, namely, one that embraces the theory-based approach to adaptive learning. This approach requires three basic mutually reinforcing components: initial ex ante

[9] Some would argue that some players did seek to lead but were restricted from doing so within the regulatory process.

[10] The ex post impact evaluations of this previous period were tied directly to tens of millions of dollars in utility shareholder incentives. This resulted both in very well funded impact evaluation studies and a clear consequential link between evaluation results and program effectiveness.

commitment to theory-based program design, well designed and executed theory-based evaluation, and program modification driven by theory improvement that is based on and motivated by the evaluation findings. Because of the regulatory nature of energy efficiency oversight in California, it is unlikely that the theory-based approach will fulfill its potential without greater regulatory support and, perhaps, some type of formal institutionalization.

One change to the current California regulatory model that is particularly important to the success of the theory based approach is a repositioning of evaluation. In the previous era, the evaluation groups were often viewed as the "police" on the programs, not the handmaidens who would make the programs more successful. Moving beyond that legacy and changing roles is a considerable challenge – and has not even been well articulated in California.

Closely related to this repositioning of evaluation, the current regulatory model needs improvement with respect to fostering the types of innovative and adaptive programs that are necessary to achieve the State's market transformation goals. The current process of setting hundreds of regulatory-based milestones and incentives to "steer" utilities toward market transformation on an annual basis is essentially a command-and-control regulatory approach. However, to succeed with the theory based approach requires an ability to modify programs continually in response to market conditions and evaluative learning. This means moving away from the current regulatory "command and control" approach which requires specific, detailed program designs to be approved before new pilot programs can be started.

The requisite repositioning of evaluation and relinquishing of command and control are, of course, closely interrelated. Taken in combination they are tantamount to a fundamental shift in the institutionalized distrust between the parties that underlies the current regulatory model, and to date, seems to have resulted in a "second best" set of risk versus reward mechanisms for utility market transformation efforts.

Ultimately, if a theory-based approach is to succeed, it would also likely require other associated changes in the regulatory process, in particular, changes that would shift the focus of regulators and utilities away from incentives based on annual "activity" milestones and toward incentives for market effects that would be assessed and paid over multi-year periods. In addition, both parties and all stakeholders would need to increase their comfort with portfolio theory, which requires greater acceptance of program failure.

Conclusion

In sum, the NSPC case study illustrates that theory-based evaluation is a powerful and effective tool for improving market transformation programs. However, *ex post* evaluation is a poor substitute for *ex ante* theory-based program design. In addition, program designers must utilize the knowledge available to them through their experience and research, and not be constrained by stakeholder interests. Theory based *evaluation* simply cannot exist in isolation of the other components of the theory based approach pertaining to program design and innovation through adaptive learning. However, creating an institutional environment that allows learning and innovation has been a major challenge in the early years of creating the NSPC program. Successful implementation of a theory-based approach requires greater

attention on the part of government leaders, and cooperation of stakeholders, so that the broader goals of the public goods program for energy efficiency can be achieved.

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