THE TOTAL COST AND MEASURED PERFORMANCE OF UTILITY-SPONSORED, ENERGY EFFICIENCY PROGRAMS IN THE COMMERCIAL SECTOR: A STATUS REPORT

Joseph Eto, Leslie Shown, Richard Sonnenblick, Suzie Kito
Lawrence Berkeley Laboratory

ABSTRACT

Discussions about utilities' future role in delivering energy efficiency services to customers should be guided in part by evidence regarding the actual performance of existing utility demand-side management (DSM) programs. This paper describes the current status of a major research project to determine the actual performance of 54 of the largest commercial sector energy efficiency DSM programs for 1992. Taken together, utility spending on these programs represents nearly 40% of aggregate industry spending on energy efficiency DSM programs in that year. We examine programs from a total resource cost perspective (e.g., including customer cost contributions) and rely extensively on post-program savings evaluations. This paper focuses on the difficulties of developing comprehensive performance information on DSM programs. Our conference presentation includes preliminary findings not contained in this paper.

INTRODUCTION

Utility demand-side management (DSM) activities are at a crossroads. After five years of unprecedented growth, during which aggregate DSM spending increased nearly four-fold to almost $3 billion in 1994, utilities and public utility commissions are reexamining their roles and obligations in improving customer energy efficiency. Many issues need to be considered, including the magnitude and value of uncaptured energy efficiency opportunities, the extent of utilities' obligations to serve, and the maturity of the energy services infrastructure. We feel strongly that evidence on the actual performance of utility DSM program should be an integral part of the discussion. Ideally, this evidence will help us answer the questions: What have utility-sponsored energy efficiency DSM programs cost? Have they been cost effective? What are "best practices"? This paper describes the current status of a major research project to answer these questions.

THE RESEARCH OBJECTIVE AND CHALLENGE

The goal of our project is develop consistent and comprehensive information on the cost of energy efficiency delivered through the nation's largest DSM programs. We have focused on the commercial sector because the energy efficiency opportunities available there are thought to be large and highly cost effective. As a result, commercial sector programs often represent the largest component of a utility's DSM

energy efficiency program. We focus on programs run in 1992 because post-program evaluations of the 1992 programs were the most recent ones consistently available when we began our study in late 1994.

Developing consistent and comprehensive information on the total cost and measured performance of utility DSM programs is difficult. As Joskow and Marron (1992) document, utility reporting and savings evaluation practices differ tremendously. Customer costs are frequently omitted, utility overhead allocation practices vary, and measurement and evaluation costs are generally incurred in years subsequent to the program year being studied. In addition, savings evaluation practices range from simple extractions from program tracking data bases (which may be augmented with substantial, site-specific information, such as metered hours of operation) to sophisticated econometric analyses of billing information, which may also include detailed, site-specific information.

However, we do not agree with Joskow and Marron's apparent conclusion that current variations in practices create such large uncertainties regarding the total cost of energy efficiency that reliance on DSM as an energy resource is unwarranted. We believe that careful examination of utility evaluations and annual filings, corroborated by extensive discussions with utility staff to verify interpretations, and systematic treatment of differences in reporting and evaluation methods can result in meaningful comparisons of DSM program performance. The challenge is to precisely represent differences, clearly document all adjustments, and critically assess the additional bias adjustments may introduce.

We have previously demonstrated that these challenges can be successfully met in an examination of 20 commercial sector lighting DSM programs (Eto, et. al. 1994). However, the procedure for determining the costs of DSM programs requires that substantial amounts of data must be collected from utility sources who are increasingly concerned about how the data will be used and who have increasingly limited staff resources to devote to helping researchers understand their programs. The research method for addressing the data must acknowledge and reconcile substantial differences in utility reporting and savings evaluation methods in order to develop a consistent set of information. We now briefly summarize these issues.

Data Collection in the post-Blue Book Era

Our research project relies on the willingness of utilities to share information and expertise on the cost and performance of their DSM programs. We use only secondary data sources, augmented by in-depth exchanges with utility staff. In developing information for the current project, we had to address an important new data collection issue: the California Public Utilities Commission "Blue Book" order (see, Blumstein and Bushnell 1994 for a succinct summary). Utility concerns regarding a host of issues loosely labeled competition were solidified with this order. In particular, the prospect that the monopoly franchise will disappear has led many utilities to adopt a defensive

position about sharing information on ratepayer-funded DSM programs.

We began our project by identifying the 50 largest DSM utilities, as measured by total DSM energy efficiency program spending reported to the Energy Information Agency on Form EIA-861 (see, for example, EIA 1994). From this list, which gives total spending on energy efficiency DSM programs, we made preliminary phone calls to verify that the utility had a commercial sector program (not including new construction) that spent more than $1 million in 1992. Having developed a shorter list of utilities (40) with programs that appeared to meet this criterion, we then sent a formal letter of introduction to upper-level utility staff, generally vice presidents or director/managers, signed by our Department of Energy and Electric Power Research Institute sponsors describing the project. The letter described our proposed treatment of data provided, a two-stage verification and review process, and, finally, a guarantee not to present information so that it could be ascribed to an individual utility.

The ensuing follow-up discussions resulted in only one formal refusal to participate in our project and one apparent refusal (i.e., repeated phone calls were not returned). As we began the data collection process with the remaining 38 utilities, we learned that five utilities did not have programs meeting our size threshold (greater than $1 million in 1992), which left us with a pool of 33 utilities and 54 energy efficiency DSM programs. We are currently working with these utilities to verify the program information we are developing through review of documents previously prepared by the utilities, which have been sent to us.

Research Method

The goal of our analysis is to develop cross-utility information on the total cost and measured performance of energy efficiency DSM programs.

The total cost of energy efficiency DSM programs includes customer-paid measure costs and changes in non-energy operating costs, utility-paid measure costs, and utility administrative costs. Administrative costs include directly assignable costs, overhead, measurement and verification (generally incurred in years subsequent to the program year evaluated), and shareholder incentives.

The measured performance of energy efficiency DSM programs requires annual savings estimates developed through post-program evaluations of program performance and estimates of the economic lifetime of measures. Current methods for developing annual savings estimates vary greatly in cost and sophistication. To date, there have been only a handful of efforts to reconcile differences among them from the standpoint of either reducing bias (see, for example, Nadel and Keating 1991, and Brown and Mihlmester 1994) or increasing precision (see, for example, Sonnenblick and Eto 1994). Our recent work to treat these issues systematically (Sonnenblick and Eto 1995) has led to an increased appreciation of the differences among evaluation methods and the inherent limitations of current savings adjustments, such as the use of net-to-

gross ratios (see, for example, Train 1994) and realization rates (see, for example, Sonnenblick and Eto 1994).

Currently, the economic lifetime of measures is necessarily estimated because the measures being installed are often new and have not completed their entire life cycle. As a result, these estimates represent a major, unavoidable source of uncertainty for all estimates of the cost of energy efficiency.

Finally, in order to understand the cost effectiveness of DSM programs, we develop information separately on avoided costs. These, too, are necessarily estimates and, like measure lifetimes, also represent a major source of uncertainty for cost-effectiveness calculations.

At this point in our review, it is too early to describe the specific treatments we will apply to clarify and reconcile differences among utility reporting practices and evaluation methods.

SUMMARY OF PROGRAMS

Currently, we are working with 33 utilities to develop information on 54 commercial sector DSM programs. At the time of this writing, data collection, verification, and analysis are in full swing. In view of the agreements we have reached with the utilities providing information on their programs, we do not present findings on the total cost and measured performance of these programs although we expect to summarize them at the conference presentation of this paper. In the remainder of this paper, we report aggregate information on the size of the programs and on the overall DSM activities of the sponsoring utilities, using aggregate DSM spending information compiled by the Energy Information Agency on Form 861 (EIA 1994).

The utilities we are analyzing with are the industry's leading DSM providers. Although our 33 utilities accounted for less than 40% of total electric industry revenues in 1992, their total DSM spending (i.e., energy efficiency and all other DSM program spending) represented nearly two-thirds (64%) of total industry DSM spending in 1992. Moreover, the energy efficiency DSM program spending by these utilities represented nearly 80% of total industry spending on energy efficiency.

By studying these utilities, we will be able to report information on a significant fraction of 1992 utility energy efficiency program activities; aggregate spending on the 54 programs we are studying totals almost $440 million or more than one third of total industry spending on energy efficiency programs in 1992. Spending on these programs accounts for nearly 50% of the sponsoring utilities' energy efficiency DSM program budgets or more than 30% of their total DSM program budgets.

Most of the programs we are reviewing offer rebates, but the group also includes a handful of direct installation programs and several combination rebate and/or

financing programs. The end uses targeted include lighting, HVAC, motors, shell, and miscellaneous.

INTERIM CONCLUDING REMARKS

No comprehensive source of comparative information on the total cost and measured performance of utility DSM programs currently exists. As a result, there is also no definitive (i.e., non-anecdotal) body of information on the success and transferability of strategies to improve the cost effectiveness of commercial sector rebate programs. This project represents a major effort to address this deficiency.

We plan to compare program costs, energy savings, and other aspects of program performance in order to help utilities improve the cost effectiveness of existing rebate programs. In addition to determining the total cost of measured energy savings from the programs, we expect to introduce supplementary information on program design, implementation strategy, and evaluation method to explain observed variations in program costs and cost effectiveness. We plan to use our comparative analysis to comment on the likely success of current approaches for improving program cost effectiveness. For example, we are examining the impact of increasing customer cost contributions (an increasingly important strategy for reducing program rate impacts) on program performance (participation, costs, and cost effectiveness). We are also examining the success of various strategies for minimizing free riders.

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