Auditing Performance in a "Standard Offer" Efficiency Program

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ABSTRACT

Public Service Electric & Gas Company (PSE&G) authorized the start of a Standard Offer program in 1992. Field operation for the Standard Offer began in 1994. The purpose of the Standard Offer has been to encourage performance contracting by providing payments, based on verified energy savings, for energy efficiency retrofit projects. These payments are funded by ratepayers as part of PSE&G's demand-side management (DSM) program approved by the New Jersey Board of Public Utilities (BPU). Because ratepayer funds are used, measurement and verification must account for savings net of those without the program. Measurement and verification of project savings was built in to the Standard Offer program design through Measurement and Verification Protocols (MVPs). MVPs were proposed by the Company and approved by the Staff of the BPU. To determine that MVPs were being followed and that savings and lost revenue calculations were reflective of actual savings and lost revenues, Tellus Institute was hired by the New Jersey Ratepayer Advocate to perform an audit of PSE&G's claimed electricity and gas savings and lost revenue calculations.

This paper describes the findings of our 1997 audit and the impacts that our findings have on PSE&G's electricity savings and lost revenue calculations when adjustments are made to reflect the findings. Adjustments were made for six factors. The largest adjustments made were for free-riders and for not including Lost Revenues after the allowed time planning horizon. Four smaller adjustments were made as well. Only one of the proposed adjustments was accepted by the BPU.

Introduction

Public Service Electric & Gas Company (PSE&G) authorized the start of a Standard Offer program in 1992. Field operation for the Standard Offer began in 1994. The purpose of the Standard Offer was to encourage performance contracting by providing payments, based on verified energy savings, from public or ratepayer funds for energy efficiency retrofit projects. In its electric demand side cost recovery filing with the Board of Public Utilities in 1997, the utility estimated cumulative savings to be over 1.1 billion kWh of electricity annually from program activity through 1998. The utility incurred over $230 million in costs from this program activity. These costs have either been recovered or are potentially recoverable from ratepayers. PSE&G will also incur future costs from commitments for future standard offer projects.

The Standard Offer programs occurred in two phases, the first, Standard Offer One (S/O 1), began in 1993. The second, Standard Offer Two (S/O 2), began in 1996. [1] These Standard Offer programs were respectively a part of PSE&G's overall DSM Plans One and Two (DSM1 and DSM2). Both PSE&G's payments to S/O project sponsors and its booking of net lost revenue from S/O projects are governed by Board-approved Measurement and Verification Protocols ("MVP") that are applied to determine the energy savings from these projects. PSE&G recovers two categories of demand-side management (DSM) costs from ratepayers: its own expenditures associated with electric DSM

[1] Request to proceed with Standard Offer 3 is pending at the NJ Board of Public Utilities as of April, 1999.

programs (which include along with the S/O programs the 1989 Large Scale Conservation Bid Program and "Core" DSM1 and DSM2 programs), and its net lost electricity revenues attributable to the electricity savings its Standard Offer programs produce. To date, just over 70% of the activity under the electric S/O programs has occurred in commercial, institutional, and industrial --i.e., non-residential-- facilities. There is a gas Standard Offer program as well as an electric Standard Offer program. Our work, and this paper, focus on the latter.

PSE&G recovers its approved DSM costs through a Demand Side Adjustment Factor (DSAF). The DSAF is included as a rider in rates charged to all customer classes.[2]

Methodology

Background

The purpose of our audit of the PSE&G Standard Offer program was to review the utility's claim for recovery of its program costs and its net lost revenues in the light of available data, and to propose adjustments to that claim, if any were warranted.

In the case of the Standard Offer, measurement and verification of project savings was built in to the program design. Measurement and Verification Protocols for different types of measures are proposed by the Company and approved by the Staff of the Board of Public Utilities. MVPs have two components, the methods by which savings will be calculated, and their application through a combination of facility audits and on-going metering.

Contractors are paid by the utility on the basis of invoices documenting energy savings established by applying the MVPs. The Company's lost revenues are also booked directly from the savings for which payments are made to contractors. Thus, the audit focussed on two key questions relating to the application of the MVPs: were the adopted MVPs being applied correctly? And had the Company proposed timely modifications of MVPs as new information became available to it?

The lost revenue aspect of utility cost recovery for the Standard Offer had to go beyond questions about M & V protocols applications in one respect. Did the lost revenue calculation appropriately reflect net changes to utility revenues due to the Standard Offer's impacts on its retail energy sales? The audit also addressed this question.

Scope

We began with a review of PSE&G's DSM records, motions, exhibits, pre-filed evidence, and discovery responses. We also reviewed three prior evaluation studies that had been conducted on the program. These included an initial market and impact evaluation, an initial process evaluation, and a study of the field implementation of the program's MVP. The information gained from this review of these materials, as well as interviews with Standard Offer program staff, was analyzed to determine to what extent PSE&G's calculation of DSM costs and DSAF was accurate, complete, and consistent with the applicable Board of Public Utilities orders.

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[2] At the point of restructuring, which is to occur in NJ by August 1, 1999, the DSAF will become part of a new "Societal Benefits Charge" (SBC).

In addition to the project materials reviewed, a sample of projects was drawn from PSE&G's electronic database of Standard Offer projects. Random numbers were generated to identify these projects. For these projects, the corresponding hard-copy project records were reviewed to determine:

(a) whether the project records were accurately input to the data base.

(b) whether there were errors within the project applications which then carry over into the electronic records.

Findings

The adopted MVPs were by and large being applied correctly. However, we found six areas in which, upon further investigation as described below, it appeared that adjustments were warranted to PSE&G's computation of the DSAF. We proposed to adjust the DSAF for: measure degradation, overstatements made in the kW savings claims associated with lighting projects, the inclusion of gas revenues received as a result of fuel-switching projects, the omission of costs from 1998 projects, free-riders, and the omission of all Lost Revenues after 4/30/98. Each adjustment was first made individually, and then all six were combined to determine the total effect on the DSAF.

In addition, a calculation of the DSAF was performed to determine the separate impacts of including all six adjustments for the residential sector and for the non-residential sector.

Explanations of all adjustments follow.

Standard Offer Measure Degradation

Based on the persistence literature, we believed that some of the energy-efficient measures installed under the Standard Offer would fail to persist over their full estimated lifetimes. Some may be removed well before their technical lifetimes are over. *Historic* measure degradation was not the issue here. Rather, our concern was with the portion of PSE&G's estimate of Lost Revenues and Incentive payments that was based on a *forecast* of kW savings that assumed all installed measures to remain in place throughout their technical lifetimes. Because some measures will not remain in place as long as PSE&G assumed, an overstatement of forecasted kW savings-- and thus of Lost Revenues and Incentive payments-- on PSE&G's part results.

Method of Adjustment. Based on a review of the literature for measure persistence (Galawish et al. 1995; Horowitz & Spada 1992; Shaw & Skywark 1995; Skumatz & Hickman 1995; Velcenbach & Parker 1993), we made the most conservative adjustment for measure degradation. We reduced projected kW savings from the Standard Offer at the rate of one-percent a year. This implies that measures persisted to accrue savings at a rate of 99% a year of PSE&G's estimates. Giving an equal weight of degradation each month implies that .0833% of energy-efficient measures no longer incur savings each month. PSE&G used actual measured kW savings in their Lost Revenue calculations up through April 1997. Their calculations were based on forecasts of kW savings from May 1997 through December 1998. Therefore, in our adjustment, the amount of Lost Revenues and Incentive payments in each month of this forecasted time period was multiplied by 99.9167% to reflect the minimum expected degradation rate.

Standard Offer Lighting Project Overstatements

There was a slight overstatement in kW savings that was caused by a methodological error in the way kW reduction was calculated for Small I&C projects as entered in to PSE&G's S/O tracking database.

The methodological error occurred when corrections in the number of pre-implementation, base line measures were not accounted for due to contractual obligations with the implementers. If it was found during post-implementation audits that pre-implementation measures were mis-counted, a note was made of the mistake, but savings were not adjusted to reflect it. Savings were instead still calculated based on the original number of measures counted before retro-fit measures were installed.

Method of Adjustment. A number of hard-copy records for Small and Regular I&C Standard Offer projects were reviewed on site at PSE&G in July, 1997. To adjust for the methodological discrepancy, the kW reductions for the Small I&C projects reviewed were recalculated using the baseline kW demand as determined from the post-implementation audit. The difference in kW reduction (PSE&G's figure minus Tellus' figure) was calculated for each project.

For the Small I&C projects, the differences from the methodological discrepancy were summed and the total was divided by the sum of the total project kW reductions as reported by PSE&G to yield a percentage overstatement of kW reductions for reviewed Small I&C projects. The percentage overstatement for Small I&C projects was calculated to be about 1.47%. This percentage of the total kW reductions for all Small I&C projects was subtracted from the corresponding Lost Revenues and Incentive payments in the PSE&G worksheets.

Standard Offer Gas Revenues

A number of projects involved having the customer switch from equipment that uses electricity to equipment that uses natural gas. For these projects, the natural gas was generally supplied by PSE&G, which is a combination electric and gas utility. While the decrease in electricity revenues was included by PSE&G in its DSAF calculations, the corresponding increase in gas revenues was not.

Method of Adjustment. According to PSE&G estimates provided to the audit team, the increase in gas revenues associated with these fuel-switching projects was upwards of $1.75 million. We adjusted the Lost Revenue by subtracting PSE&G's estimate of increased gas revenues associated with the fuel-switching projects from PSE&G's reported Lost Revenue.

1998 Projects

Due to the fact that PSE&G did not yet have an approved 1998 DSM Plan, we adjusted the DSAF to take out Standard Offer costs to PSE&G and Lost Revenues associated with new projects that begin after January 1, 1998. We found this to be approximately 8% of kW savings. Discretionary Core program costs, totaling $15.5 million, not associated with mandated public benefit programs were also removed for 1998.

Free-Riders

The phenomenon of free-riders occurs when customers who take advantage of DSM programs would have bought and installed energy-efficient measures even without help from their utility. It is believed to be inappropriate for the utility to claim lost revenues which result from the kW savings of these projects. According to a previous evaluation of PSE&G's Standard Offer program (Goldman, Kito & Moezzi 1995), free-riders exist in PSE&G's DSM programs. This study reports that for Regular Standard Offer projects, about 43% of ESCO sponsored projects (including PSE&G's subsidiary PSCRC) are free-riders and about 30% of customer sponsored projects are free-riders. While this study was preliminary in nature, PSE&G had no other evidence or studies on free-ridership at the time of this audit.

Method of Adjustment. According to information supplied by PSE&G, ESCO sponsored projects are about two-thirds of all Regular Standard Offer projects and that customer sponsored projects account for one-third of all Regular Standard Offer projects. A weighted average of percent free-riders was determined to be 39.78%. This percentage was applied to all Lost Revenues after January 1, 1996. The portion of Lost Revenues attributable to Regular Standard Offer projects was determined to be 86.58%. This figure was calculated by dividing kW reductions from Regular Standard Offer projects by the total kW reductions for all Standard Offer projects.

Lost Revenues After 4/30/98

According to the rules set forth by the Board, it appeared to us that PSE&G was not allowed to forecast Lost Revenues beyond 12 months. In their calculations, they forecasted Lost Revenues for 20 months.

Method of Adjustment. In our adjustment, all Lost Revenues for the months of May 1998 through December 1998 were omitted in our revised DSAF calculations.

Order of Adjustments

Adjustments were first made for Measure Degradation, Lighting Project Overstatements, and the reductions in 1998 Program Costs. After these were taken out of the Lost Revenues to which they applied, the Gas Revenues adjustment was made to Lost Revenues. The adjustment for Free-Riders came after the adjustment for Gas Revenues. The Gas Revenues adjustment was made after the first three adjustments because including gas revenues does not have an effect on how much measures persist, overstatements and any costs incurred in 1998. A portion of the fuel-switch project customers may have been free-riders, so the adjustment for Free-Riders was made after the adjustment for the increase in gas revenues. After all other adjustments were made, the Lost Revenues from May 1998 through December 1998 were omitted.

Results

The Company's proposed "Total Costs to be Recovered" as shown in Table 1 were just over $300 million. This covers the period of May 1997 through December 1998. We conclude that the total costs eligible for recovery for this period of time should not exceed $205.779 million. This is a

difference of $96.740 million. After deducting the amounts collected through the DSAF at its current level, the incremental revenue impact of PSE&G's request is $253.074 million. The incremental revenue impact associated with our maximum recommended increase is $156.334 million. This again is a difference of $96.740 million. The annual revenue impact of PSE&G's request is $151.844 million, while the annual revenue impact associated with our minimum recommended increase is $93.800 million, a difference of $58.040 million.

The typical residential bill impact of a DSAF change would be an increase of 3.4 percent with PSE&G's request. Taking into account our adjustments lowers this to an increase of 2.2 percent.[3]

In order of increasing contribution to our overall adjustment, the six individual adjustments are:

1. Adjustment for lack of full persistence of measures in the future.
2. Adjustment for a flawed procedure in recording Small I&C audit observations.
3. Adjustment for gas revenue impact on lost revenues.
4. Removal of costs for projected new DSM activity under DSM3.
5. Removal of forecast lost revenues beyond one year.
6. Adjustment for free rider effect on lost revenues.

When the adjustments are combined, the overall adjustment is less than the sum of the individual adjustments, because the adjustments overlap. Consider, for example, the adjustment for removing the costs of new 1998 S/O 2 program activity. Once those costs are removed, the effects of other adjustments that would have been made to them are eliminated.

Table 1. Costs to be Recovered in the DSAF

	Total Costs to be Recovered	Individual Adjustments
Total Before Adjustments	$302.519 million	
Measure Degradation		$ 0.048 million
Savings Overstatements		$ 0.484 million
Gas Revenues		$ 1.728 million
1998 Projects		$24.090 million
Free-riders		$50.384 million
LR after 4/30/98		$37.326 million
Total After Adjustments	$205.779 million	

Conclusions

Electric utilities in New Jersey are allowed to recover reasonable costs from their demand-side management programs. According to our estimates, PSE&G overstated its DSM costs to be collected from ratepayers by almost one-third. This conclusion results from the combined effect of several

[3] An additional analysis was performed to look at the affects of separating the costs associated with residential sector DSM from the costs associated with non-residential sector DSM. Charging residential customers only for programs that benefit the residential sector, and not for non-residential sector programs, would further lower the bill impact to an increase of only 1.6 percent.

adjustments we made in PSE&G's calculations of its costs. The largest contribution to this overstatement was PSE&G's lack of accounting for free-riders in their calculation of the DSAF. Correcting for all of our adjustments reduces the total bill impact on residential customers from PSE&G's estimate of a 3.4 percent increase to an increase of only 2.2 percent.

The New Jersey Board of Public Utilities accepted only the gas revenue adjustment during the litigation brought by the New Jersey Ratepayer Advocate. The Ratepayer Advocate has appealed this decision to the state courts, but no further decision has yet been reached.

It should further be noted that with the onset of restructuring, rates will be unbundled in New Jersey effective August 1, 1999. PSE&G has proposed that from that date it will no longer collect generation-related Lost Revenues that result from the Standard Offer.

Observations

PSE&G, like many utilities across the country, is compensated for its DSM programs. In this case, the compensation is dollar for dollar. Because PSE&G gets back every dollar it spends from ratepayers, careful scrutiny of its estimated DSM program costs is important. If costs (which include Lost Revenues and Incentive Payments as well as direct expenditures on Core programs) are not carefully examined, then the potential exists for PSE&G to overestimate costs and to thus over-collect from ratepayers unchecked. As we described in this paper, this would be the case if adjustments are not made to PSE&G's calculations.

In this context, PSE&G's estimate of Lost Revenues is of special relevance. Lost Revenues accounted for almost half (approximately 45%) of all the money PSE&G sought to collect through its DSAF. Our analysis showed that the inclusion of free-riders would make a significant difference in the amount of Lost Revenues PSE&G recovered. At the time of its calculations, PSE&G was relying on a five-year-old stipulation in which all parties agreed to assume no free-ridership existed. PSE&G did not update the estimate of free-ridership when new information pertaining to the subject was available that suggested that some level of free-ridership did in fact exist in PSE&G's Standard Offer program.

It was the risk of phantom Lost Revenues that particularly alerted the New Jersey Ratepayer Advocate, who believes that doubt in DSM cost recovery should be resolved in favor of ratepayers, not the utility. It raises the question of the standard of verification that DSM cost recovery estimates should be held to when this type of Lost Revenue calculation is to be performed and included in utility compensation. This is why the Ratepayer Advocate felt strongly about appealing the Board of Public Utilities decision to only adjust for gained gas revenues and not for any of the other adjustments we recommended.

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