REGULATORY OVERSIGHT OF SHARED-SAVINGS INCENTIVES FOR UTILITIES: LESSONS FROM THE CALIFORNIA COLLABORATIVE

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ABSTRACT

Traditional regulation of utilities is biased against activities that have the effect of reducing sales because reduced sales reduce utility earnings. The outcome of the California collaborative was agreements that will allow utilities to increase their earnings through customer adoption of utility-sponsored energy efficiency programs. In other words, utilities will be provided with incentives to improve customer energy efficiency. Two utilities have proposed that their incentives be based on a share of the savings that result from their programs. In this paper, we review how the incentive will be calculated and the regulatory issues that arose in their design.

Shared-savings incentives are based on the energy savings that result from an energy efficiency program, the value these savings have in the form of avoided utility generation, transmission, and distribution, and the cost of achieving them through utility and customer expenditures. We describe the policy issues underlying the definitions adopted for each of these components. We also discuss the addition of performance penalties to further stimulate utility-sponsored customer energy efficiency activities. As these programs mature, we expect additional refinements to reflect increased utility and regulatory experience with shared-savings incentives.

BACKGROUND

Increasing customer energy efficiency often represents the most cost-effective means for supplying consumer's demands for energy services and utilities are uniquely positioned -- some would argue, obligated -- to stimulate the adoption of energy efficiency by customers. Yet there is an inherent conflict between society's desire for a least-cost mix of energy services, ratepayer's desire for lower energy bills, and shareholder's desire for reliable profits. The National Association of Regulatory Utility Commissioners now formally recognizes this conflict and has resolved to "ensure that the successful implementation of a utility's least-cost plan is its most profitable course of action" (NARUC 1989).

One promising approach for stimulating utility participation in the acquisition of cost-effective energy efficiency opportunities is called shared savings. In a shared-savings arrangement, the difference between the cost of an energy efficiency activity and its value measured in avoided supply-side resources is "shared" by the utility shareholders and ratepayers. While sound in principle, the implementation of shared-savings incentives raises a number of issues for regulators to ensure an equitable allocation of risks and rewards between ratepayers, shareholders, and society. This paper draws from the experience of the 1989 California collaborative (CPUC 1990a and 1990b), to illustrate some of these considerations. See Schultz and Eto (1990) for a longer discussion of these issues.

THE SHARED-SAVINGS FORMULA

While all incentive mechanisms for utility investments in stimulating customer adoption of energy efficiency are predicated on the assumption that the difference between lower cost energy efficiency opportunities and higher cost supply-side resources can be shared, shared-savings incentives specify explicitly the

magnitude of these savings and their value. Other types of bonuses (e.g., higher rates-of-return and bounty-type incentives) can encourage utility efforts to promote energy efficiency, but these incentives are not necessarily related to the net benefits of the programs as alternatives to supply-side options. Thus, shared-savings incentives are touted for their ability in principle to reward performance in implementing energy efficiency programs as a resource option, not merely through-put of ratepayer dollars spent on programs (Moskovitz 1989).

In general terms, the central characteristic of a shared-savings mechanism is the definition of "net resource value". Viewed as a resource, the value of an energy efficiency investment is the product of several components, as represented by the following simple formula:

$$\mathbf{NRV = (LR \cdot AC) - C}$$

where,

NRV = Net Resource Value ($)
LR = Load Reduction (kW or kWh)
AC = Avoided Cost ($/kW of $/kWh)
C = Cost of the Energy Efficiency Investment ($)

The preceding formula produces a positive value when the net benefit of an energy efficiency investment is cost-effective relative to the avoided supply-side resources. This net benefit is then "shared" between ratepayers and shareholders.

WHEN ARE SHARED-SAVINGS INCENTIVES APPROPRIATE?

The preceding formula also indicates when shared-savings incentives are not appropriate for utility demand-side programs. For example, when maximizing net resource benefits is not a primary objective of a program (which is often the case for low-income assistance programs), there may be no benefits to share. In addition, there

are many demand-side activities whose net resource value may be difficult to measure (such as information, rate design, and measurement and evaluation programs). For these reasons, we believe the use of shared-savings incentives should be limited to utility programs with measurable net resource benefits. Practically speaking, this requirement limits shared-savings incentives to utility programs to improve customer energy efficiency through adoption of specific technologies or practices (such as rebates for lighting, HVAC, and other equipment).

DESIGNING SHARED-SAVINGS INCENTIVES

In the California collaborative, discussions centered on how energy savings should be measured, how benefits and their recovery should be determined, and on how program costs should be defined. Resolution of these issues led to the development of additional incentives to pursue the acquisition of energy efficiency resources aggressively and at the same time minimize program costs.

Energy Savings

Measuring energy savings is an imperfect science. In principle, it should be performed after a demand-side program has been put in place and observed for some time. A particularly difficult measurement issue lies in properly accounting for effects that are not within the control of the utility but which affect energy savings (such as weather or occupant behavior). The collaborative decided to rely on pre-specified engineering estimates of savings for individual measures, but to base aggregate savings on the actual numbers of installations made by the utility. This decision protects the utilities from uncertainties in the performance of individual measures while providing an incentive to increase program participation. The utilities also agreed to initiate comprehensive measurement programs to improve future estimates of the performance of energy efficiency measures. However, these findings will only serve to modify savings estimates for future programs.

Program Costs

In a shared-savings arrangement, demand-side program costs can be based on utility costs or total costs (i.e., utility plus participant costs). Utility costs are easier to measure and using them provides a direct incentive to the utility to minimize its costs. However, the use of total costs is theoretically superior from the standpoint of cost-effectiveness to society, although it may dilute the incentive for utilities to minimize its own costs. The collaborative decided that either could be used subject to certain restrictions. If only utility costs are used, programs must first pass the total resource cost test (which relies on the total costs of the program; see CPUC/CEC 1987). If total costs are used, utility costs are first subject to caps that limit the maximum per unit costs for selected program elements (such as the cost of the energy conservation equipment).

Avoided Cost Benefits

Avoided costs, like conservation program performance, are a subject to a large number of influences, only some which are under the control of the utility. Furthermore, recovering the benefits of demand-side programs over a time period that closely parallels the realization of savings, means the utility will have to wait a considerable period of time before recovering its full share of the savings. The collaborative resolved this issue in a manner analogous to contractual agreements that pay qualifying facilities for non-utility generated power. In effect, the utility is allowed to recover the entire avoided cost benefits of a single year's program over an accelerated time period (3 years). This procedure, in turn, calls for a forecast of future avoided costs that is determined in a separate, on-going regulatory proceeding.

Performance Penalties

Concern over the prospect that utilities might agree to the terms of a shared-savings arrangement, but then pursue some demand-side programs only half-heartedly (justified in part by observed underspending by utilities of their authorized conservation budgets

during the last several years; see Caldwell and Cavanagh 1989) led to the introduction of minimum performance standards for each demand-side program. The standards were typically set at an agreed fraction of the overall program goals for number of measures to be installed, homes to be weatherized, or audits to be completed, depending on the program. Utilities that fail to meet the minimum performance standards would be subject to penalties on their earnings.

CONCLUSION

The success of financial incentives to spur utility participation in demand-side programs rests ultimately on the unambiguous specification of the new "rules of the game." These rules must fairly allocate risks and rewards between ratepayers, shareholders, and society. The collaborative process in California confirmed the value of establishing these rules in a relatively informal (i.e., non-adjudicatory) setting where the relative merits of various approaches could be freely discussed and refined to the satisfaction of all parties.

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REFERENCES

Caldwell, C., and Cavanagh, R. 1989. "The Decline of Conservation at California Utilities: Causes, Costs and Remedies," Natural Resources Defense Council, San Francisco, CA. July.

California Public Utilities Commission and California Energy Commission (CPUC/CEC) 1987. "Standard Practice Manual for Economic Analysis of Demand-Side Management Programs." San Francisco, CA.

Moskovitz, D. 1989. "Profits and Progress Through Least-Cost Planning." National Association of Regulatory Utility Commissioners, Washington, DC. November.

National Association of Regulatory Utility Commissioners (NARUC). 1989. "Resolution in Support of Incentives for Electric Utility Least-Cost Planning." Washington, DC.

Report of the Statewide Collaborative Process (CPUC) 1990a. "An Energy Efficiency Blueprint for California." California Public Utilities Commission, San Francisco, CA. January.

Report of the Statewide Collaborative Process (CPUC) 1990b. "An Energy Efficiency Blueprint for California, Appendix A, Measurement Protocols for DSM Program Eligible for Shareholder Incentives." California Public Utilities Commission, San Francisco, CA. January.

Schultz, D. and Eto, J. 1990. "Designing Shared-Savings Incentive Programs for Energy Efficiency: Balancing Carrots and Sticks." Lawrence Berkeley Laboratory, LBL-29503, Berkeley, CA. December.