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Carrots and Sticks: Shared-Savings Incentive Programs for Energy Efficiency

Regulators who want to encourage aggressive utility demand-side programs can provide opportunities for increased utility earnings for such activities. Designing these mechanisms calls for new standards of evaluation to ensure a fair sharing of risks and rewards.

Don Schultz and Joseph Eto

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In 1989, the National Association of Regulatory Utility Commissioners (NARUC) formally acknowledged that traditional regulation discourages utility participation in least-cost planning (LCP) activities.¹ A subsequent NARUC "white paper" succinctly identifies the disincentives:²

1. Each kWh a utility sells, no matter how much it costs to produce or how little it sells for, adds to earnings;
2. Each kWh saved or replaced with an energy efficiency measure, no matter how little it costs, reduces utility profits;
3. The only way regulation di-

rectly encourages utilities to pursue cost-effective conservation is the risk that dissatisfied regulators may disallow costs; and

4. Purchases of power from cogeneration, renewable resources or other nonutility sources add nothing to utility profits, no matter how cost-effective these resources are.

Coupled with growing consensus that increased LCP activities make good economic and environmental sense, the NARUC resolution urges member commissions to "ensure that the successful implementation of a

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utility's least-cost plan is its most profitable course of action." The NARUC report evaluates some of the theoretical properties of various incentive approaches, such as rate-of-return adjustments, bounties, and shared savings.³

The focus of this article is on the practical issues that emerge when regulators review utility incentive proposals for energy efficiency programs. More particularly, the focus is on one type of incentive mechanism — shared savings — in which the net benefits from the energy efficiency investment are shared between ratepayers and utility shareholders. This discussion centers on the regulatory concerns and resolutions that arose in reviewing the shared-savings mechanisms proposed by two California investor-owned utilities, Pacific Gas and Electric (PG&E) and San Diego Gas and Electric (SDG&E). The problems raised by their proposals included: establishing the basis for determining net benefits, establishing minimum levels of utility performance, rewarding cost-minimizing and resource value-maximizing behavior, and equitably allocating the risks associated with uncertainty in the performance and value of the programs.

We suggest that in some cases practical implementation considerations should override the theoretically superior choice. We also argue that important differences between utility demand-side programs make it unreasonable to

apply the same incentive mechanism uniformly to all types of DSM programs.

Although different circumstances among states and utilities are likely to influence the details of shareholder incentive mechanisms, we believe the evaluation principles identified may be useful to regulators who must review efficiency incentive proposals.



I. The California Collaborative Process

In 1989, California initiated a statewide collaborative process involving each of its four major investor-owned utilities and 11 state agencies and intervenor groups. The process was intended to address falling utility budgets for energy efficiency programs,⁴ which were declining despite the existence of a unique regulatory mechanism, the Electricity Revenue Adjustment Mechanism (ERAM), which effectively decouples utility profits from sales.⁵

Although the ERAM decoupling removes disincentives to

utilities to promote DSM programs that reduce utility sales, ERAM does not provide positive incentives for utilities to make investments in customer energy efficiency programs that are comparable to investments in electricity generation. In other words, ERAM (or similar mechanisms which decouple the short term effects of reduced sales from utility earnings) makes the utility indifferent in the short term to effects of energy efficiency programs, but does not address the longer term issue of utility earnings opportunities which exist only for supply-side investments.

A major outcome of the collaboration was agreement by California's utilities and other participants to conduct pilot programs that would provide incentives to utility shareholders for investments in energy efficiency. Negotiations to work out the details of the utility plans followed the collaborative process, and Commission approval came in August 1990.⁶

Both PG&E and SDG&E proposed incentive programs exhibiting features of what have come to be called "shared savings."⁷ As with the shared-savings mechanisms adopted for utilities in New York, Rhode Island, and New Hampshire, the central feature of the PG&E and SDG&E shared-savings mechanisms is the sharing of the net benefits from energy efficiency investments between ratepayers and shareholders. The regulatory and implementation issues that arise with this type of mechanism are dis-

cussed in the following sections.

II. Regulatory Objectives for Utility Incentives

Shared-savings mechanisms such as those adopted for the two California utilities provide important links between the notion of energy services and least cost planning. Shared-savings incentive mechanisms can be developed which will facilitate the pursuit of three important objectives related to implementation of utility DSM programs:

1. Resource Value Maximization — to pursue the total amount of cost-effective energy efficiency improvements to the stock of energy-using durables (buildings, appliances, etc.) as an alternative to supply-side resource options.

2. Program Cost Minimization — to implement DSM programs in the most cost-efficient manner possible.

3. Minimum Performance Penalties — to increase the certainty that a cost-effective and authorized program will be implemented by establishing disincentives, if minimum performance levels are not realized.

III. Shared-Savings Incentives for Utility Efficiency Investments

Many types of incentive mechanisms for utility investments in energy efficiency are predicated on the assumption that the difference between lower cost demand-side resources and higher cost supply-side resources can be shared. Some types of bonuses (e.g., higher rates-of-return and bounty-type incentives) can en-

courage utility efforts to promote energy efficiency, but these incentives are not necessarily related to the net benefits of the programs as an alternative to supply-side options.

By contrast, shared-savings incentives specify explicitly the magnitude of the savings and their value. Shared-savings incentives are touted for their potential ability to reward performance in implementing energy efficiency programs as cost-effective re-

Shared-savings incentives reward performance in implementing energy efficiency programs as cost-effective resource options — not merely to reward utility effort.

source options — not merely to reward utility effort as measured by through-put of ratepayer dollars spent on DSM programs.⁸

A. Defining Net Resource Value

The central characteristic of a shared-savings mechanism is defining "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:

$$V = (L \times AC) - C$$

where:

V = Net resource value (\$)

L = Load reductions (kW or kWh)

AC = Avoided costs of supply (\$/kW or \$/kWh)

C = Cost of energy efficiency investment (\$).

The net benefit of the investment relative to a supply-side resource should produce a positive value. This net benefit is then shared between ratepayers and shareholders. There are, however, other reasons for utility involvement in demand-side activities and there are also demand-side activities whose net resource value may be difficult to measure. For these two reasons, we do not believe the use of shared savings is an appropriate incentive for all utility demand-side activities.

B. Applicability of Shared-Savings Incentives

Several examples illustrate the difficulties of applying shared-savings to all types of DSM programs. In the case of low-income assistance programs, the assistance — often in the form of payment of all costs of installing energy efficiency materials — is often justified on equity grounds because these low-income customers are unlikely to be able to participate in "mainstream" programs that offer rebates or other forms of partial payment. In California, such programs have been authorized and even encouraged without demonstration of cost-effectiveness from a net resource perspective. Since in

many cases these programs are without net resource savings to share, they are not appropriate for shared-savings incentives.

Other DSM programs do not fit well with shared-savings mechanisms, for different reasons. Energy service programs (i.e. audits of customer facilities), for example, can provide useful information to customers about how to reduce their bills (and utility loads) by behavioral changes such as turning off lights or thermostat setpoints. Serious measurement problems are often associated with such programs, however, because these behavioral changes may not be enduring or may be retained only with continuing utility involvement and expense.

Other examples of inappropriate candidates for shared-savings include general administration costs and certain measurement and evaluation activities which involve more than one DSM program. These costs are typically part of a utility DSM budget, but are extremely difficult to allocate to specific savings or to establish performance requirements for them.

For these reasons, we believe shared-savings programs are best suited for programs that: (1) involve the inducement of energy efficiency hardware (as opposed to behavioral changes); and (2) are intended to serve as least-cost resource options.

Shared-savings programs typically offer mature technologies even if they are not yet widely available. Such programs may encompass residential appliance effi-

ciency, residential weatherization retrofit, and commercial/industrial energy management measures.

To a lesser extent, we believe that shared-savings incentives may also be appropriate for programs that have resource value but emphasize new technologies or building practices that make advance estimation of load impacts and customer acceptance difficult.

We do not recommend shared-savings treatment for programs for which it is impossible or extremely difficult to estimate load impacts.

Programs which are likely to reduce loads but which are authorized primarily for purposes of helping customers control their bills (such as energy management services and direct assistance programs) are *not* recommended for shared-savings. In California, these types of programs are being given "cost-plus" treatment, meaning that the revenue permitted to be earned by shareholders is pegged simply at 5% of costs incurred by the utility to implement the programs.

To minimize the obvious dan-

gers of "gold-plating," the California treatment of cost-plus programs includes minimum performance standards (e.g. 75% of expected program goals) that programs must meet to be eligible. In each case, goals and performance are not tied to energy savings, but to some other indicator which can be readily verified — number of audits, number of low-income families assisted at a specified level, etc. With this kind of performance requirement, the "cost-plus" treatment is better described as a "Performance-Based Earnings Adder" mechanism.

We do not recommend shared-savings treatment for programs for which it is impossible or extremely difficult to estimate load impacts, either before or after implementation. Examples include information programs, time-of-use programs, measurement and evaluation projects, and general administration. While these programs and costs are important components of an overall package of DSM programs, it is extremely difficult to establish meaningful indicators of performance or net resource value.

Our recommendations are summarized in Table 1, below.

C. Designing Effective Shared-Savings Incentives

Achieving the objectives for utility incentives outlined above requires a delicate balancing of the carrots and sticks available to regulators. On the one hand, the incentives — both their levels and, just as important, the utility's perception of certainty of their recov-

ery — must be sufficient to stimulate utility participation in the aforementioned demand-side markets. On the other hand, regulatory sticks for minimum performance are also appropriate to ensure that opportunities are being pursued aggressively.

In California, a major issue lay in clearly identifying which party — the utility or its ratepayers — would bear the risks for the underlying factors affecting the net resource value of a utility's demand-side activities. The assignment of risks and rewards relates in turn to which aspects of a utility's performance in delivering demand-side resources are within the control of the utility and which ones are not.

The ensuing discussion of how the shared-savings components (program costs, load impacts, and avoided costs) were defined for PG&E and SDG&E illustrates how this balance was struck in 1990. We anticipate that this "snapshot" will change as both the utilities and their regulators gain experience in delivering energy services.

1. Cost of the Investment. In California, as elsewhere, two different definitions of costs have been considered: (1) costs based on only the amount that it costs the utility, and (2) costs which include any participant costs beyond the financial assistance provided the customer by the utility. In the vernacular of the California Standard Practice Manual,⁹ this difference is comparable to the difference between the Utility Revenue Requirements test (utility cost-based) (or "UC") versus the Total Resource Cost ("TRC") test (the cost of a measure plus utility administrative costs).

Figure 1 illustrates this fundamental difference. As depicted in the figure, an energy efficiency investment induced by a utility program may have the same resource value (avoided cost savings in the figure) as one based on total cost but significantly different net values, because "costs" are defined differently for the TRC and UC tests.

In the TRC test, the costs consist of those borne by all parties, including the participant and utility. In the UC test, only those costs

borne by the utility are included. Because the net values are different, there are different levels of savings to share, depending upon which definition of costs is chosen.

Equity and Symmetry. If the TRC test is the basis for establishing cost-effectiveness of a DSM program, for example, it seems to make sense to use total cost as the basis for establishing net value and therefore, shareholder earnings levels. To establish the cost-effectiveness of energy efficiency relative to supply-side options based on total costs, yet provide utility shareholder incentives based on utility costs (or vice versa) would be asymmetric and could create serious inconsistencies.

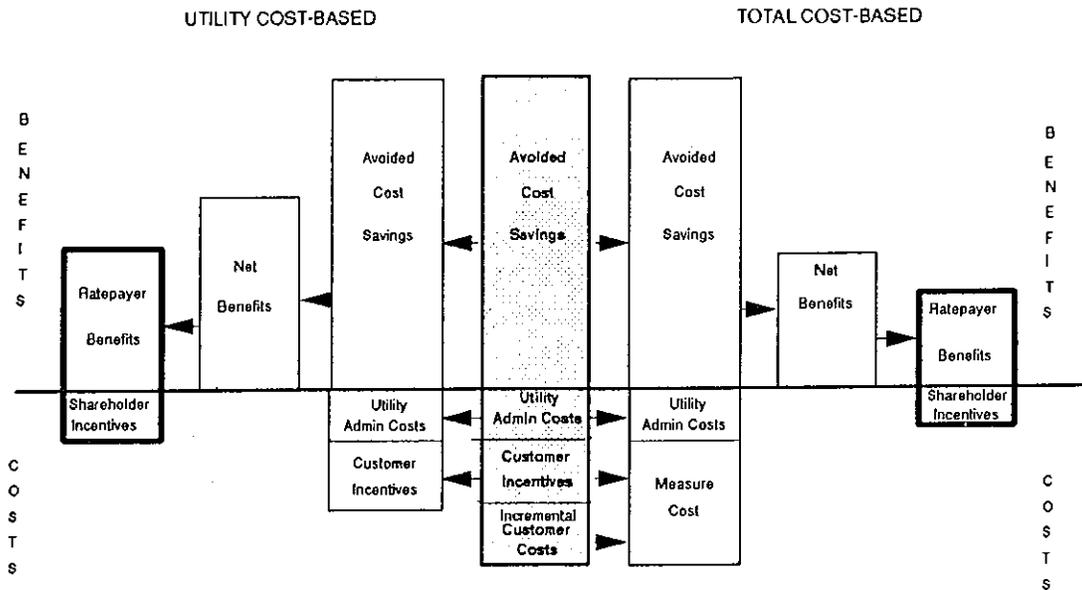
Practicality. These theoretical considerations may, however, be offset by other implementation concerns. For example, it can be argued that utility costs are much easier to establish and track than total costs, thereby making the calculation of net benefits less ambiguous. It can also be argued that utilities should be held responsible for *their* costs but not for the other elements of total costs.

It is also important to note that the basis for determining costs to include in the mechanism is directly related to one of the general objectives noted previously.— cost-minimization. If net value is based solely on utility costs, the shared-savings mechanism has a built-in cost-minimization function, because the savings to share will increase if the utility reduces its costs by offering the lowest possible level of financial assis-

TABLE 1: Matching Types of DSM Programs with Shareholder Incentives

Program Category	Incentive Treatment
CATEGORY 1 (retrofit incentives)	SHARED SAVINGS
CATEGORY 2 (new construction)	SHARED SAVINGS OR COST PLUS
CATEGORY 3 (low-income; services)	EARNINGS ADDER (with minimum performance)
CATEGORY 4 (general advertising, general administration measurement and evaluation)	NO SHAREHOLDER INCENTIVES

FIGURE 1: Comparison of Shared Savings Concepts



tance to induce customer participation. If net value is based on total costs, the link between utility program costs (i.e., incentive payments to customers plus program administration costs) and utility earnings is less direct, potentially weakening the ability to meet the objective of cost-minimization.

Defining an Approach. Although it is necessary to establish clearly the cost basis in a shared-savings mechanism, the importance of selecting utility or total costs as the basis may not be so critical in practice for several reasons. First, concerns about the potential inconsistency between resource selection based on total costs and earnings linked only to utility DSM costs can be mitigated by establishing an agreement that only measures which “pass” the TRC test will qualify for inclusion in the mechanism, even though levels of utility earnings are based

on utility cost only. Second, if it is necessary to give customers incentives which approximate the full cost of the measure, there is no difference between a utility- or total-cost based mechanism because the customer contribution in this case is zero. Also, if total resource costs are used as the basis, an additional cost-minimization element can be added to the shared-savings mechanism to adjust the utility earnings depending on the amount actually spent compared to the expected expenditures. Such a provision would increase earnings if the program can be implemented at lower-than-expected costs and decreases the earnings if the opposite occurs.

In California, the utility-cost approach was proposed by PG&E and the total-cost approach by SDG&E. The proposals were agreed to, however, only after supplementing the specific mech-

anisms with provisions which addressed the concerns noted above. Therefore, the shared-savings mechanism adopted for PG&E is based on utility costs (with agreement on TRC eligibility) and the SDG&E mechanism is based on total costs (with a supplementary cost-minimization element). With these modifications, both objectives of resource value maximization and cost-minimization may be met by each shared-savings mechanism.

Cost Recovery. Several other issues related to the costs of DSM programs must be addressed. For example, the timing and procedures for program cost verification and cost recovery need to be established. For both shared-savings mechanisms in California, it was agreed that: (1) program costs would be expensed, with flexibility to spend more than initially authorized (up to a cap) and

to shift expenditures among programs and program elements (within pre-specified boundaries); (2) verification would be part of a general, annual verification of utility performance; and (3) under- or over-expenditure of authorized costs will be tracked in a balancing account with any subsequent changes to rates being accommodated at the end of the rate case cycle; (4) the general rate case, which typically occurs every three years, will be the forum for reviewing the terms and conditions of these mechanisms and considering them for extension, with or without modification.

Total costs involve additional considerations because they include customer costs that are not formally part of the utility accounting system. A central consideration, therefore, is how to treat deviations in these costs after programs are put in place (i.e. deviations between expected total costs and actual total costs).

The primary component of total costs is the cost of the energy-efficient measure (see Figure 1). An *ex-post* approach would alter utility earnings if post-implementation measurement showed changes to the costs of any measures promoted by the programs. In California, these costs are pre-specified, meaning that costs of all measures are agreed upon prior to program implementation and fixed for purposes of subsequent performance review. New information on costs of measures will be collected and used for programs in the future, but deviations from the pre-implemen-

tion estimates will not affect shareholder earnings retroactively.

In short, although the utility is held accountable for changes in costs due to changes in the mix of elements or programs, changes over time in the cost of an individual measure (e.g. a compact fluorescent) will not retroactively affect the calculation of earnings for programs put in place in that year.

In California, costs of all measures are agreed upon prior to program implementation and fixed for purposes of subsequent performance review.

2. Load Reduction Estimates.

The second factor integral to calculating net resource value (and therefore utility earnings) in a shared-savings mechanism is the reduction in energy and peak demand resulting from energy efficiency investments. In contrast to other profit mechanisms, shareholder earnings from a shared-savings mechanism are directly related to the reduction in load from the energy efficiency measures installed because of the utility programs. As a result, these energy and demand reductions must be explicit.

A major issue associated with load reductions when developing a shared-savings mechanism is whether to: (a) "fix" estimates for each measure to be promoted by each and every program; (b) agree prior to implementation on an explicit savings methodology; or (c) agree that load reductions will be established after program implementation, based upon a particular method and schedule for monitoring.

In California, it was agreed that Option (a) would be used for most programs. For a few programs, where *a priori* estimates were very difficult to establish, Option (b) will be used.

Relying on measured and verified savings after program implementation — Option (c) — has considerable appeal. This approach, adopted in Massachusetts, seems to come closest to being a true performance-based mechanism, since utility earnings are approved after the true load reductions from the program are measured. However, this approach was rejected in California for several reasons.

Measurement Issues. First, although California utilities have been implementing energy efficiency programs for over a decade, many important measurement issues remain unresolved. For example, it remains unclear whether it is possible (let alone practical) to obtain reliable energy savings values from analysis of customer bills from all participants or only by (sub) metering the loads of high efficiency appliances.

Largely because of the continued difficulties and uncertainties associated with establishing definitive load reductions for energy efficiency programs, the approach in California relies on pre-specification of load reductions in its shared-savings agreements.

California regulators and utilities felt that the reliance on post-implementation "real measurement" would subject these activities to considerable pressures and concerns about gaming and to prolonged disputes about their accuracy. Utility earnings would be withheld pending the resolution of these disputes, with the outcome being dependent on a regulatory litigation process ill-equipped to address complex measurement issues. This prospect had little appeal for either the utilities or regulatory staff. Meanwhile, there was some support for the belief that, in most cases, reasonably reliable savings estimates could be made for most measures being promoted by the major programs.

Estimated Values. The result of these considerations was an agreement on an energy and capacity reduction value for each major DSM measure to be promoted by each of the major energy efficiency programs. The agreement included establishing estimated values for all of the major elements that affect cumulative load reduction from a DSM program, including useful lives of measures and "free rider" adjustments.¹⁰

As with total cost estimates, therefore, the utility's actual earnings per participant or measure

from programs implemented in the next few years will not be affected retroactively by new studies or measurements which might produce alternative load reduction values. Earnings can only be affected by the level of participation.

Performance Verification. To establish performance and shareholder earnings, the focus is on

The utility's actual earnings per participant or measure from programs implemented in the next few years will not be affected retroactively by new studies or measurements.

verification of utility records that show how many of what type of energy efficiency measures were installed — not on the after-the-fact measurement of actual load reductions from specific measures or programs.

The approach adopted in California does not mean it is abandoning efforts to obtain better load reduction estimates for measures and programs. Improved estimates will remain a central and critical objective in making energy efficiency a reliable alternative to supply-side additions. To-

ward this end, adoption of the shareholder incentive mechanisms includes a multi-year measurement plan for each utility, with the specific objective of improving the accuracy of energy efficiency savings estimates. More accurate savings estimates from these studies will be used for any future shareholder incentive agreements and to revise the load reduction effects included as part of future utility resource plans.

3. Avoided Costs. The third major component in calculating net resource benefit to be shared by shareholders and ratepayers is avoided cost. Current conventions for evaluating the economics of DSM programs rely on projections of the utility system marginal (or avoided) costs in order to determine whether reducing energy and capacity demand is more cost-effective than meeting load requirements with supply-side options. With a shared-savings mechanism, projections of avoided cost become even more critical because these estimates directly affect shareholder earnings. The issue is not only the degree of accuracy of avoided cost projections, but also their consistency with avoided costs evaluation used for other purposes.

Estimate or Measurement? As with the other two components — load reductions and program costs — estimates of avoided cost can be pre-specified (agreed upon prior to program implementation and fixed for a specified period of time) or developed and revised during program implementation

to reflect the most up-to-date projections. The issue is similar to one raised in establishing the terms and conditions for paying Qualifying Facilities (QFs): who should bear what levels and types of risks in the face of uncertain avoided costs in the future?

For a shared-savings mechanism, a more direct question is: if avoided costs turn out to be different than projected, should utility earnings from a measure installed as a result of prior year's program activities be adjusted to reflect these actual avoided costs? Because the benefits of an energy efficiency investment are likely to last for 10 to 20 years or more, theory suggests that shareholder benefits should be adjusted throughout the useful life of the energy efficiency measure. As with load impact and total cost estimates, there is theoretical appeal for a procedure which directly links shareholder earnings to subsequent variations in avoided costs. How direct the links should be is affected by several practical considerations.

The first relates to the potential for litigation noted above with after-the-fact revisions to load impacts. However, in this case, the burden might be eliminated by relying on procedures that establish avoided costs for other purposes (such as "as-available" energy and capacity payments for QFs). Here, the primary issue is whether the avoided costs calculated for "other purposes" are appropriate for properly valuing energy efficiency investments. Absent linkage to an existing reg-

ulatory procedure, adjustments to shareholder earnings based on subsequent deviations in avoided costs are likely to be contentious.

However, even with acceptable methods and regular proceedings to adjust avoided costs (and therefore shareholder earnings), there are practical problems which weigh against the apparent appeal of doing so. Programs typically involve numerous measures with highly varied useful lives, so



the bookkeeping requirements on the utility and the regulatory agency to track, review, and adjust earnings to reflect changes in avoided costs would be enormous.

Also, if earnings from a shared-savings mechanism were directly linked to an ongoing update of avoided costs over the life of the energy efficiency investments, the level of earnings for utility shareholders in any given year would be diluted to relatively low levels, even if the program is quite large.¹¹ A relatively modest level of annual

earnings is not likely to attract nearly as much interest as an agreement to permit the accelerated recovery of earnings.

Accelerated Recovery. Even though accelerated recovery would produce earnings for fewer years, the importance and visibility of the earnings from the energy efficiency programs would likely be much greater.

The approach adopted in California reflects these considerations with provisions that fix the avoided cost projections used in valuing the energy efficiency programs during the next few years and allow accelerated (three-year) recovery of the utility earnings from these programs. To a large degree, these features were designed to increase the utility's and the regulators' certainty about expected program impacts. If the financial risk to the utility is reduced, the utility may be willing to accept a smaller share of the net benefits.

On the surface, the treatment of demand-side programs described here appears similar to the "front-loaded" standard offer contracts made with California small power producers in the early 1980s. While availability of these contracts contributed to an apparent overcommitment to QF power and ultimately to suspension of the standard offers, there is little likelihood of a comparable glut of demand-side resources for two reasons: first, all projects must pass the TRC test to ensure that they are cost-effective; and second, the amount of the energy efficiency investments is capped by

limits placed on the amount that can be invested during a designated period. This cap ensures that the pace of energy efficiency programs will be compatible with utility system resource needs.

D. Penalties for Non-Performance

Agreeing on definitions of costs, load reductions, and avoided costs for use in a shared-savings mechanism is a necessary but not sufficient basis for stimulating utility participation in demand-side markets. Virtually any variation of the shared-savings mechanisms described here will be "performance-based," in the sense that earnings will depend on the ability of utility managers to attract participants for the energy efficiency programs. However, even if a shared-savings mechanism offers equal or greater opportunities to increase earnings than a supply-side project, pro-

gram goals may not be accomplished for reasons other than an inability to obtain sufficient customer participation.

One way to increase the likelihood that program objectives will be met is to supplement the features of shared-savings incentives with performance features which sharply reduce utility earnings and/or establish penalties in the event program objectives are not met. The notion is that if new earnings opportunities prove insufficient to sustain utility management commitment to efficiency goals, perhaps certain "downside" features will. By increasing the likelihood that program objectives will be met, penalty features can help improve the reliability of the energy efficiency programs.

There are many ways to incorporate minimum performance standards. In California, the two shared-savings mechanisms re-

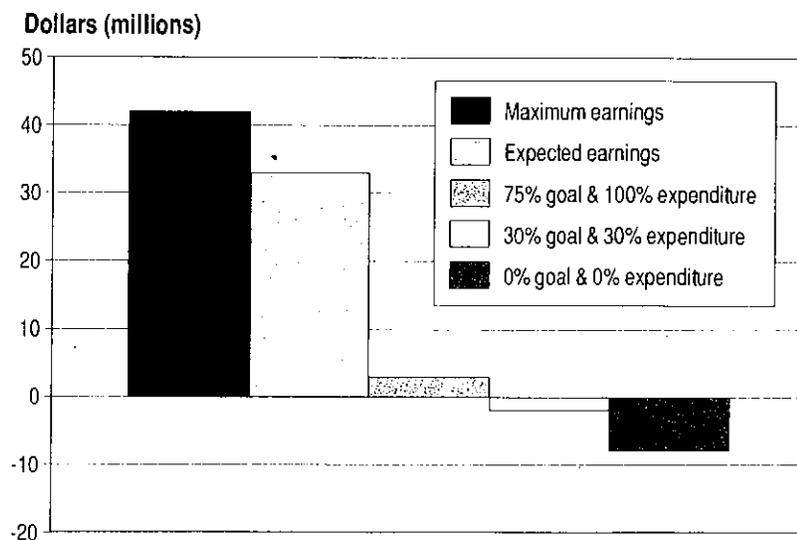
flect different approaches. As one example, PG&E's incentive mechanism incorporates relatively high minimum standards, a "dead-band" for reduced performance levels where no earnings (but no penalties) result, and penalties to shareholders if less than 50% of program objectives are met in any given year.

Figure 2 illustrates the effect of incorporating minimum performance standards and adjustments to shared-savings earnings under alternative levels of performance for the PG&E and SDG&E proposals. A central feature is pre-program agreement on program objectives, as measured by customer response to install the energy efficient measures, and agreement on how earnings are to be affected by various levels of performance. As reflected in the figure, the approach approved for PG&E and SDG&E includes opportunities to increase earnings relative to expected performance (the first and second bars, respectively), with adjustments for lower than expected performance (the third bar), and penalties for poor performance.

The last two categories show that shareholders not only forego earnings opportunities if program performance falls far short of expectations, but would actually sustain lower earnings.

Clearly, incorporation of reasonable performance standards into a shared-savings mechanism involves a host of considerations, such as prior utility performance and whether the program involves new program de-

FIGURE 2: Earnings as a Function of Performance



sign features or is based on familiar approaches. Particularly in the initial phases, developing appropriate and acceptable conditions for ensuring minimum utility performance will involve more the art of negotiation than hard science or economic theory.

III. Conclusions

Providing utilities incentives to develop energy efficiency programs for their customers can be a useful tool for regulators seeking to reap the benefits of least-cost plans for their state. Yet many factors affect the performance and value of demand-side resources, and the utility has control over only some of them.

The goal of regulatory review should be to insure equitable balancing of these factors between participants, nonparticipants, and shareholders. At the same time, efforts to reduce some of the uncertainties associated with measuring the output of demand-side resources should be given high priority.

Inherent differences among different demand-side programs call

for different types of incentives. These differences suggest a continuing need for creative regulatory approaches to stimulate utility participation in using energy efficiency programs as a viable resource option. ■

Footnotes:

1. Nat'l. Assn. of Regulatory Utility Commissioners, Resolution in Support of Incentives for Electric Utility Least-Cost Planning, adopted February 1989, Washington, DC.; see also S. Wiel, *Making Electric Efficiency Profitable*, PUB. UTIL. FORT., July 6, 1989, at 9-16.
2. D. MOSKOVITZ, PROFITS AND PROGRESS THROUGH LEAST-COST PLANNING (Nat'l. Assn. of Regulatory Utility Commissioners, Washington, DC. 1989).
3. Although there are many variations on these three basic types of incentives, see Moskowitz, *Id.*, the differences between them can be broadly summarized as follows. *Rate-of-return adjustments* increase utility earnings by raising the percentage of rate-based costs recovered by the utility. *Bounties* increase utility earnings by directly rewarding utilities with cash bonuses for demand-side activities. *Shared-savings* increase earnings through an explicit formula that allows the utility to keep some of the difference between the cost of demand-side resources and the value

of the supply resources avoided.

4. C. CALWELL AND R. CAVANAGH, THE DECLINE OF CONSERVATION AT CALIFORNIA UTILITIES: CAUSES, COSTS AND REMEDIES (Natural Res. Defense Council, 1989).
5. C. MARNAY AND G. COMNES, CALIFORNIA ERAM: THEORY AND PRACTICE (Lawrence Berkeley Laboratory, 1990).
6. Calif. Pub. Util. Comm., Decis. 90-08-068, Aug. 1990.
For background and description of the programs, see also STATEWIDE COLLABORATIVE PROCESS, AN ENERGY EFFICIENCY BLUEPRINT FOR CALIFORNIA, and Appendix A, MEASUREMENT PROTOCOLS FOR DSM PROGRAMS ELIGIBLE FOR SHAREHOLDER INCENTIVES (1990).
7. The other major California electric utility, the Southern California Edison Company (SCE), proposed use of a performance-based rate-of-return adjustment as an incentive.
8. See Moskowitz, *supra* note 2.
9. CAL. PUB. UTIL. COMM. AND CAL. ENERGY COMM., STANDARD PRACTICE MANUAL FOR ECONOMIC ANALYSIS OF DEMAND-SIDE MANAGEMENT PROGRAMS (1987).
10. Free riders are program participants who would have engaged in a DSM activity in the absence of a utility program to stimulate participation. For these individuals, the utility inducement was not necessary. Although the presence of free riders leaves the total cost of the resource unchanged, their participation cannot be properly credited to the utility's efforts. Consequently, conventional practice holds that the utility should not be rewarded for the savings from these participants.

11. For example, if the net present value of the resource benefits of an energy efficiency program is \$15 million, and the shareholder share is set at 15% of the benefits, the utility earnings would be \$2,250,000. If the utility earnings are recovered for same period over which the resource benefits are realized (e.g. 15 years), the annual earnings would amount to roughly \$150,000 per year (neglecting for the moment the time value of money).



The California collaborative offered many a challenge to the analytically inclined.