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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking on the Commission's own motion to establish rules and procedures governing utility demand-side management.	FILED PUBLIC UTILITIES COMMISSION AUGUST 7, 1991 SAN FRANCISCO OFFICE R.91-08-003
Order Instituting Investigation on the Commission's own motion to establish procedures governing demand-side management and the competitive procurement thereof.	I.91-08-002

ORDER INSTITUTING RULEMAKING AND ORDER INSTITUTING INVESTIGATION

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I. Summary and Background

A. Summary

By this order, we open a rulemaking proceeding which builds upon Commission policies related to utility gas and electric demand-side management (DSM) programs. The respondent utilities to this rulemaking will, and interested parties may, file comments on these proposed rules within 45 days.

We also open today a companion investigation to this rulemaking, naming the same utility respondents. This investigation will serve as the forum for taking evidence should we determine that, based on the comments filed on this rulemaking, evidentiary hearings are necessary to resolve any particular issues. It will also serve as the forum to review and approve funding for any utility proposals to engage in the competitive procurement of DSM programs, referred to generally as "DSM pilot bidding."

Respondents to the two proceedings initiated today are Southern California Gas Company (SoCalGas), San Diego Gas and Electric Company (SDG&E), Southern California Edison Company (Edison), and Pacific Gas and Electric Company (PG&E).

Since R.91-08-003 and I.91-08-002 involve related issues of law and fact, it is appropriate to consolidate these two dockets pursuant to Rule 55 of the Commission's Rules of Practice and Procedure. Consolidation provides the Commission with maximum decisionmaking flexibility in addressing the issues before it in these proceedings. For administrative convenience, the rulemaking will be the lead docket, and all filings shall be made in that docket unless otherwise specified.

B. The Objectives of the OIR

The California Collaborative made great strides. Its achievements mark an important starting point in our efforts to reestablish DSM as a viable, lasting element of utility resource procurement. But much work remains and it is time for this Commission to take up where the Collaborative left off. The demand-side management arena is increasingly dynamic and evolving. The much broader world of least-cost resource procurement, and DSM's role in it, is equally dynamic. We believe it is important to articulate clearly our primary goal regarding utility demand-side management, and how we expect to achieve this goal.

In issuing this OIR, we have one overriding goal: to ensure the stable, sustained development of least-cost utility gas and electric energy efficiency programs that provide reliable savings for all customers. Complementing this overriding goal are several additional goals. These secure the role of DSM and ensure that our foremost goal is met.

1. To continue to work toward a resource procurement framework in which DSM and traditional supply-side options compete on an equal footing for a place in the utility's resource plan.

2. To establish greater consistency in the treatment of demand-side resources across utilities and in our different regulatory forums.

3. To enhance our efforts to establish a common resource planning tool which can accommodate both demand- and supply-side options for use in a single forum.

4. To continue to implement PU Code § 701.1 and § 747 regarding utility DSM activities and resource procurement generally.[1]

5. To establish guidelines to review and evaluate utility DSM activity.

6. To continue to foster a competitive market for utility energy services.

This rulemaking attempts to strike a balance between the need for consistency and the need to allow utility managers the flexibility required to respond to their unique circumstances. Striking such a balance will ensure the efficient design and sustained development of utility DSM programs. A summary of the rules and policies proposed in this rulemaking are attached as Appendix A.

The OIR is divided into six parts. Part One provides a brief summary of recent events leading up to this OIR. Part Two addresses DSM program definitions. Part Three addresses cost-effectiveness indicators for DSM program activities. Part Four focuses on shareholder incentive mechanisms. Part Five discusses regulatory oversight of DSM activities. Part Six addresses utility DSM pilot bidding programs.

C. Background

This Order Instituting Rulemaking (OIR), and the accompaning Order Instituting Investigation (OII), mark our continued commitment to make DSM an equally important component of utility resource procurement and to continue California's role as a

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1 PU Code § 701.1 requires the Commission to include a value for environmental costs and benefits in calculating the cost-effectiveness of energy resources and to exploit all practicable and cost-effective conservation and improvements in energy efficiency. PU Code § 747 requires this Commission to direct utilities to test demand-side management bidding.

leader in the development and use of DSM programs. They are the logical extension of our recent decisions in the general rate cases (GRCs) of PG&E (see Decision (D.) 89-12-057 and SoCalGas see D.90-01-016), and our decisions resulting from applications filed after the DSM Collaborative process (D.90-08-068 and D.90-12-071). In those rate case decisions, we took additional steps toward the consistent treatment of demand- and supply-side resource alternatives, with the intent of integrating long-run demand- and supply-side planning. Integrated resource planning is one of the fundamental steps required to achieve our ultimate goal of developing an all-source bidding framework that allows demand- and supply-side resources to compete on an equal footing to provide utility energy service.

We gave considerable attention to the development of uniform guidelines for utility DSM activities in the PG&E and SoCalGas general rate cases. We chose not to adopt overarching principles at that time, however. First, we were not convinced that the general rate case provided the appropriate forum for establishing a statewide approach to utility DSM. The GRC covers a broad range of issues and generally does not allow for in-depth industrywide focus on one issue, in this case, demand-side management. In addition, at the time we were considering the guidelines proposed in the PG&E and SoCalGas rate cases, the Collaborative process was well underway, and we chose to await its recommendations before adopting a specific approach. We did, however, express our interest in establishing a forum where the concepts raised in the GRCs could be carefully analyzed once the Collaborative process had submitted its report.[2]

2 See D.89-12-057, pp. 374-377, and D.90-01-016, pp. 57-61c.

In D.90-08-068 and D.90-12-071, we reaffirmed our commitment to DSM by approving four settlement agreements arrived at by the four major utilities and the active parties to the Collaborative. The decisions authorize considerable expansion of each utility's DSM programs and reflect the success of the DSM Collaborative process we initiated in 1989.

1. The En Banc Hearing On Demand-side Management

On July 20, 1989, this Commission convened an en banc hearing to reexamine the role of demand-side management in utility resource procurement. With that hearing, we achieved a goal set forth in D.89-05-067 of our generic examination of ratemaking (I.86-10-001), when we first made clear our intent to take a fresh look at utility DSM activities.

2. The California Collaborative

The Collaborative working group sprang from our July 20, 1989 en banc hearing on the status of utility DSM programs. At the en banc hearing, several participants recommended a process which would allow the state's interested parties to collaborate on a blueprint for the revitalization of DSM activity in California. We agreed, with the hope that a collaborative approach could help facilitate that goal.

The California Collaborative set its own agenda and membership. Its stakeholders were a wide array of interest groups: the California's four major investor-owned energy utilities, representatives of various California State agencies, environmentalists, ratepayers of all types, agriculture, energy service companies, and independent energy producers. The group's success led to the utility applications, which by our approval, stand as a milestone in the "fresh look" we continue to take at utility DSM activities (D.89-05-067).

The Collaborative stakeholders made substantial progress in many areas of DSM program planning and implementation, but they did not reach consensus on all issues. In addition, the

stakeholders chose to limit the focus of discussion to those areas they believed were most important to the revitalization of DSM. Thus, even with the success of the Collaborative, our interest in considering a more uniform and comprehensive approach to utility DSM continued. In our decision approving the post-Collaborative utility applications, we specifically stated our plan to issue a rulemaking on utility DSM.[3]

The two proceedings initiated today focus on three principal areas: 1) Collaborative positions agreed to by consensus but which are not yet formal Commission policy; 2) policy areas where the stakeholders failed to reach consensus and where resolution is critical to secure a sustained role for DSM in future utility resource procurement strategies; and 3) other important policy areas not explicitly addressed in the Collaborative.

3. The Blueprint and Increased Utility DSM Activity

The Collaborative's achievements are reflected in its report to the Commission, An Energy Efficiency Blueprint for California (the Blueprint). In their report, the Collaborative's stakeholders proposed a new regulatory mechanism designed to allow utility shareholders to participate in the benefits of DSM. They also created new and expanded DSM programs, and identified key characteristics of DSM programs which must be considered in order to provide lasting energy efficiency savings. Finally, they recommended policies to govern the regulatory treatment of utility DSM programs.

As promised in the Blueprint, California's four major utilities filed applications requesting Commission authorization for expanded DSM programs and shareholder incentive mechanisms. The parties to the proceeding subsequently entered into settlement

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3 See D.90-08-068, p. 43.

agreements, and in D.90-08-068 and D.90-12-071, we approved, with some modifications, the terms of the respective settlements.

4. DSM and the Future of Competitive Resource Procurement

As we explore the potential for shareholder incentive mechanisms to assist in the stable development of utility DSM activities, we are simultaneously addressing a broader range of issues related to competitive resource procurement generally, and all-source bidding in particular.

In the Biennial Resource Plan Update (the Update), we have established, and continue to refine, our framework for the competitive procurement of electric supply-side resources (see D.91-06-022). But that proceeding is not the forum in which we review, approve, and fund utility DSM programs. Decisions governing utility DSM are made in the general rate case. We also rely on different resource planning tools in the two forums to determine the appropriate mix of demand- and supply-side resources for each utility. In the Update, we use the Iterative Cost-Effectiveness Methodology (ICEM) for supply-side procurement; in the general rate case, we use the cost-effectiveness indicators included in the Standard Practice Manual: Economic Analysis of Demand-Side Management Programs (SPM) to assist in funding decisions for utility DSM.

In addition, we have yet to develop the same type of comprehensive competitive acquisition process for DSM programs as we have in the Update for supply-side resources.[4] These gaps must be bridged to move us closer to establishing a framework, where all resource options compete on an equal footing, in a common

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4 Nor have we established a companion to the Update for long-run natural gas planning to determine the long-run marginal cost of increasing natural gas pipeline capacity. We are currently considering developing such a framework.

forum, for a place in the utility resource plan. To achieve that goal, we have initiated two additional resource procurement activities and an investigation to develop policies that will allow nonutility suppliers access to the utility's electric transmission system.

a. Fully Integrated Resource Planning

In the Update, PG&E, SDG&E, and Edison are currently engaged in an experiment to establish whether ICEM, used for least-cost resource planning on the supply-side, can also accommodate the inclusion of DSM resources. In this way, we hope to determine whether our existing framework can eventually be used to engage in fully integrated electric resource planning. SDG&E has agreed to present its results as part of its resource plan filing in the next phase of the Update.

b. Pilot DSM Bidding Programs

Concurrent with efforts to test ICEM's usefulness as a tool for integrated resource planning, PG&E has proposed to implement a pilot DSM bidding program. Such pilots were endorsed by the Collaborative and are now required pursuant to Public Utilities (PU) Code § 747. We intend for the other utilities to test the potential for energy service companies (ESCOs) to deliver cost-effective DSM programs. We commend PG&E for its efforts, and we are encouraged by the enthusiasm displayed by the other utilities who have assisted PG&E in designing its bidding experiment.

Our Division of Strategic Planning will work with the utilities to develop their pilots. Our Commission Advisory and Compliance Division (CACD) will prepare an evaluation of the various pilots. We will submit our evaluation to the Legislature by January 1, 1993, together with our recommendation regarding which, if any, of the pilots the State should adopt.

c. OII on Transmission Access

As part of the Commission's emphasis on competitive resource procurement, our investigation on nondiscriminatory access to electricity transmission services for nonutility power producers has begun (I.90-09-050). It will address access, cost allocation, and pricing issues, with the goal of promoting competition in the electric generation sector.

II. Resource Planning and DSM Program Definitions

A. Principles for DSM Activities and Resource Planning

To guide the orderly development of DSM, the Collaborative stakeholders defined and proposed several principles to govern both utility resource planning generally and DSM activities in particular. This Commission now takes up these proposals.

1. The Goal of Utility Resource Planning

The Collaborative members unanimously agreed that "...the principal goal of utilities' resource planning and investment is to minimize the cost to customers or society of reliable energy services." (Blueprint, p. 56.) We generally agree with the Collaborative's definition but believe it requires some refinement.

This Commission's goal for utility resource planning is the development of environmentally sensitive, reliable, least-cost energy service. Using energy more efficiently to provide services that are of comparable or higher quality constitutes an important means of achieving this goal. We have therefore encouraged the utilities to treat energy efficiency improvements and energy conservation as viable alternatives to traditional supply-side resource options (see D.90-01-016 and D.89-12-057). We direct the utilities to engage in resource planning and acquisition with this in mind.

2. Lost Opportunities

We believe the utility should emphasize "lost opportunities" as they examine potential alternatives to supply-side resources. Lost opportunities are energy efficiency options which offer long-lived, cost-effective savings, and which, if not exploited promptly, are lost irretrievably or rendered much more costly to achieve (Blueprint, p. 7).

The subject of lost opportunities received considerable attention during the Collaborative. Indeed, the Collaborative explicitly assigned "...priority...to efficiency investments that address potential 'lost opportunities' to utility systems." (Ibid, p. 56.) In addition, the shareholder incentive mechanisms adopted in D.90-08-068 were tied in part to the utilities' success in capturing lost opportunities.

We concur with this consensus. As the utilities consider DSM choices, they should place special emphasis on programs which capture potential lost opportunities. To ensure this emphasis, we direct the utilities to accompany future requests for shareholder incentives, or increases in DSM funding levels generally, with a detailed account of their efforts to capture lost opportunities.

3. Cream Skimming

As defined by the Blueprint, "cream skimming" describes the situation in which only the lowest cost conservation and load management measures are designed and implemented, leaving behind other cost-effective opportunities for energy efficiency. Thus, cream skimming can increase the potential for lost opportunities.

The stakeholders viewed shareholder incentives as the primary cause of cream skimming. The stakeholders were concerned that, faced with incentives, the utility would pursue a DSM strategy designed to maximize shareholder earnings rather than minimize total resource costs.

To reduce the potential for cream skimming (and lost opportunities), the stakeholders agreed that any proposed incentive mechanism should include strategies explicitly designed to avoid such activities. Parties are invited to provide comments on whether cream skimming as described by the Collaborative continues to be a concern, and whether the utilities should continue to provide a detailed account of strategies to avoid cream skimming with any proposal for shareholder incentives, or increases in funding levels for DSM programs which are eligible for incentives.

B. Common Program Definitions

This rulemaking comes at a time of rapid growth of utility DSM programs. Our decision to approve shareholder incentive mechanisms for energy efficiency programs helped enable this growth. These shareholder mechanisms are detailed in D.90-08-060.

As a result of this new regulatory approach, and the utilities' enthusiastic response to it, the familiar questions of which DSM programs the utility ought to pursue, when it should pursue them, and at what price, have become increasingly complex. To respond to these questions, and to ensure that the programs' stated benefits are captured for ratepayers and for society, we need to establish and maintain consistent treatment of DSM programs across utilities and in the various proceedings where we address utility DSM activities. Consistent treatment of these activities is particularly important for determining program cost-effectiveness and funding levels, for measurement and evaluation activities, and in the treatment of shareholder incentives.

Establishing consistent treatment requires a common terminology. This rulemaking attempts to manage increased complexity and guard against the potential for regulatory inconsistencies in several ways. As a first step, we propose to adopt definitions for utility DSM programs. We expect the utilities to use these definitions when characterizing any proposed

programs; the burden is on the utilities to justify any departure from them.

Recognizing that the DSM industry is likely to retain its dynamic character for some time, this rulemaking will remain open in order to accommodate any request to add or modify DSM program definitions.

DSM Program Definitions and the Reporting Requirements Manual

We have previously ordered staff to work with the utilities and the California Energy Commission to develop a common terminology that could be used by each of the utilities to report their DSM activities. Our order specifically asked for "...a common set of definitions and levels of detail [to] facilitate the flow and evaluation of information between rate cases and between the two regulatory agencies." (D.86-12-032.)

This order resulted in the Demand-Side Management Reporting Requirements Manual (Manual). The Manual defines the principal components of demand-side management: energy efficiency, energy conservation, load management, fuel substitution, and load building. The Manual also provides definitions for the various subcategories that comprise each of these principal components.

The experience of the Collaborative, the rapid expansion of utility DSM programs, and the experimental nature of the current shareholder incentive mechanisms have persuaded us that energy efficiency and conservation will suffer unless we formally establish clear definitions for DSM programs. With the definitions included in the Manual as our guide, we therefore propose to adopt the program definitions included in Appendix B of this order.

In proposing these definitions, we recognize that the Blueprint agreed to certain definitions for use exclusively in the Collaborative. For the three terms defined in the Blueprint and absent from the Manual--"cream skimming," "lost opportunity" and

"resource value"--, we adopt those terms and definitions as part of this order and include them in Appendix B. The Manual should be modified to include the definitions taken from the Blueprint and included in Appendix B.

III. DSM Cost-effectiveness Indicators

The rules and policies proposed in this section address the use of cost-effectiveness indicators for utility DSM programs. Section A considers cost-effectiveness indicators for programs which reliably reduce the utility's capacity and/or energy requirements and therefore serve as alternatives to utility supply-side resources. Section B addresses programs which do not reduce these requirements, programs for which considerable uncertainty accompanies the assessment of such reductions, and programs which meet other policy objectives.

A. Cost-effectiveness Indicators for DSM Alternatives to Supply-side Resource Options

The Standard Practice Manual

To help assess the extent to which various DSM activities affect different customer classes, the utility, and society generally, we have worked with the California Energy Commission to develop the Standard Practice Manual: Economic Analysis of Demand-Side Management Programs (SPM). The tests described in the SPM--the Total Resource Cost Test (TRC), the Societal Test, the Participant Test, the Ratepayer Impact Measure (RIM), and the Utility Cost Test (UC)--do a good job of determining the variety of effects utility DSM activities have on different interests.

But the SPM's cost-effectiveness indicators differ significantly from the methodology (ICEM) we use to assess supply-side options. The cost-effectiveness analyses performed for demand- and supply-side options also take place in separate regulatory forums. On the demand side, the results derived from

the SPM are used in general rate cases, where we identify and approve funding for cost-effective utility DSM programs. On the electric supply side, our Biennial Resource Plan Update goes beyond simply identifying which supply-side options are cost-effective. In the Update, utilities determine the precise mix of cost-effective generation additions which provides the greatest benefits to ratepayers. Thus, in contrast to the SPM, ICEM chooses from among the cost-effective supply-side resources to determine which are the most cost-effective to add to the utility system, taking into account the type, size, and timing of potential additions.

ICEM's explicit focus on least cost is absent from the SPM. ICEM is therefore preferable from a resource procurement perspective. Indeed, we have long held as a goal the ability to assess demand- and supply-side options using a common, least-cost resource planning tool like ICEM. We recognize, however, that time and considerable effort will be required to achieve our goal. The utilities' current experiments in the Update, designed to test the potential for fully integrated electric resource planning, represent the initial steps.

Until the utilities' tests are complete, and a methodology established, that allows for the side-by-side comparison of demand- and supply-side options in a single forum (whether it be ICEM or a suitable alternative), it is appropriate that the SPM continue to provide the basis for determining DSM program cost-effectiveness. Accordingly, we direct the utilities to perform cost-effectiveness analyses for any proposed DSM program in a way that is consistent with the methods included in the SPM.

a. **Choosing Among Different Indicators of Cost-effectiveness for DSM Programs**

Our proposal to formally establish the tests in the SPM as the basis for assessing cost-effectiveness does not resolve the important issue of which indicator should receive greatest weight when DSM funding levels are determined. In D.90-01-016 and

D.89-12-057 we determined that the TRC test should be the principal determinant of DSM program cost-effectiveness.

Our preference for the TRC test as the primary indicator of program cost-effectiveness reflects our belief that utility DSM activities should focus on those programs that serve as alternatives to supply-side resource options. Energy efficiency programs and load management programs which promote energy efficiency serve as such alternatives because they reliably reduce a utility's fuel and/or capacity needs.

Our preference for the TRC test and our decision to direct the focus of utility DSM activities on particular programs are not intended to diminish the value of other programs. We nonetheless expect the utility to fashion its DSM activities based on the direction provided in this rulemaking. Likewise, our preference for the TRC test does not diminish the importance of the information provided by the other indicators included in the SPM. Indeed, to ensure optimal DSM funding levels, we need to understand the variety of effects DSM programs has on customer rates, on the utility, and on society generally. Therefore, to the extent practicable, we direct the utility to perform each of the tests included in the SPM for any proposed DSM program.

b. Cost-effectiveness and Non-price Factors

This Commission has recognized the importance of considering factors other than price when making resource procurement decisions (see for example D.88-09-026 and D.91-06-022). By excluding these factors, planners are likely to commit to a resource plan which is more costly and provides fewer long-term benefits than one which includes them. These "non-price" factors describe the effects of economic activity--electric generation in this case--for which there is no functioning market but which can impose real costs on, or provide real benefits to, society. These factors include effects on the environment, fuel

diversity, system operations (e.g., dispatchability and curtailability), and electric (and gas) transmission.

We continue to support valuing and incorporating relevant non-price factors along with price considerations in resource procurement whenever practicable. In so doing, our procurement decisions will better ensure that ratepayers receive current and future electricity services in the most efficient and environmentally sensitive manner.

The valuation of non-price factors occurs in the Update, where we have made considerable progress. For example, in D.91-06-022 we modified our framework for making long-term resource procurement decisions to explicitly value environmental externalities related to air emissions. In addition, the next phase of the Update will consider the value of fuel diversity. Finally, non-price factors associated with the interconnection of QFs to the utility's system will be considered as part of our investigation of nondiscriminatory access to electric transmission (I.90-09-050).

Though much of our work with non-price factors has focused on supply-side resources, many of these same factors, and perhaps others, affect DSM. Accordingly, insofar as non-price factors developed for supply-side options apply to DSM, we direct the utilities to include them in cost-effectiveness analyses in a manner that is consistent with their development in the Update. This will move us another step closer to the equal treatment of demand- and supply-side resource options, and maintain consistency across regulatory proceedings.

c. Cost-Effectiveness and Resource Value

"Resource value" refers to the extent to which energy efficiency and load management programs reliably reduce utilities' fuel and/or capacity needs. For programs which offer resource value, that value represents a key element in DSM cost-effectiveness analyses. Resource value is also one of the

components used to determine shareholder incentives for the mechanisms adopted in D.90-08-068 for PG&E and SDG&E.[5]

As discussed above, the Update determines the mix and timing of supply-side options the utility would add to its system over a 12-year planning horizon to meet resource requirements at least cost. This approximates the utility's long-run avoided cost of new electric capacity and energy. Thus, the Update determines the value of the resource that DSM programs would defer or avoid. For DSM programs designed to defer or avoid utility supply-side resources, we direct the utilities to base the resource value associated with those programs on the avoided costs adopted in the Update. The utility should use these values in any applicable cost-effectiveness analyses included in the SPM and for calculating shareholder incentives under a shared-savings approach.

d. Cost-effectiveness and Indirect Costs

Certain stakeholders to the Collaborative urged that "indirect costs" also be included in DSM program cost-effectiveness analyses.[6] The costs proposed by these parties for consideration include: 1) information and transaction costs (costs borne by the customer to identify, choose, install and maintain a DSM option); 2) costs associated with the risk the customer faces in making investments in DSM; and, 3) the costs related to any changes in the quality of energy services produced by DSM. The stakeholders recommending the inclusion of these costs recognized that such

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5 Edison's current shareholder incentives plan allows for the amortization of a portion of its DSM expenditures. In its recent GRC, however, Edison joined PG&E and SDG&E by proposing a shared-savings approach to shareholder incentives. SoCal's current mechanism relies on program expenditures to determine shareholder rewards and/or penalties.

6 Blueprint, Policy Principle #6, pp. 66-67.

costs are generally difficult to quantify, but believed that better quantification will increase the ability to predict customer willingness to participate in DSM programs. These stakeholders argued that improving our ability to forecast adoption rates is critical in the attempt to integrate demand- and supply-side options.

Other Collaborative stakeholders disagreed with this recommendation. They argued that the speculative nature of these estimates, and the excessive costs required to make them, outweigh the benefits that might come from the attempt. They argued further that the question of whether to consider indirect costs is a technical rather than a policy issue and is therefore better addressed as part of the ongoing effort to improve and modify the SPM.

Insofar as a DSM program results in indirect costs, these costs should be considered. However, we agree that the speculative nature of any attempts to quantify these costs significantly reduces their usefulness as an analytic tool at this time. Estimates of indirect costs can provide useful information, and parties are welcome to continue to make an effort to account for them. But because the methods currently in use to establish indirect costs are insufficiently precise, we are not persuaded, for the purposes of funding determinations, to require their inclusion in any cost-effectiveness tests at this time.

We further agree that the examination of indirect costs is a technical issue; technical matters related to cost-effectiveness analysis have traditionally been addressed by the SPM working group, which is convened by the CPUC and the CEC. That group has made a valuable contribution to the complex task of assessing the cost-effectiveness of DSM programs. The working group represents the appropriate forum for resolving the technical issues associated with indirect cost considerations.

e. Cost-Effectiveness and Shareholder Incentives

Before our decision approving utility shareholder incentive mechanisms, there had been no consideration of these earnings in DSM program cost-effectiveness analyses. During the discussion of incentives in the Collaborative, the stakeholders reached consensus on the issue, concluding that shareholder incentives attributable to eligible DSM programs should be treated as a cost and included in the TRC, RIM, and UC tests.[7]

We concur. The utilities should include estimated shareholder earnings when performing each of the cost-effectiveness indicators listed above. Because these estimated earnings represent a real economic cost to the development of utility DSM programs rather than an economic transfer, we further direct the utilities to include these costs in the Societal version of the TRC test.

B. Cost-effectiveness Indicators for Selected Programs

For specific DSM programs the usefulness of the TRC test as the primary indicator of cost-effectiveness is limited. Accordingly, the following section describes those cases in which relaxation of the TRC test is appropriate. This should not be viewed as a wholesale departure from the SPM, however. Rather, our intent is to ensure primary emphasis on the TRC test while allowing for the pursuit of a limited number of other programs to which the TRC test does not readily apply. To the extent practicable, the utility should perform each of the cost-effectiveness indicators for the various programs discussed below.

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7 See the Blueprint, Policy Principle #2, p. 61.

1. Direct Assistance

We have consistently stated that Direct Assistance programs achieve important policy goals and are justified in spite of their departure from our broader goal of least-cost electricity service. Direct Assistance programs have met, and continue to meet, equity concerns. These programs provide services to low-income customers who could not otherwise take advantage of other utility DSM programs to lower their utility bills and reduce energy consumption. The Collaborative stakeholders also singled out Direct Assistance as an important element of demand-side management.[8]

In determining Direct Assistance funding levels, we have made it clear that "positive cost-effectiveness results should not be considered a necessary requisite for program continuation."[9] Positive cost-effectiveness of Direct Assistance programs is an important factor, but not the only factor we will consider. It is important that Direct Assistance programs be cost-efficient, however.[10] In order to ensure cost-efficiency, Direct Assistance program expenditures, like expenditures for all other DSM programs, must be scrupulously accounted for. This task is made easier when Direct Assistance program expenditures for the gas and electric sectors are accounted for separately. The combined utilities should explicitly delineate between the two for accounting purposes.

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8 See the Blueprint, Policy Principle #11, p. 74-75.

9 See D.89-12-057.

10 In contrast to cost-effectiveness analysis, in which comparisons are made between the costs and benefits of a given project, cost-efficiency refers to the costs associated with the implementation of a specific project.

2. Information Programs and Energy Management Services

Information programs are those which provide general information describing generic conservation opportunities and are not expressly solicited by the customer. For example, the utility provides the customer with generic information to reduce utility bills but stops short of providing on-site evaluations or customer billing data.

Energy Management Services (EMS) provide information explaining the relative costs and benefits to the customer of installing measures, or adopting practices, designed to reduce utility bills. For these programs, information is expressly solicited by the customer. Recommendations subsequently provided by the utility are based on the customer's recent billing history and/or customer-specific information regarding appliance and building characteristics.

For both information programs and EMS, the relationship between the services provided and the effect these programs have on customer load remains tenuous. Absent this clear link between program and savings, the TRC test is a limited tool for assessing cost-effectiveness. We will therefore not require strict adherence to the TRC as the primary indicator for these programs at this time.

3. Load Building

Load building programs have the effect of increasing consumption of gas or electricity without affecting the customer's use of other utility-supplied fuels. As such, the primary effect of these programs is to increase load. Energy efficiency programs and load management programs that promote energy efficiency serve as alternatives to supply-side options; programs that increase load do not serve a comparable role. Consequently, the TRC test is not applicable to load building.

We expect utility DSM activities to primarily focus on energy efficiency programs and load management programs which

promote energy efficiency. However, certain load building programs may meet other policy goals. For example, load building programs designed to develop alternative fuel vehicles and mass transit can provide substantial air quality benefits. Utilities, through these and other cost-effective DSM programs, may have a role to play in capturing these types of benefits. In defining this role, we must be careful, however, to avoid a situation in which one sector of society--the utility ratepayers in this instance--inappropriately subsidizes another. We intend to look at any request for load building programs on a case-by-case basis, keeping in mind our overriding goal of ensuring reliable, least-cost energy savings for all customers.

Finally, to the extent the utilities pursue any load building programs, such programs should avoid frustrating our efforts to encourage ratepayers to conserve energy by sending ratepayers conflicting messages about energy consumption. We direct the utilities to design any load building programs specifically to avoid this undesirable result.

4. Fuel Substitution

Fuel substitution programs replace equipment using one fuel with equipment using a different fuel. Though some fuel substitution programs may offer resource value, and in some cases, environmental benefits, these programs have nonetheless been the subject of considerable controversy in our proceedings. First, we currently lack a regulatory mechanism to assess the relative differences in resource value between electric and gas DSM programs that compete to provide the same service. Least-cost electric resource planning occurs in our Update, where we identify the value of utility supply-side resource additions. There is no comparable

proceeding for the natural gas utilities we regulate.[11] Thus, assessing the resource value of the use of one fuel type over another is hard. In addition, environmental impacts can also accompany fuel-substitution programs; judging these tradeoffs is difficult. The tests in the SPM do not assess these tradeoffs. Finally, fuel substitution programs have raised concerns regarding potential load building. For all these reasons, fuel-switching decisions are complicated and contentious.

We believe fuel substitution programs should have two goals: to increase energy efficiency, thereby reducing the utility's need for additional capacity or peak generation, and to improve environmental quality. Fuel substitution programs designed specifically to meet these goals should, when practicable, be subject to the same cost-effectiveness test as energy efficiency programs; that is, they should pass the TRC test. For those fuel substitution programs designed primarily to retain or build load, there is no accompanying resource value and the TRC test is of little use. We generally discourage the utilities from pursuing fuel substitution programs with a predominately load building character. For fuel substitution programs designed to retain load, we direct the utility to make a convincing showing that the benefits of the program justify relaxing our focus on energy efficiency programs.

We invite the parties to submit detailed proposals with their comments to improve current methods for assessing the tradeoffs of fuel substitution programs. Until we develop a framework for establishing the long run marginal cost of additional gas pipeline capacity, we propose to apply the general guidelines

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11 We are, however, considering developing a framework to determine the long-run marginal cost of increasing natural gas pipeline capacity.

discussed above to funding decisions for fuel substitution programs.

IV. Shareholder Incentives for Utility DSM Activities

A. Why Incentives?

At the DSM en banc hearing, Commissioners challenged utilities and interested parties with developing shareholder incentive mechanisms. We were convinced that shareholder incentives should be tested, and that considerable effort would be required to develop the type of incentives most appropriate for all of California's interests.

1. Balancing Demand- and Supply-side Earning Opportunities

California's investor-owned utilities (IOUs) face no regulatory disincentive to invest in DSM. Energy efficiency programs can reduce consumption, and with it utility revenues, but our Electric Revenue Adjustment Mechanism and the Core Fixed Cost Account effectively decouple utility revenues from sales. However, while the IOUs faced no disincentive to invest in DSM prior to our approval of shareholder incentives, regulatory treatment of DSM expenditures skewed the focus of utility resource procurement activities toward supply-side options at the expense of DSM opportunities providing equal or greater benefits.

a. The Need For Comparable Regulatory Treatment

Approving funding for utility DSM programs does not ensure their implementation. Indeed, it is not funding levels that matter, but dollars spent and programs implemented. During the eighties, actual expenditure levels declined. This decline was likely the product of conditions which may no longer persist. Nonetheless, to avoid any future decay of utility DSM activities, and to ensure continued pursuit of energy saving opportunities for the state's ratepayers, we believe the utility must be provided a

comparable opportunity to accrue earnings on prudent investments in both demand- and supply-side alternatives.

The utility has the opportunity to earn a fair rate of return on capital costs prudently incurred for investments in supply-side resources. Our review of the reasonableness of those costs, and our determination of the level of risk borne by the utility, govern the risk/reward relationship on the supply side. The rate of return earned by the utility on investment costs prudently incurred is commensurate with the level of risk borne.

Before our decision approving shareholder incentive mechanisms, the utility had no comparable opportunity for earnings from prudent demand-side investments. This unequal treatment sent a signal to the utility to focus its investment dollars on supply-side resources at the expense of reliable demand-side alternatives providing equal or greater benefits. By approving shareholder incentive mechanisms, we took a significant step toward establishing comparable regulatory treatment between utility demand- and supply-side resources.

b. The Risk of Overcompensating

In eliminating the regulatory imbalance described above, we must not replace one bias with another. Unequal treatment of resource options will likely lead to less benefits and greater costs for the ratepayer in the long run. Our most recent decision in the Update established a framework to ensure that all electric supply-side alternatives receive consistent and equal treatment in the resource procurement process (D.91-06-022). The treatment of utility earnings must also avoid biasing the procurement process in favor of a particular resource type. To avoid any such bias, the opportunity to earn utility profits from demand- and supply-side investments should be comparable. We will continue to explore shareholder incentive mechanisms keeping in mind the need to avoid favoring either demand- or supply-side resources in competition for utility investment dollars.

2. Protecting the Ratepayer: A Measured Approach

Our enthusiasm for shareholder incentive mechanisms must be balanced by the need to protect the ratepayer. The profits the utilities are projected to receive from the Collaborative-proposed, and any adopted, program expansions will result in only slightly higher rates. When we adopted the various mechanisms, we balanced the modest effect on rates with the benefits of expanded utility programs, and the information and experience we expected to cull from the "incentive experiment."

But any innovative approach of this type has some uncertainty, and some level of risk to ratepayers and the utility. There is currently little experience outside California with shareholder incentives for energy efficiency investments, and the results from the limited number of states that have implemented incentive mechanisms are inconclusive. It is therefore appropriate to proceed carefully with our experiment to minimize the uncertainty that comes with novel regulatory approaches. Our decision to attach no precedent to the variety of incentive mechanisms approved as part of the settlement agreements is consistent with this careful approach. Though the utilities need limited flexibility to design, learn from, and refine their incentive mechanisms during the early stages following the Collaborative, most of the variation in mechanisms should ultimately converge toward a more uniform, statewide approach.

The methodology currently used to determine the majority of shareholder incentives adds an element of uncertainty that must be addressed. For reasons discussed in Section V below, we will base shareholder incentive earnings on savings estimates made prior to program implementation for eligible utility programs whose savings can reasonably be estimated. Methods designed to estimate savings after program implementation continue to be improved, but exclusive reliance on them at this time could substantially increase ratemaking uncertainty. The rules established in this

section, and in Section V, seek to maintain ratemaking certainty and reasonably offset the increased risk that comes with establishing savings estimates prior to program implementation. Ultimately, we expect to base program savings and any accompanying shareholder earnings on estimates made after program implementation.

To help determine which, if any, of the incentive mechanisms most appropriately balances all of the state's interests, we directed CACD to prepare and submit a report evaluating the details of the various approaches approved in D.90-08-068. CACD will submit its report by December 31, 1992; thus it would be premature at this time to adopt a single set of detailed rules for shareholder incentive mechanisms that would apply to each of the four IOUs.[12] We will develop detailed rules for incentives in the companion investigation issued today after CACD has submitted its report. However, to address the concerns raised above, we establish a limited number of more general principles as part of this rulemaking. A number of these principles come in response to recommendations made in the Blueprint and draw from the information and experience gained since we approved the 1990 utility settlement agreements in D.90-08-068.

B. Principles Governing Shareholder Incentives Mechanism

The utilities may request to expand or add to their DSM activities prior to the completion of CACD's report. These requests may also include proposed incentive mechanisms which differ from those approved in conjunction with D.90-08-068. We propose these rules keeping in mind the goals of this rulemaking

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12 As we stated in D.90-08-068, we anticipate that CACD's report will require a process similar to the one we have become familiar with in our management audits, whereby CACD coordinates and directs an independent consultant funded by ratepayers.

and our intent to establish, to the extent practicable, a set of statewide standards applicable to utility shareholder incentives. These rules governing shareholder incentive mechanisms will apply to any new utility program, or program modification, proposed after adoption of this rulemaking.

1. Programs Eligible for Shareholder Incentives Should Be Limited

Precisely which utility-sponsored DSM programs should be eligible for shareholder incentives was of central importance to the Collaborative stakeholders. (Blueprint, pp. 11-12.) Program eligibility also received considerable attention in the utilities' post-Collaborative applications. Because we find ourselves in the initial stage of our experiment with DSM incentives, it is important that we examine the conditions under which shareholder incentives are reasonable and appropriate.

Energy efficiency programs and load management programs which promote energy efficiency represent DSM programs intended to serve as alternatives to supply-side options. Load building and load retention are not such alternatives; consequently, we agree with the Blueprint recommendation that load building and load retention should not be eligible for shareholder incentives.

Also consistent with the Blueprint's recommendation, we will exclude fuel substitution programs from shareholder incentives at this time. As we discussed in Section III above, several technical issues remain related to fuel substitution. Until these issues are resolved, it is difficult to assess the benefits ratepayers receive from fuel substitution programs. In Section III, we requested proposals to address these issues and will continue to work toward their resolution.

Eligibility for shareholder incentives should therefore be limited to energy efficiency programs and load management programs which promote energy efficiency. We stress, however, that by limiting program eligibility, we do not expect, nor are we encouraging, utilities to abandon programs which are ineligible for shareholder incentives.

2. **Shareholder Incentive Mechanisms Should Be Based On A Shared Savings Approach For Eligible Programs Whose Savings Can Be Reasonably Estimated**

Shareholder incentive mechanisms accompanied each of the settlements agreements approved in D.90-08-068. Of the four mechanisms approved, PG&E and SDG&E based theirs on a system of shared savings for those programs whose savings can be reasonably estimated. Under this approach, both the utility and the ratepayer share in the value of the savings brought about by the successful implementation of eligible utility programs. Under the approach adopted for SoCalGas and Edison, shareholder incentive earnings are derived from program expenditures and more closely resemble traditional ratebasing practices.[13]

For eligible programs whose savings can be reasonably estimated, we prefer the shared-savings approach because the incentive reflects the resource value of the energy saved. Under this approach, rewards are directly linked to the value of the supply-side resource deferred, or avoided, by the efficiency measure. For the other approaches currently in place, earnings are based solely on dollars spent, which is unrelated to the value of the savings to ratepayers and to the utility. The shared-savings'

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13 In its current GRC (Application (A.) 90-12-018), Edison has requested a shared-savings approach for its shareholder incentive mechanism.

focus on resource value makes it superior to other approaches which strictly tie incentive levels to program expenditures.

Accordingly, we direct the utility to pursue a shared-savings approach for eligible programs whose energy savings can be reasonably estimated.

3. Shareholder Incentive Mechanisms Should Include Reward and Penalty Features

The Collaborative gave considerable attention to the issue of utility accountability. Many stakeholders believed that the utility should be rewarded for exceptional performance and held accountable for poor performance. Some stakeholders felt this concern was best addressed by coupling the opportunity to earn profits with a commensurate risk to incur penalties for performance which falls short of expectations.

We agree that minimum performance requirements represent a reasonable way of ensuring accountability and that such requirements should accompany any request for shareholder incentives. Including minimum performance requirements acts to balance utility risk and reward. With reward provisions, the utility is given a positive incentive to perform well. Minimum performance requirements, and accompanying penalty mechanisms, provide the utility with a positive incentive not to perform poorly.

Requiring a reward/penalty feature also ensures that risks are more equitably shared between the ratepayer and the shareholder. Though the shared-savings approach departs from the standard risk-reward relationship embedded in traditional ratebasing approaches, the reward/penalty mechanism can help ensure that one party is not disproportionately burdened by or freed from risk sharing.

We therefore direct the utility to include minimum performance requirements and an accompanying penalty feature with any proposed shareholder incentive mechanism. The utility should

focus minimum performance requirements on energy efficiency programs, and in particular, on potential lost opportunities.

4. Shareholder Incentive Mechanisms Should Include a Limit on the Level of Earnings Potential

Shareholder incentive mechanisms will greatly assist the stable development of utility DSM activities for California's ratepayers. In approving the incentive experiment for utility DSM programs, we were concerned that ratepayers and the utility not be subject to excessive risk that might accompany the experiment. Consistent with that concern, it is appropriate to establish limits on the level of potential earnings from eligible utility DSM programs approved by this Commission.[14]

The potential for shareholder earnings depends on the type of incentive mechanism in effect, the prespecified savings estimates assigned to DSM measures and programs, and utility performance. Our relative inexperience with each of these elements, particularly in the area of estimating program savings, creates a level of risk and uncertainty. It is therefore reasonable to establish a mechanism which reduces that risk and still provides the utility with a comparable opportunity for earnings from prudent investments made in demand- and supply-side resources. A mechanism that limits the level of potential shareholder earnings meets both of these conditions.

We therefore direct the utility to include with any request for, or modification to, shareholder incentives a mechanism that limits shareholder earnings. The mechanism should be designed keeping in mind our general goal of providing the utility with a

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14 Our new regulatory framework for the telecommunications industry also limits the level of potential shareholder earnings. Limiting such earnings applies equally to utility DSM activities.

comparable opportunity to accrue earnings from prudent investments made in demand- and supply-side resources.

V. Regulatory Oversight of Utility DSM Program Activity

The Collaborative stakeholders considered program measurement and evaluation methods important enough to devote an entire section of the Blueprint to the topic.[15] The stable development of least-cost reliable energy efficiency programs for California's ratepayers depends on well-designed methods of program measurement and evaluation. Once designed, those methods must be adhered to and periodically revisited to ensure they reflect new information and added experience gained from continued utility DSM activities.

A. Program Success and Stability Require Careful Monitoring

1. Program Measurement and Evaluation

Utility performance--whether defined by energy saved or devices installed--forms the basis of our regulatory treatment of utility energy efficiency programs in California. The utility should have the opportunity to earn rewards for performing well; it should face penalties for poor performance. For the DSM programs currently in place, performance and earnings are largely a function of prespecified savings estimates and the utility's success in achieving program targets.

Energy savings must be measured to the full extent practicable to verify that forecasted savings are realized, and to improve the accuracy of future savings estimates. Program

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15 See Appendix A of the Blueprint, "Measurement Protocols for DSM Programs Eligible for Shareholder Incentives."

implementation must be evaluated in order to learn what works, what doesn't, and why. Ultimately, thoughtful measurement and evaluation will improve the design and success of future programs.

Accurate measurement of forecasted savings is crucial if we are to achieve our goal of a resource procurement framework in which DSM and traditional supply-side options compete on an equal footing for a place in the utility resource plan. This Commission has the fundamental responsibility of ensuring that California's ratepayers receive reliable electric service. We must feel secure that forecasts of DSM savings are as reliable as forecasts of supply-side options in meeting energy needs.

For all these reasons, we expect the utilities to make program measurement and evaluation a priority.

2. *The Case for Prespecified Savings*

Tracking the number of devices installed and dollars spent for utility DSM programs is a formidable but not insurmountable task. The task is considerably more daunting under the current conditions of rapidly expanding utility activities. Measuring energy savings after program implementation, however, even under conditions of moderate program expansion, is considerably more complicated.

The question of whether to base shareholder incentives on savings estimates made after implementation, or on prespecified savings estimates, was the subject of considerable debate in the Collaborative, where parties recognized that the choice would require making tradeoffs between ratemaking simplicity, certainty, and accuracy on the one hand, and risks to ratepayers and shareholders on the other. The stakeholders ultimately chose to prespecify and hold constant the bulk of program effects. They also held constant the equations used to calculate shareholder rewards and penalties which, in turn, rely on these prespecified effects. The stakeholders based their decision to prespecify savings on the currently limited ability to reliably estimate

program effects after implementation. They recognized that their choice had the effect of emphasizing the need for ratemaking certainty at the expense of increasing ratepayers' risk.

3. Striking a Balance Between Regulatory Certainty and Protecting the Ratepayer

The stakeholders' emphasis on ratemaking certainty was balanced by the set of pre- and post-implementation measurement protocols agreed to by the Collaborative's measurement subgroup. Establishing clearly defined protocols, the stakeholders reduced some of the risk to ratepayers that comes with prespecified savings estimates. Limiting the period during which savings estimates would remain fixed is one way the protocols reduce risk. At the end of the period, based on the results of utility measurement and evaluation activities, the protocols allow savings estimates, incentives, or both, to be modified.

We are not yet at a stage of development in utility DSM activities that would allow us to base incentive mechanisms solely on savings estimated after program implementation. Thus, we will continue to use prespecified savings estimates as part of a shareholder savings mechanism. The provision in the Blueprint measurement protocols allowing for the periodic adjustment of savings estimates and incentives, and the guiding principles governing shareholder incentive mechanisms described in Section IV above, will mitigate the risk to ratepayers of prespecifying savings estimates.

However, ratepayers should not be subjected to the risks of prespecified savings indefinitely. To ensure they are not, we will shift as swiftly as practicable from prespecified savings to ex post measurement for the purpose of determining shareholder incentive earnings. Well-designed measurement and evaluation techniques will improve savings estimates, program design, and ultimately, savings to ratepayers. The net result of these improvements will be a reduction of risk to the ratepayer and a

continued opportunity for the utility to earn profits for good performance.

We therefore direct utilities to include a comprehensive and aggressive measurement plan with any proposals for DSM programs that include a shareholder incentive mechanism. This plan should be consistent with the protocols put forth in the Blueprint and should include provisions for both updating and improving savings estimates. We include the protocols as Appendix C of this rulemaking.

With time and experience the measurement and evaluation protocols will require reevaluation. Indeed, we expect the utilities to explore and devise improved methods of measurement and evaluation. To the extent parties wish to propose changes to the protocols included as Appendix C, such proposals should be filed as part of this docket.

Finally, we adopt an additional Blueprint recommendation that the utilities assess the rate impacts of proposed incentive mechanisms. (See the Blueprint, p. 13.) Apart from benefiting ratepayers, this requirement will provide useful information about incentives and an added level of ratepayer protection, without placing unreasonable regulatory requirements on the utility. Assessing these impacts will also enhance measurement and evaluation efforts by increasing our ability to understand the relationship between the effect of shareholder incentives on increasing energy efficiency, and the costs those incentives impose on ratepayers to achieve the benefits of more efficient energy use. The utilities are therefore directed to explicitly quantify the following for any proposed shareholder incentive mechanism:

1. The rate effects of both the incentive and program costs;
2. Net resource savings; and
3. The timing of both rate effects and resource savings.

B. Formal and Informal Review of Utility DSM Activities

1. The Role of Advisory Committees

To assist in implementation of their new DSM programs, each utility has formed Advisory Committees to preserve the cooperative atmosphere of the Collaborative. The committees provide an informal forum for parties to review progress made by the utility in implementing approved DSM activities, and to work with the utility on proposed changes.

The successful administration of the Advisory Committees can, like the Collaborative itself, augment effective program implementation. The committees' role as the utility's partner in designing program changes offers a way to incorporate information and experience gained from measurement and evaluation. However, the Advisory Committees do not dilute the utility's responsibility to develop a wide range of cost-effective DSM programs, nor do they supersede this Commission's role in approving and overseeing those programs.

Therefore, we direct the utilities to continue the Advisory Committees. For the Committees to be effective, however, a solid partnership must be established. This requires the utility to define clearly the role of the Committee and the input it seeks; to provide the Committee with comprehensive information on program implementation activities; to notify Committee members in a timely fashion of proposed program changes; to provide adequate information supporting such changes; and, to coordinate Committee activities with current and anticipated regulatory proceedings and other review procedures. We expect these requirements to guide utility management of the Advisory Committees.

2. The Need for a Single Forum to Review Utility DSM Activity

In issuing this rulemaking, we intend to improve the consistency with which DSM programs are treated across utilities and across regulatory forums. The rules and policies proposed in

this rulemaking are designed to assist that improvement. Establishing a single forum where the utilities' DSM can be reviewed simultaneously may further enhance consistent treatment.

Decisions governing utility DSM activities take place in several different proceedings. The general rate case is currently the principal forum in which we review, approve, and fund each utility's DSM activities. In those proceedings we approve funding levels and shareholder incentive mechanisms for utility DSM programs, review program design, and establish guidelines for shifting funds among programs.

In D.90-06-068, we provided the utilities with the opportunity to request program modifications between general rate cases. These requests are made in our rate adjustment proceedings (e.g., Energy Cost Adjustment Clauses (ECACs) and Annual Cost Allocation Proceedings). The significant expansion of utility DSM activities and the novelty of our incentive approach called for a limited degree of flexibility to make such funding adjustments and other program changes. We expect experience and aggressive evaluation to rapidly reduce or eliminate the need for annual adjustments, however.

To reduce the potential for inconsistency that can arise when utility DSM activities are addressed in a piecemeal fashion, in a variety of forums, we propose to establish a single proceeding to address utility DSM. The proceeding would take place every two years, with each utility's filings occurring at the same time. A two-year cycle should provide adequate flexibility for any required program modifications.

This proceeding would become the sole forum in which we review, approve, and fund utility DSM activities. To the extent issues related to demand-side management continue to spill over to other proceedings (as in the case of the general rate case, where the utilities' resource plans are reviewed for ratemaking purposes), we would expect any characterization of the utility's

DSM programs to be consistent with those made in the proceeding we propose to establish today.

We invite the parties to comment on this proposal or to offer alternatives to consolidating the review of utility DSM activities in a single, separate proceeding. Parties proposing alternatives should submit specific details in their proposals.

VI. DSM Bidding

This Commission's goal for utility resource procurement is reliable, least cost, environmentally sensitive electric service. We believe an all-source bidding framework, in which demand- and supply-side options compete on an equal footing for a place in the utility resource plan, offers great potential to achieve that goal. We have made significant progress to that end; but additional work is required in each of the areas that affect competitive resource procurement. That work is ongoing.

In our Biennial Resource Plan Update, our efforts to develop a workably competitive framework for procuring supply-side resources from qualifying facilities (QFs), and our current experiment with integrated resource planning, represent two important steps on the road to all-source bidding. Our investigation of nondiscriminatory access to electricity transmission services for nonutility power producers is another (I.90-09-050). On the demand side, the success of Collaborative, the continued expansion of utility DSM programs, and the steps taken in this rulemaking, move us still closer to our goal. As one of those steps, we intend to grant energy efficiency options an equal opportunity alongside supply-side resources to compete to provide reliable, least-cost electric service. Third party providers of energy services (ESCOs) have a role to play in this developing market. Testing various DSM bidding mechanisms will help determine what that role is.

A. Developing a Competitive Market for DSM

1. The Role of Bidding

Our efforts to use market forces in the various industries we regulate demonstrate that competitive markets can generate efficiencies and savings that benefit all Californians. We will now test the potential to achieve energy savings through a workably competitive market in which nonutility providers bid to deliver demand-side energy services. Any DSM bidding mechanism must allow ESCOs a fair opportunity to provide energy services that offer the greatest long-term benefits to ratepayers at least cost. As we proceed with our test, we intend to ensure, as we have in each of the industries where we have made use of market principles, that the risks associated with fostering a competitive market are shared equitably.

In addition to capturing the benefits of competition for ratepayers, conducting DSM pilots can also help us learn more about DSM delivery mechanisms in a careful, deliberate manner. To determine which delivery mechanism will best serve the various customer classes and market sectors, we will conduct several pilot bids. We will evaluate the pilots and compare them with utility DSM programs to determine which approach best minimizes program costs, reduces administrative burdens, and results in persistent energy savings for the ratepayer. These pilots will also help determine the best role for utilities in achieving energy savings for the ratepayer.

We are working toward a procurement framework that gives the utility comparable incentives to meet its resource needs through demand- or supply-side resources. Who ultimately provides those services--whether it be utility or nonutility providers--should depend on who can reliably deliver the greatest long-term benefits at the lowest cost. We intend to foster a competitive industry in which both QFs and ESCOs have an equal opportunity to compete to provide utility services under an all-source bidding

arrangement. Thus we add DSM pilot bidding mechanisms to our other competitive resource procurement activities. These activities--competitive bidding for utility supply-side additions, integrated resource planning, access for nonutility generation to utility transmission systems, and DSM bidding--are important components in our careful, deliberate move to all-source bidding.

2. Making Use of Past Experience in the Experiment

At this time, ESCOs are at an early, albeit rapid, stage of development. There is great potential ahead for them to provide significant energy savings. The QF industry was in an analogous position in the early 1980s but has persisted through a series of regulatory experiments and changes to become a reliable source of energy supply in California. Our commitment to foster a competitive, reliable third party generation industry contributed significantly to the QFs' successful development.

Our framework for workable competition on the supply side relies on three basic principles: the procurement process must be fair; contract terms must equitably share risks among the shareholders, ratepayers, and third party producers; and utility market power must be mitigated. To ensure a stable future for DSM in California, these same principles must apply.

Like the planning and acquisition processes in place on the supply side, the framework on the demand side must ensure comprehensive evaluation. Accordingly, to the extent practicable, this evaluation should consider all relevant factors, both price and non-price, for all DSM projects. In this way, the procurement process will fairly select those options offering the greatest long-term benefits to all ratepayers at the lowest cost.[16]

16 We expect any proposed DSM bidding mechanism, like the utility's own pursuit of DSM programs, to account for potential lost opportunities.

Ensuring that contract terms equitably allocate risks and benefits received considerable attention during the development of our competitive framework for supply-side resources. A primary concern was (and is) the need to protect captive ratepayers. We will give comparable consideration to risk and reward sharing as we explore demand-side bidding and the role of ESCOs in delivering energy services.

Thus, we will experiment with several bidding approaches, much in the same way that we chose to experiment with different utility incentive mechanisms when we approved the post-Collaborative utility applications. Testing and comparing several pilots will better enable us to develop a bidding mechanism most appropriate for California.

PU Code § 747 requires us to test one or more DSM bidding pilots, the feasibility of a bid that includes both demand- and supply-side resources ("integrated resource bidding"), and a DSM bidding pilot for gas utilities. We are required to submit the results of our experiment to the Legislature by January 1, 1993. The approach we have chosen--testing several types of pilots--will improve the quality and usefulness of those results. CACD will prepare the report evaluating the pilots.

3. The DSM Bidding Universe

DSM bidding is proliferating throughout the country, but there is limited experience with program implementation. Most bidding programs currently being tested allow ESCOs to compete for energy efficiency services through long-term performance contracts with the utility. These contracts generally specify the savings winning bidders must achieve over a specified time, as well as other beneficial features found appropriate for consideration. The contracts may vary in the types of services sought. Those services range from requests for specific measures within single customer classes, to requests for packages of services that cut across

various classes and that include everything from facility analysis to installation and financing.

Bidding programs can also vary in the way ESCOs compete to provide energy efficiency services. So-called partnership and replacement bids are two common approaches. In a partnership bid, bidders compete to provide energy efficient measures that generally enhance, rather than replace, utility programs. The replacement bid allows ESCOs to compete directly with the utility for the right to implement utility-sponsored programs.

Pilot bidding programs explored outside of California have also tested the role of shareholder incentives in DSM bidding. Some approaches include cash bonus payments for exceptional performance, granting the ESCOs "mining rights" to conduct additional energy efficiency programs in the utility's territory, special incentive payments for particularly long-lived efficiency measures, and financial penalties for performance that falls below some prespecified standard.

It is not clear from these pilots which approach is most effective or whether shareholder incentives are necessary for the successful development of DSM bidding framework. To the extent incentives mechanisms are included in the pilots, they should ensure that any risks that might result from their implementation are equitably shared among ratepayers, shareholders, and third-party providers. The mechanisms should also be designed under the rules and policies set forth in Section IV above. Finally, we will assess shareholder incentive mechanisms, and the bidding pilots generally, with the intent of developing a statewide approach.

B. Proceeding with the Pilots

Currently, only one pilot is under consideration. PG&E volunteered to conduct the first pilot, and chose to pursue a partnership bidding approach. PG&E's proposed pilot will allow ESCOs to compete for DSM programs in markets currently untapped by PG&E, and for programs that represent incremental additions, or

enhancements, to PG&E's DSM activities already underway. PG&E submitted its draft RFP for approval in its current ECAC (A.91-04-003).

To learn more about alternative DSM delivery mechanisms and to fulfill the mandate of PU Code § 747, we direct the utilities to work with the Division of Strategic Planning (DSP) to develop and implement other bidding mechanisms. In designing any pilots, the utilities should rely on a process similar to the one used by PG&E. That process should include the formation of a DSM Bidding Advisory Committee with DSP acting as facilitator. The package of pilot bidding programs conducted should include at least one replacement pilot, an integrated resource pilot, and a DSM bidding pilot for gas utilities.[17] The companion investigation instituted today will allow us to best examine the variety of pilots we plan to conduct; it provides a single forum for parties to present and mutually explore the details which must be resolved.

The investigation is the logical place to review, conduct, and evaluate the pilots. ECACs, and our other proceedings in which the pilots might also be considered, are specifically designed to address regulatory issues wholly unrelated to DSM bidding. This investigation has one focus--utility demand-side management and demand-side bidding--, so it can better evaluate each pilot in a consistent manner based on the structure established in this rulemaking. With this order we therefore remove PG&E's pilot bidding proposal from A.91-04-003. PG&E's proposal will be considered in the investigation initiated today. As the other utilities develop their pilots, they shall file their requests in this investigation. While we are proceeding via investigation rather than application, we caution that the utility

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17 See PU Code § 747.

bears the burden of proof as to the reasonableness of any program expenditures and must discharge that burden before such amounts will be reflected in rates.

As stated above, we commend PG&E for its ongoing efforts to design and implement a DSM bidding pilot, and we are anxious for the pilot to proceed expeditiously. We therefore direct the assigned administrative law judge to notice a prehearing conference to coordinate evidentiary hearings to review PG&E's proposal.

IT IS ORDERED that:

1. The four respondents to these proceedings, Southern California Gas Company, San Diego Gas & Electric Company, Southern California Edison Company, and Pacific Gas and Electric Company (PG&E), shall file comments on these proposed rules and policies. Interested parties may also file comments.

2. Those who wish to receive the full text of filed comments shall send a letter request to the persons on the attached service lists within 30 days. Comments shall be filed with the Docket Office within 45 days. Parties filing comments in these proceedings shall serve the full text of such comments on respondents and on those who have so requested in writing. Where no such written request has been received from a given party, the filer need only serve a notice on the party stating that the filer has submitted comments and will serve the full text of such comments on request.

3. The Executive Director shall serve a copy of this order on each respondent, as well as on all appearances in A.90-04-034, A.90-04-036, A.90-04-037, A.90-04-041, A.90-12-018, A.91-04-003, and I.89-07-004.

4. PG&E's request for approval of its demand-side management pilot bidding program is hereby removed from A.91-04-003, and shall be considered in I.91-08-002, pursuant to the schedule specified by the assigned administrative law judge.

5. The assigned administrative law judge shall notice a prehearing conference to coordinate scheduling of PG&E's pilot bidding program.

6. R.91-08-003 and I.91-08-002 are hereby consolidated; except as otherwise specified in connection with requests for pilot bidding program approval and funding, or as specified in the future, all filings shall be made in R.91-08-003, which is the lead docket.

This order becomes effective 30 days from today.
Dated August 7, 1991, at San Francisco, California.

PATRICIA M. ECKERT
President
G. MITCHELL WILK
JOHN B. OHANIAN
NORMAN D. SHUMWAY
Commissioners

Commissioner Daniel Wm. Fessler, being necessarily absent, did not participate.

I CERTIFY THAT THIS DECISION WAS APPROVED BY THE ABOVE COMMISSIONERS TODAY

NEAL J. SHULMAN, Executive Director

SUMMARY OF PROPOSED RULES AND POLICY STATEMENTS

I. Resource Planning and DSM Program Definitions

1. This Commission's goal for utility resource procurement is reliable, least cost, environmentally sensitive electricity service. Using energy more efficiently constitutes an important means of achieving this goal. The utilities should treat energy efficiency improvements and energy conservation as viable alternatives to traditional supply-side resource options.

2. Lost opportunities are those energy efficiency options which offer long-lived, cost-effective savings and which, if not exploited promptly, are lost irretrievably or rendered much more costly to achieve. The utilities should place special emphasis on DSM activities which capture potential lost opportunities. The utilities should submit a detailed account of strategies designed to capture lost opportunities with any request for shareholder incentive mechanisms and/or for increases in DSM program funding.

3. As defined by the Collaborative, "cream skimming" results in the pursuit of only the lowest cost conservation and load management measures, leaving behind other cost-effective opportunities. To reduce the potential for cream skimming, the stakeholders agreed that any proposed incentive mechanism should include strategies explicitly designed to avoid such activities. Parties are invited to provide comments on whether cream skimming as described by the Collaborative continues to be a concern, and whether the utilities should continue to provide a detailed account of strategies to avoid cream skimming with any proposal for shareholder incentives, or increases in funding levels for DSM programs which are eligible for incentives.

4. To ensure optimal funding of DSM activities requires consistent treatment of programs across utilities and across regulatory forums. Common terms and program definitions help ensure consistent treatment. The utilities should use the definitions included in Appendix B of this rulemaking when characterizing any proposed program. The burden is on the utility to justify any departure from them. The Reporting Requirements Manual should be modified to include the terms and definitions included in Appendix B. This OIR will remain open to accommodate any request to modify the terms or definitions proposed herein or to add new terms or definitions.

II. Cost-Effectiveness Indicators

5. The tests in the Standard Practice Manual (SPM) help assess the variety of effects associated with new or expanded DSM programs. The tests in the SPM will serve as the standard for determining DSM program cost-effectiveness until a methodology is established that allows for the side-by-side comparison of demand- and supply-side resources. The utilities should perform cost-effectiveness analyses for any proposed DSM program consistent with the indicators and methodologies included in the SPM. The utility should, to the extent practicable, perform each of the tests included in the SPM for any proposed DSM program.

6. This Commission relies on the Total Resource Cost Test (TRC) as the primary indicator of DSM program cost effectiveness. This reflects our view that utility DSM activities should focus on programs that serve as alternatives to supply-side resource options. Energy efficiency programs and load management programs which promote energy efficiency serve as such alternatives because they reliably reduce a utility's fuel and/or capacity needs.

7. To the extent practicable, nonprice factors should be considered along with price factors in utility resource procurement. Insofar as nonprice factors developed in the Biennial Resource Plan Update (Update) for supply-side resources affect DSM programs, the utility should include them in cost-effectiveness analyses consistent with their development in the Update.

8. Resource value refers to the ability of a DSM program to reliably reduce utilities' fuel and/or capacity needs. For DSM programs designed to defer or avoid these requirements, the resource value associated with such programs should be consistent with the utilities' avoided cost adopted in the Update. These values should be used in applicable cost-effectiveness analyses and when calculating shareholder incentives.

9. Insofar as a DSM program results in indirect costs, they should be considered. The speculative nature of any attempts to quantify indirect costs significantly reduces their applicability as an analytic tool at this time. These costs should therefore not be required in any of the cost-effectiveness tests included in the SPM. The issues related to indirect costs of DSM programs are technical in nature. The SPM working group, which is convened by the CPUC and the CEC, represents the appropriate forum for considering indirect costs as they apply to DSM programs.

10. Shareholder incentives represent a true economic cost in the production of utility DSM programs and should be included in the TRC test, the Societal test, the Rate Impact Measures, and the Utility Cost test.

11. The usefulness of the TRC test as a primary indicator of cost-effectiveness is limited for certain programs. Direct Assistance programs address equity concerns; as such, positive cost-effectiveness shall be an important, but not the sole, factor used to determine funding levels for these programs. Cost-efficiency is also important in the conduct of Direct Assistance programs. For Information Programs and Energy Management Services, the link between programs and savings is difficult to discern. Strict adherence to the TRC should not be required for these programs.

12. Load Building programs lack resource value, and the TRC does not apply to these programs. Though utility DSM activities should focus on energy efficiency programs and load management programs which promote energy efficiency, the pursuit of certain load building programs may achieve other policy goals. The utility should design any load building program so as to avoid frustrating this Commission's goal of encouraging energy efficiency and energy conservation.

13. Fuel substitution programs may offer resource value and environmental benefits. We currently lack a framework to assess the tradeoffs between gas and electric DSM programs that compete to provide the same service. The tests included in the SPM do not capture these tradeoffs. Fuel-substitution programs should reduce the utilities need for electric generation without degrading environmental quality. The TRC test should be the primary indicator of cost-effectiveness for fuel-substitution programs that meet these criteria. We discourage utilities from pursuing fuel substitution programs with a predominantly load building character. For fuel-substitution programs designed to retain load, the utility should demonstrate that the benefits of the program justify relaxing our focus on energy efficiency programs.

V. Shareholder Incentives

14. The Electric Revenue Adjustment Mechanism and Core Fixed-Cost Account remove the disincentive for utilities to invest in demand-side management. To ensure that demand-side management programs which result in, or promote, energy efficiency are not disadvantaged in utility resource procurement decisions, the utility should be provided a comparable opportunity for earnings from prudent investments in both demand- and supply-side alternatives. Shareholder incentives can help ensure that these opportunities are comparable.

15. The differences among utility shareholder incentive mechanisms approved in D.90-08-068 should eventually converge toward a more uniform, statewide approach. Pending CACD's report on shareholder incentives, it is appropriate to establish a limited number of guiding principles governing future shareholder incentives. These principles should apply to shareholder incentive mechanisms proposed after the final adoption of this rulemaking.

16. Shareholder incentive mechanisms should be designed to encourage energy efficiency and load management programs that promote energy efficiency. Load building and load retention programs should not be eligible for shareholder incentives. Fuel substitution programs should also be ineligible pending resolution of the technical issues associated with assessing the benefits to ratepayers of these programs.

17. Shareholder incentive mechanisms should balance risk and reward. Coupling rewards for good performance with penalties for poor performance represents a reasonable way of achieving that balance. Any proposed shareholder incentive mechanism should therefore include minimum performance requirements and

accompanying penalty features. The utilities should focus minimum performance requirements on efforts to achieve energy efficiency opportunities, and in particular, on those which represent potential lost opportunities.

18. Shareholder earnings derived from a shared-savings approach to incentives reflect the value of the energy saved. Incentive mechanisms that determine earnings based solely on program expenditures are unrelated to that value. Thus, for programs whose savings can be reasonably estimated, a shared-savings approach is superior. Shareholder incentive mechanisms should be based on a shared-savings approach for programs whose savings can be reasonably estimated.

19. Reliance on energy savings estimates made prior to program implementation to determine shareholder incentives increases risk to ratepayers. This risk should be minimized while still providing a comparable opportunity for earnings from prudent expenditures in both demand- and supply-side resources. A mechanism which limits the level of potential shareholder earnings meets these goals. This mechanism should be designed keeping in mind the need to establish comparable earnings opportunities between prudent demand- and supply-side expenditures.

VI. Measurement, Evaluation, and Accounting

20. The stable development of DSM programs that deliver reliable energy savings for California's ratepayers depends on well-designed methods of program measurement and evaluation. Thoughtful measurement and evaluation practices are required to gauge utility performance, verify energy savings, and improve the design and success of future DSM programs. The utilities should make program measurement and evaluation a priority.

21. It is reasonable to base shareholder incentives on prespecified savings estimates at this time. The shift from prespecified savings estimates to estimates made after program implementation should occur as swiftly as practicable. Though prespecified savings estimates increase risks to ratepayers, the measurement protocols developed as part of the Blueprint help mitigate these risks.

22. It is important that forecasts of DSM savings be as reliable as forecasts of supply-side options in meeting California's energy needs. Rigorous measurement and evaluation enhances the reliability of these forecasts. The utility will include a comprehensive and aggressive measurement plan with any request for DSM funding which includes shareholder incentives. This plan should be consistent with the protocols included as Appendix C of this rulemaking. Proposed changes to these protocols should be filed as part of this rulemaking.

23. The utility should explicitly quantify the following for any proposed shareholder mechanism:

- The rate effects of both the program incentive and programs costs to which the incentive will apply;
- The program's net resource savings; and
- The timing of both rate effects and resource savings.

24. The DSM Advisory Committees provide an informal forum for parties to review utility programs and to work with the utility on any proposed changes to its programs. These activities can augment effective program implementation. The utilities should continue the Advisory Committees. For the Committees to be effective, the utilities should clearly define the role of the Committee and the input it seeks; provide the Committee with comprehensive information on program implementation activities;

notify Committee members in a timely fashion of proposed program changes; provide adequate information supporting such changes; and coordinate Committee activities with current and anticipated regulatory proceedings and other review procedures.

25. We intend to improve the consistency with which DSM programs are treated across utilities and across regulatory forums. Decisions governing utility DSM activities currently take place in several different proceedings. Establishing a single forum where the utilities' DSM activities can be reviewed simultaneously may further enhance consistent treatment. We propose to establish a single forum in which utility DSM activities would be reviewed, approved, and funded every two years. Parties are invited to comment on this proposal or to provide detailed alternatives to the proposal.

VII. Bidding

26. All-source bidding, in which demand- and supply-side options compete on an equal footing for a place in the utility resource plan, offers great potential for achieving our goal of reliable, least cost, environmentally sensitive electric service.

27. The utilities will work with the Division of Strategic Planning (DSP) to develop and implement several DSM pilot bids. PG&E has volunteered to conduct a pilot bid based on a partnership approach. Public Utilities Code §747 requires this Commission to test at least one replacement bid, and an integrated resource pilot, and a DSM bidding pilot for gas utilities. CACD will perform an evaluation of the pilots. This Commission will submit its report, with any recommendations, to the Legislature by January 1, 1993.

28. The bid pilots should be designed to ensure that 1) the procurement process is fair, 2) contract terms equitably share risks, and 3) utility market power is mitigated. To the extent practicable, the bidding pilots should incorporate both price- and non-price factors for all DSM programs.

29. Each of the pilots, including PG&E's, will be addressed in the investigation opened in conjunction with this rulemaking.

DSM Program Terms and Definitions

Lost Opportunities

Efficiency measures which offer long-lived, cost-effective savings that are fleeting in nature. If these measures are not exploited promptly, the opportunities are lost irretrievably or rendered much more costly to achieve.

Cream Skimming

Designing and implementing only the lowest cost energy efficiency programs and load management programs which promote energy efficiency while leaving behind other cost-effective opportunities for energy efficiency.

Resource Value

A measure of the extent to which energy efficiency and load management programs reliably reduce utilities' fuel and/or capacity needs.

I. CONSERVATION AND ENERGY EFFICIENCY PROGRAMS

Conservation programs are defined as programs which have the effect of reducing consumption of at least one fuel during most or many hours of operation of the equipment or building affected by the measure. Energy efficiency programs are defined as programs which reduce energy use for a comparable level of service.

RESIDENTIAL CONSERVATION AND ENERGY EFFICIENCY

Residential Information Programs: Programs intended to provide customers with information regarding generic (not customer-specific) conservation opportunities. For these programs, the information is unsolicited by the customer. Programs which provide incentives in the form of unsolicited coupons for discounts on low cost measures are included.

Residential Energy Management Services: Programs intended to provide customer assistance in the form of information on the relative costs and benefits to the customer of installing measures or adopting practices which can reduce the customer's utility bills. The information is solicited by the customer and recommendations are based on the customer's recent billing history and/or customer-specific information regarding appliance and building characteristics.

Residential Weatherization Retrofit Incentives: Programs which provide financial incentives (rebates, low-interest loans) to install weatherization measures in existing buildings. The incentives are solicited by the customer and based on the customer's billing history and/or customer-specific information regarding appliance and building characteristics. Incentives are predominantly weatherization measures that affect the building shell. Incentive payments for other measures (nonbuilding shell) are included if provided in connection with building shell materials.

Residential New Construction: Programs which provide financial incentives or significant technical assistance to builders of new residential structures. The incentives are intended to lead to the installation of more energy efficient materials or appliances than would have been installed in the absence of the program.

Appliance Efficiency Incentives: Programs which provide incentives to customers in existing residential structures. The incentives are intended to lead to the installation of a more efficient appliance than would have been installed in the absence of the program. Incentives are paid (to manufacturers, salespersons, or customers) for the replacement of an existing appliance or the installation of a new appliance in an existing residential building.

Direct Assistance: Programs which are intended to provide assistance to low income or other "target" customer groups. Assistance consists primarily of full subsidies of the conservation measures. The primary purpose of the program is to serve an equity objective in assisting customers who are highly unlikely or unable to participate in other residential programs.

Master Meter: Program intended to reduce energy usage in existing residential structures which have master meters by replacing the master meter with individual meters.

Other Residential Conservation Programs: Any residential conservation program or program activities not defined above.

NONRESIDENTIAL CONSERVATION AND ENERGY EFFICIENCY

Nonresidential Information Programs: Programs intended to provide customers with information regarding generic (not customer-specific) conservation opportunities. For these programs, the information is unsolicited by the customer. Programs which provide incentives in the form of unsolicited coupons for discounts on low cost measures are included.

Commercial Energy Management Services: Services to customers in commercial buildings which provide customer assistance in the form of information on the relative costs and benefits to the customer of installing measures or adopting practices which can reduce the customer's utility bills. The information is solicited by the customer and is based on the customer's recent billing history and/or customer-specific information regarding appliance and building characteristics.

Industrial Energy Management Services: Services to customers in industrial facilities which provide customer assistance in the form of information on the relative costs and benefits to the customer of installing measures or adopting practices which can reduce the customer's utility bills. The information is solicited by the customer and is based on the customer's recent billing history and/or customer-specific information regarding appliance and building characteristics.

Agricultural Energy Management Services: Services to customers in agricultural facilities which provide customer assistance in the form of information on the relative costs and benefits to the customer of installing measures or adopting practices which can reduce the customer's utility bills. The information is solicited by the customer and is based on the customer's recent billing history and/or customer-specific information regarding appliance and building characteristics.

Commercial Energy Efficiency Incentives: Programs which provide incentives to customers in existing commercial buildings. The incentives are intended to lead to the installation of a more efficient device than would have been installed in the absence of the program.

Industrial Energy Efficiency Incentives: Programs which provide incentives to customers in existing industrial facilities. The incentives are intended to lead to the installation of a more efficient device than would have been installed in the absence of the program.

Agricultural Energy Efficiency Incentives: Programs which provide incentives to customers in existing agricultural facilities. The incentives are intended to lead to the installation of a more efficient device than would have been installed in the absence of the program.

Nonresidential New Construction: Programs which provide financial incentives or significant technical assistance to builders of new nonresidential structures. The incentives are intended to lead to the construction and operation of equipment which is more efficient than would have occurred in the absence of the program.

Street Lighting Conversion: Programs designed to replace less efficient lighting equipment with more efficient lighting equipment in utility-owned street lights.

Other Nonresidential Conservation/Energy Efficiency Programs: Any nonresidential conservation program or program activities not defined above.

SYSTEM EFFICIENCY

Conservation Voltage Reduction: Programs which improve utility generation system efficiency by regulating the voltage levels of delivered electricity.

Other System Efficiency Programs: Any other program intended to improve the efficiency of utility-owned transmission or distribution facilities.

II. LOAD MANAGEMENT

Load management programs are defined as any program which reduces electric peak demand or has the primary effect of shifting electric demand from the hours of peak demand to non-peak time periods.

Residential Air Conditioner Cycling: Programs which involve the installation of cycling devices on residential air conditioning equipment. Air conditioning loads are interrupted ("cycled" or "shed") by the utility at times of peak load.

Residential Time-of-Use: Programs intended to reduce customer bills and shift hours of operation of appliances to off peak periods through the installation of a time-of-use meter and the availability of time-differentiated rates.

Pool Pump Timer: Programs which involve the promotion of shifting pool pump hours of operation from on-peak to off-peak periods.

Nonresidential Air Conditioner Cycling: Programs which involve the installation of cycling devices on air conditioning equipment in nonresidential buildings. Air conditioning loads are interrupted ("cycled" or "shed") by the utility at times of peak load.

Nonresidential Time-of-Use: Program intended to reduce customer bills and shift hours of operation of equipment from on-peak to off-peak periods through the installation of a time-of-use meter and the availability of time-differentiated rates. Mandatory TOU participation is not included.

Thermal Energy Storage: Programs which provide financial incentives to customers or builders to install thermal storage equipment and materials capable of fully or partially storing thermal energy during nonpeak periods for use during peak demand periods.

Interruptible/Curtailable: Programs which provide financial incentives in the form of reduced billing charges to customers in exchange for the capability of utility-initiated interruption or curtailment of service. Terms of the reduced service agreement (frequency, duration, penalty clauses, incentive levels, cost of equipment) are agreed to by contract.

Other Load Management: Any other load management program not defined above.

III. FUEL SUBSTITUTION

Fuel Substitution programs are defined as programs which are intended to substitute (replace) energy using equipment of one fuel with a different fuel. The programs are intended to influence the customer's choice between electric or natural gas service from the utility, with the effect of increasing sales/consumption from one fuel and decreasing sales/consumption from the competing fuel. The reference point for classifying a program as a fuel substitution program is the effect on fuel choice of the customer, not the effects on utility generation.

Electric Fuel Substitution: Programs which promote the customer's choice of electric service for an appliance, group of appliances, or building rather than the choice of service from a different fuel. These programs increase customers' electric usage and decrease usage of utility-supplied natural gas. Electric fuel substitution includes Bypass Deferral Special Contracts which cause the deferral or avoidance of the installation of gas-fired equipment which would have been used to produce electricity for the customer's use, and are negotiated and established pursuant to CPUC procedures. Contract provisions may include a discounted rate, conservation and/or load management incentives, or a combination of rate and conservation/load management incentives.

Gas Fuel Substitution: Programs which promote the customer's choice of natural gas service for an appliance, group of appliances, or building rather than the choice of service from a different energy source. These programs increase customer usage of natural gas and decrease usage of an alternative fuel.

IV. LOAD RETENTION AND LOAD BUILDING

Load Retention and Load Building programs are defined as programs which have the effect of increasing the annual sales/consumption of one fuel without affecting the customer's use of other fuels.

Electric Load Retention: Consists of Bypass Deferral Special Contracts, established and negotiated pursuant to adopted CPUC procedures, which defer or prevent a customer decision to terminate or substantially reduce electric utility service with no corresponding establishment of incremental utility-supplied natural gas purchases. Contract provisions may include a discounted rate, conservation and/or load management incentives, or a combination of rate discount and conservation/load management incentives.

Electric Load Building: Programs which have the effect of increasing electric annual sales/consumption without changes in the customer's use of alternate fuels. Increased sales/consumption is promoted by increased usage of existing electric equipment, or the addition of electric equipment/service when no meaningful alternative fuel source is available. Electric Load Building includes Incremental Sales Contracts negotiated and established pursuant to adopted CPUC procedures.

Natural Gas Load Retention: Consists of programs which provide an incentive to defer or prevent a customer decision to terminate or substantially reduce utility natural gas service, with no corresponding establishment of incremental utility-supplied electricity use by the customer.

Natural Gas Load Building: Programs which have the effect of increasing gas annual sales/consumption without changes in the customer's use of alternate fuels. Increased sales/consumption is promoted by increased usage of existing natural gas equipment, or the addition of natural gas equipment/service when no meaningful alternative fuel source is available.

IV . MEASUREMENT AND EVALUATION PROGRAMS

Measurement and Evaluation activities are defined as programs and activities intended to establish or improve the ability to measure and evaluate the impacts of demand-side management programs, collectively or individually.

Load Metering: Activities related to the collection, analysis and reporting of data obtained through the use of metering devices. Includes metering at the level of appliances within buildings as well as total building metering and class load metering. Metering activities are conducted on samples of

customers for the primary purpose of obtaining consumption and demand estimates which are representative of a customer class, not of DSM program participants.

Customer Surveys: Activities related to the collection, analysis and reporting of data obtained from customer contacts (e.g. mail, telephone, on-site) regarding building characteristics, appliance holdings, energy efficiency measures in place, customer attitudes, or other information related to current or future energy usage patterns. Survey activities are conducted on samples of customers for the primary purpose of obtaining information about customers which are representative of a customer class not of DSM program participants.

New Technology Testing: Activities related to the measurement and assessment of demand-side technologies for possible inclusion in future C&LM programs. Costs associated with in-site testing and evaluation of measures or devices in a pilot program are included.

Program Evaluation: Activities related to the collection, analysis, and reporting of data for purposes of measuring program impacts from past, existing or potential program impacts. Activities include program-specific evaluations as well as activities which evaluate more generic issues which are relevant to more than one program. Costs associated with the preparation of this Reporting Requirements Manual to the CPUC are included as a separate program within this category.

Other Measurement: Activities not listed above which contribute to the measurement of past, current, or future demand side program impacts.

V. OTHER DSM ACTIVITIES

Other DSM activities are defined as a residual category to capture expenditures which cannot be meaningfully included in the previously-defined DSM program categories. A primary element includes general administrative and support costs which cannot readily be attributable to the implementation of any specific DSM program.

PROGRAM ELEMENT DEFINITIONS

DESCRIPTION: "Program element" refers to either customer classes within sectors or to end uses/measures within customer classes or customer sub-classes.

Customer classes are defined by either rate schedule, SIC code, or energy consumption characteristics. "End use" refers to the purpose for which energy is used (see below); "measure" refers to specific customer actions which reduce or otherwise modify energy end use patterns.

CUSTOMER SUB-CLASS PROGRAM ELEMENT DEFINITIONS: For the residential sector the following three types of program element sub-class designations should be used:

Single Family(SF)
Multi-Family(MF)
Mobile Home (MH)

For the nonresidential sector, sub-class program elements consist of customers classified by SIC code and size (consumption/demand). The size program element designations are as follows:

Large (greater than 500 kw)
Medium (less than 500kw and more than 49kw)
Small(less than 50kw)

Customer SIC-based program elements consist of the further dissaggregation of "industrial" (per the program definition) into the four sub-class designations used by the CEC in the CFM process (TCU, Assembly, Process, and Mining/Extraction) and dissagregation of the Commercial Buildings into the 10 SIC-based building types used by the CEC.

END USE PROGRAM ELEMENT DEFINITIONS: Recommended end use definitions/acronyms for the residential sector are as follows :

SPHT(e)=space heating, electric;
SPHT(HP)=space heating, heat pump;
SPHT(g)=space heating, natural gas;
SPCL(C)=central electric air conditioner;
SPCL(Ev)=evaporative cooler;
SPCL(HP)=space cooling, heat pump;
SPCL(W)=window air conditioner;
WATHT(e)=electric water heating;
WATHT(g)=gas water heating;
REFR=refrigerator;
FREEZ=freezer;
COOK(e)=electric range;
COOK(g)=gas range;
LGHT=lighting;
PLPMP=pool pump.

Recommended end use designations/acronymns for the commercial building sector are as follows:

LGHT(I)=indoor lighting;
LGHT(O)=outdoor lighting;
AC(e)=air conditioning, electric;
AC(g)=air conditioning, natural gas;
VENT=ventilation(motors/fans to operate HVAC equip);
SPHT(e)=electric space heating;
SPHT(g)=natural gas space heating;
WATHT(e)=electric water heating;
WATHT(g)=natural gas water heating;
REFR=refrigeration
COOK(e)=electric cooking;
COOK(g)=natural gas cooking;
MISC(e)=miscellaneous electric;
MISC(g)=miscellaneous natural gas;

OTHER TERMS:

Useful Life: The length of time (years) for which the load impacts of a DSM measure/device is expected to last.

Load Impact Adjustments: Refers to any adjustments made to load impacts for purposes of valuing the impacts in the context of cost-effectiveness evaluation. The primary example would be the use of "Net-to-Gross" factors, as defined and used in the Standard Practice Manual for Economic Analysis of Demand-Side Management Programs, December, 1987. Other examples would include estimates of the amount and rate or decay in effectiveness of the measures, and therefore the decline in load impacts over time.

REPORT OF THE STATEWIDE

COLLABORATIVE PROCESS

AN ENERGY EFFICIENCY BLUEPRINT FOR CALIFORNIA

APPENDIX A

MEASUREMENT PROTOCOLS FOR DSM PROGRAMS ELIGIBLE FOR SHAREHOLDER INCENTIVES

JANUARY 1990

Appendix A: MEASUREMENT PROTOCOLS FOR DSM PROGRAMS ELIGIBLE FOR SHAREHOLDER INCENTIVES

Submitted by:

A&C Enercom
Association of California Water Agencies
California Department of General Services
California Energy Coalition
California Energy Commission
California Large Energy Consumers Association
California/Nevada Community Action Association
California Public Utilities Commission, Division of Ratepayer Advocates
Independent Energy Producers Association
Natural Resources Defense Council
Pacific Gas and Electric Company
San Diego Gas and Electric Company
Southern California Edison Company
Southern California Gas Company
Toward Utility Rate Normalization

January 1990

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I. Introduction and Summary

This appendix was prepared by a subcommittee of experts convened by the Collaborative. It describes the consensus reached by these experts on the measurement of demand-side management programs that are approved for inclusion in a utility incentive mechanism. The subcommittee was composed of representatives of the California Public Utilities Commission--Division of Ratepayer Advocates, the California Energy Commission, the state's four major investor-owned utilities, and Lawrence Berkeley Laboratory (see Section V).

The Measurement Subcommittee recognizes that accurate measurement of the load impacts of DSM programs is critical for establishing demand-side management as a viable resource option and for establishing useful criteria for determining utility performance in DSM program implementation. Current practices for estimating DSM program impacts may not always rely on best available methods. Considerable improvement in these procedures is necessary.

The Measurement Subcommittee has identified a set of measurement protocols that provide acceptable procedures for the measurement of DSM program impacts. The most important aspects of these protocols can be summarized as follows:

1. The application for an incentive mechanism will include a detailed plan to improve the accuracy of load impact estimates.

2. The fulfillment of this plan is a precondition for extension of utility incentive mechanisms beyond the third year.

3. For purposes of determining utility incentive payments, the average load impacts per unit will be prespecified and held

constant during the first three years[1] of program implementation; estimates of total program savings used for incentive payments will be affected by actual participation levels and the mix of measures installed.

4. After the third year, the average load impacts for future program activities will be adjusted to reflect the results of the measurement plan.

The Subcommittee has not attempted to reach consensus on the exact measurement techniques that must be followed for each possible type of program, nor has it discussed how or whether to adjust load impacts for potential rebound, income, or productivity effects, because these issues need to be resolved on a program-specific basis. Rather, we have provided guidelines for the scope and intensity of measurement. Detailed measurement plans for each utility's incentive programs will be developed according to these guidelines and submitted with program proposals. The results of these measurements will be used in different ways depending on the particular incentive mechanism approved for each utility.

This appendix describes both guidelines for acceptable measurements prior to the implementation of DSM programs in the initial phase of utility incentive mechanisms and guidelines for expected improvements in the accuracy of these measurements after three years. A sample evaluation plan has been developed to demonstrate the use of the measurement guidelines. This document also includes the consensus reached on the estimated useful lives of selected residential measures and a glossary of the terms used.

[1]The duration of programs proposed in the March 1990 applications for utility shareholder incentives may be longer or shorter than three years, and may be linked to each utility's existing General Rate Case cycle. However, measurement analysis requires three years to produce useful results. The integration of the cycles of program implementation and of measurement will be further clarified in the March 1990 applications.

II. Measurement Protocols for Demand-Side Management

OVERALL GUIDELINES

Trade-offs between ratemaking simplicity and certainty, on the one hand, versus analytical accuracy and ratepayer/shareholder risk, on the other, must be made when choosing between program impact estimates made prior to program implementation and those made through measurements after implementation. In general this appendix places a higher value on ratemaking certainty, because it recommends prespecifying most program impacts in advance for three years and then refining these impact estimates as measurement results become available.

"Impacts" refers to a variety of elements which, collectively, can and should be used to evaluate DSM programs. Among the more important types of impacts are load impacts, which refer to the changes in energy use patterns (including kWh, kW, and/or therms) affected by the program. "Impacts," however, also include various types of costs used in the valuation process--program costs, DSM measure costs, and utility avoided costs. Depending on the specific type of utility incentive mechanism, some or all of these kinds of "impacts" will affect a determination of both the value of a DSM program and performance of the utility in implementing the program.

"Measure" is a noun used to mean any particular product, equipment, or physical modification that saves resources, e.g. compact fluorescent lights, high-efficiency air conditioning, heat recovery systems, and direct load control devices.

The Measurement Subcommittee agrees upon the following measurement protocols:

1. Load impacts for each measure expected to be part of each program will be prespecified as an estimate of average impacts per unit installed; Table 1 provides additional information on the components of "load impacts." Procedures will also be established prior to implementation

for the inclusion of additional estimates of average load impacts for measures not initially identified.

2. At the time a utility applies for an incentive mechanism, the utility will provide additional information that will identify estimates of expected participation levels, utility program costs (aggregate, for each program), measure costs (average for each measure within each program and totals for each program), and the avoided costs to be used in establishing the resource value of each program.

3. Approval of a utility incentive mechanism will include the adoption of a three-year measurement and evaluation plan, which identifies the timing and type of evaluation techniques that will be employed to improve the load impact savings estimates established prior to implementation. This plan will also identify the process by which it can be modified during the three years. Any such modifications should involve the substitution of specific activities that are functional equivalents of the original activities.

4. Satisfactory completion of the measurement plan activities is a precondition for any request to continue an incentive mechanism after the third year.

5. It is understood that measurement and evaluation activities include projects that go beyond the direct measurement of program load impacts; examples of such activities include customer decision-making processes, process evaluation, and more general demand-side data collection activities.

6. Prespecified average load impacts per measure (including kWh, kW, and/or therms) will not be changed for programs implemented in the first three years of a utility incentive mechanism (even if the initial programs last less than three years), unless these changes are established through a process agreed upon at the time of application for the incentive mechanism. Average savings per unit may be modified beyond the third year, if warranted. Actual customer participation levels, however, will be used in the calculation of a utility incentive.

7. When a utility incentive mechanism is affected by program costs (as defined by the Utility Cost test or the Total Resource Cost test of the Standard Practice Manual), pre-implementation cost estimates should be clearly established in terms of: (a) the average cost per unit (corresponding to the average load impact per unit, as determined in Item #1 above); (b) the source(s) of such estimates; and (c) the source(s) and procedures to be used in determining these costs subsequent to implementation.

8. Post-implementation estimates of load impacts (per Item #1 above) and participation levels (per Item #6 above) should be used in accounting for program load impacts in long-term demand forecasting activities, as well as for extensions of a utility incentive mechanism beyond the third year.

9. Adoption of a utility incentive mechanism will include the adoption of avoided costs to be used in the calculation of the utility incentive, or the adoption of a future source of avoided cost projections to be used.

10. All of the above protocols will be reviewed and possibly modified prior to the adoption of any extension of a utility incentive mechanism beyond three years.

This appendix does not include a discussion of the different techniques that could be used to separate out efficiency improvements from a program's net load impacts in the cases where rebound, income, or productivity effects may decrease expected load savings from the program. This is not because these measurements may not be important for some programs; rather it stems from uncertainty regarding the way utilities should be rewarded for programs that induce "pure" efficiency increases and how these impacts should be used to "adjust" load impact estimates that are more closely tied to resource value. In addition, it may be difficult or costly to measure income, productivity, or rebound effects that may reduce expected conservation savings.

Each utility should include in its measurement plans methods to measure rebound, income, or takeback effects for programs or sectors where these effects are likely to be significant. These results will be used to adjust future program load impact estimates and possibly future incentive payments, if any.

At the time of the post-collaborative application for modifying DSM program expenditures and utility incentive mechanisms, each utility application should contain a comprehensive DSM Measurement Plan which identifies, for each program designated as eligible for an incentive: (a) the measurement techniques and specific values to be used for each measure of each program to be implemented in the first three years (e.g., the kWh, kW, and/or therms per unit and other load impact parameters and program cost estimates identified in Table 1); (b) the plans for improving the accuracy of the estimates over time; and (c) methods to measure efficiency changes for programs or sectors where the utility believes the income or rebound effect may be significant. These plans should demonstrate that the measurement plan for each program (as defined in the DSM Reporting Requirements Manual) conforms with the guidelines and expectations identified and discussed in the following sections.

PRE-IMPLEMENTATION MEASUREMENT PROTOCOLS

Table 1 identifies the acceptable methods and procedures for estimating, prior to program implementation, the various program impact parameters for programs implemented during the first three years of a utility incentive mechanism. The program impact parameters include the load impact (and its components), participation level, utility costs, and total costs. (All terms used in the table are defined in the Glossary, Section IV.) Depending on the nature of the utility incentive mechanism, estimates of some or all of these parameters may affect the determination of the performance of a utility in implementing the program.

Table 1

ACCEPTABLE PRE-IMPLEMENTATION MEASUREMENT ACTIVITIES FOR CONSERVATION AND LOAD MANAGEMENT PROGRAMS

Program Impact Parameter	Judgment	Engineering	Statistical (Bills)	Metered	Customer Survey	Other Market Data	Utility Accounting Records
Load Impacts:							
First-year, annual		X	X	X		X	
Load shape	X	X		X			
Net-to-gross	X		X		X		
Rebound effect	(Not included in preprogram load impact estimation procedures.)						
Useful life	X	X		X	X	X	
Persistence	X	X	X	X			
Participation Level	X					X	
Utility Costs	X						X
Total Costs	X	X			X	X	X

NOTE: Each term used in this table is defined in the Glossary.

Load Impacts

In general, all aspects of establishing load impacts prior to the implementation of DSM programs should be consistently employed for estimates used both to establish a utility incentive mechanism and to establish DSM programs as a resource option. This will require that utilities work toward achieving consistency between load impact estimation procedures used at the time of approval of an incentive mechanism and those employed for resource planning purposes after 1990.

The measurement of DSM savings is a maturing field. As such, it is still dependent on a great deal of professional judgment as to the proper procedures to apply to each particular program evaluation. Therefore, measurement activities in particular must be insulated from the financial pressures of utility incentive mechanisms.

If measurement activities produce more accurate load impact estimates, the changes should *not* be used retroactively to establish load impacts for the purpose of determining incentive payments during the first three years. Such changes *should* be used to (a) establish load impact estimates for subsequent DSM program implementation and (b) revise the load impacts from prior-year program implementation in subsequent demand forecasts.

Table 1 identifies six specific load impact parameters: first-year (annual) energy savings, load shape, net-to-gross, rebound effect, useful life, and persistence. Of these six, all except load shape should be developed and understood to apply to individual measures or prespecified groups of measures within each DSM program. That is, the measurement plan for each program should include estimates of "first-year, annual," "net-to-gross," etc. for each measure included in a DSM program (e.g., compact fluorescents, or each efficiency level of appliances for a Residential Appliance Efficiency incentive program). The load shape estimates, however, may be established at the end-use level (e.g., refrigeration, lighting, air conditioning) for each end use affected by the program.

First-year, annual. This value should represent the average reduction in kWh or therms expected in the first year following installation for each of the DSM measures expected to be installed as a result of the program. At a minimum, the estimate should reflect established engineering calculation procedures that account for such matters as the physical and operational characteristics of a specific energy efficiency measure compared with the characteristics of the equipment that would have been used in the absence of the program. To the extent that "measured" data exist (from bill analysis or metered equipment) for any or all measures for the program, such information should be used. If "measured" data exist for a group of measures (but not for individual measures), it is acceptable to use this information to adjust the engineering estimates for each individual measure.

Load shape. For each electric end use (e.g., refrigeration, lighting, cooling), for each program, a load shape should be developed which represents how the reduction in kWh is distributed across different time periods. The time periods normally will be the same as those for which separate avoided costs are calculated. The load shape also should identify the average kW reductions for each time period for each end use. Table 1 identifies "judgment," "engineering," and "metered" as acceptable sources of load shape estimates. If "judgment" is used as the basis for load shape data, the central assumptions underlying the judgment should be identified. In general, engineering-based load shape data (e.g., from heat load simulations) are preferable to "judgment" and should be used if available, and "metered" data (from a representative sample, even if from another region) are preferable to "engineering" estimates and should be used if available. Load shape estimates from natural gas programs are not expected.

Net-to-gross. Measurement techniques should estimate the effects of a measure (or program) by accounting for "what would have happened without the program." This adjustment may be made directly in the technique for estimating first-year savings, e.g., by the proper use of control groups. If it is not made directly and is not reflected in any other load impact parameter, then a net-to-gross factor should be used. While this adjustment is normally estimated for individual measures, a

common adjustment for all measures for a given program may be reasonable. If judgment is the basis of this value, adequate justification should be provided.

Rebound effect. While it is understood that some programs may have a rebound effect, it is agreed that this effect has not been demonstrated sufficiently to the point where it is appropriate to include this effect in any pre-implementation estimate of load impacts.

Useful life. Useful lives for purposes of pre-implementation estimates of load impacts should be consistent with the estimates agreed upon by the Collaborative members, as discussed in the section below, "Estimated Useful Lives of DSM Measures," page A-16. However, alternative estimates of useful lives may be used, if identified prior to program implementation and accompanied with adequate documentation.

Persistence. Estimates of any degradation of a measure over time should be identified in terms of a "decay factor" which shows, for each year over the useful life of the measure, the amount of the load impact relative to the first-year impact. Pre-implementation estimates of persistence may be based on estimates that have already been used in earlier filings. Any new estimates based on "judgment" should include adequate justification.

Participation Level

The estimates of participation made prior to implementation will necessarily involve considerable judgment. Participation level may be expressed in different ways for different programs (e.g., number of light bulbs, number of square feet of commercial floor space, number of customers), but the unit of measurement for participation level should be compatible with the other load impact parameters. That is, total first-year load reductions should be the simple product of first-year annual average reductions and the participation level (times the net-to-gross factor and other adjustments, if applicable).

Actual participation for each measure (or group of measures) may differ substantially from pre-implementation estimates. There is no expectation that the utility will necessarily achieve the target participation level established before program implementation for each measure or group of measures.

Utility Costs

Utility cost estimates should be provided for each program and should represent the estimated total (aggregate) cost for the utility to implement the program. This should correspond to the amount of dollars requested/authorized to fund the program.

Estimates of utility costs made prior to implementation will necessarily involve considerable judgment, because cost estimates will be affected by participation level and (for example)-the type and amount of customer incentive payment. Actual utility costs, as measured post implementation, may differ substantially from the pre-implementation estimates.

Total Costs

The "total cost" parameter in Table 1 should be defined in terms consistent with the Total Resource Cost test of the Standard Practice Manual. The two major elements of these costs--measure costs and utility implementation costs--should be identified separately. Measure costs should be presented for each measure and expressed in terms compatible with the average load impacts per unit and the participation level. That is, the product of the average cost per measure and the participation level should yield the aggregate measure cost for that measure. The implementation cost component of the total cost estimate should be for the program as a whole and should be the same as the implementation cost component of Utility Costs.

POST-IMPLEMENTATION MEASUREMENT PROTOCOLS

The measurement plans filed at the time of the application for authorization of a utility shareholder incentive mechanism should clearly identify, for each program:

1. The type and timing of the measurement activity that is planned (e.g., metered, statistical, etc.);
2. The individual measures the activity is intended to analyze;
3. The program impact parameters that are the intended focus of measurement;
4. The basis for establishing mutually agreeable modifications to the measurement plan.

It is understood that the completion of the activities described in the measurement plan constitutes a precondition for any request to extend the utility incentive mechanism beyond the third year.

Table 2 provides a summary reference for measurement and evaluation procedures that should be completed within a three-year post-implementation phase. As with Table 1, each line identifies acceptable measurement techniques for each impact parameter, as discussed below. The discussion in this section identifies more precisely how the results of the improved evaluation capabilities are to be used for determining utility performance, adjusting pre-implementation load impact estimates in subsequent demand forecast submittals, and revising estimates for programs implemented in the future.

Table 2 refers primarily to measurement of full-scale implementation of a program. The measurement of pilot programs will often be more intensive and may include techniques that are not possible or appropriate for full-scale programs.

Load Impacts

A primary feature of the measurement plan should be the clear designation of activities that will improve the ability to measure program load impacts. It is understood that the goal of the analyses conducted in this three-year period is to improve the estimates used initially for many if not all of the various load

Table 2

ACCEPTABLE POST-IMPLEMENTATION MEASUREMENT ACTIVITIES FOR CONSERVATION AND LOAD MANAGEMENT PROGRAMS

Program Impact parameter	Judgment	Engineering	Statistical (Bills)	Metered	Customer Survey	Other Market Data	Utility Accounting Records
Load Impacts:							
First-year, annual		X	X	X		X	
Load shape			X	X			
Net-to-gross	X		X		X	X	
Rebound effect			X		X		
Useful life		X		X	X	X	
Persistence/decay	X	X	X	X			
Participation level							X
Utility Costs							X
Total Costs		X			X	X	X

NOTE: Each term used in this table is defined in the Glossary.

impact parameters. It is also understood that the results of these post-implementation measurement activities for each load impact parameter should *not*, unless by mutual agreement, be used retroactively to establish load impacts for the purpose of determining incentive payments during the first three years. Results of such studies, however, *should* be used for subsequent revisions to historical and projected impacts of programs implemented prior to the initiation of the incentive mechanism, and for developing estimates for subsequent program implementation.

First-year, annual. In general, it is expected that the measurement plan will produce improvements in estimates of this important parameter by relying more on metered or statistical analyses to replace engineering-based estimates. It is recognized, however, that conducting metered studies for all measures for all programs is impractical; emphasis should be on a representative sample of applications for those measures that are expected to be the most significant for each program. It is also recognized that statistical techniques may not be practical for isolating the effects of individual measures, and may be most productively employed for purposes of identifying the effects of a group of measures. It is acceptable, and perhaps desirable, to use the results of metered and statistical analysis to proportionately adjust average per-measure load impacts that are based on engineering estimates.

Load shape. By the end of the initial three-year period, all load shape estimates should be based on some kind of metered data at the end-use level (but not necessarily at the individual measure level), even if not based on a metering activity undertaken in the utility service territory.

Net-to-gross, rebound effect, useful lives, and persistence. Utilities should strive to improve the accuracy of at least one of these parameters for each program during the first three years.

Participation Level

Participation levels will be an important element in determining overall utility performance. Post-implementation records will

be used, along with the prespecified estimates of load impacts per unit, to determine overall program load impacts.

Utility records are the only acceptable source for determining customer or measure participation. The utility is responsible for establishing and maintaining records that can be used for this purpose. Utility records are subject to review prior to the final determination of any utility incentive payment.

Utility Costs

Utility costs will be an important element in determining overall utility performance. Utility records are the only acceptable source for determining utility costs. The utility is responsible for establishing and maintaining records that can be used for this purpose. Utility records are subject to review prior to the final determination of any utility incentive payment.

Total Costs

Post-implementation estimates of total costs may be an important determinant of utility performance. The utility implementation cost component of Total Costs is subject to the same treatment as Utility Costs, above. The measure cost component should be based on either customer or manufacturer surveys conducted subsequent to the first year of program implementation. To the extent that customer operation and maintenance costs are an integral aspect of total costs, these may be based on engineering estimates established prior to program implementation.

ESTIMATED USEFUL LIVES OF DSM MEASURES

The Measurement Subcommittee sought consensus on the useful lives of conservation measures that are commonly installed by utility conservation programs in the residential and commercial sectors. The consensus reached by the group on residential measures is specified in Table 3, along with each member's initial estimates. These values should be used in the application for authorization of a utility incentive mechanism in March and in all future calculations of energy savings and/or

financial rewards, unless a utility can make a strong case for a new value based on new evidence.

The group did not reach a consensus on the useful lives of commercial conservation measures, because of the larger variety of measures and larger variance among utilities in the estimates of useful life. Table 4 summarizes the different estimates gathered for each utility. The Measurement Subcommittee will continue to seek consensus on commercial useful lives in time for the utilities' March applications for utility incentive mechanisms. If consensus is not reached, utilities will simply provide their best estimates (including adequate documentation for each estimate).

Table 3

USEFUL LIVES OF RESIDENTIAL
ENERGY CONSERVATION MEASURES (YEARS)
(Compiled from utility and CEC sources)

	PG&E	SCE	SDG&E	SCG	CEC RCS[1]	Consensus
Caulking	20	10	–	10	20	10
Weatherstripping	10	10	–	10	20	10
Ceiling insulation	20	*	35	22	25	25
Wall insulation	–	30	–	22	20	25
Low-flow showerheads	10	–	–	–	20	10
Water faucet aerators	20	–	–	–	–	10
Duct wrap/insulation	15	–	–	*	15	15
Water heater blanket	10	–	–	*	20	10
Fluorescent bulbs	9	10	–	–	–	10
Window shade awnings	10	–	–	–	–	10
High-efficiency A/C	20	15	18	–	20	18
Central heat pump	–	15	–	–	18	18
Evaporative coolers	–	15	–	–	–	15
Clock thermostat	25	10	–	*	20	15
High-efficiency refrigerator	20	15	10	–	20	20
High-efficiency central furnace	20	–	10	19	20	20
Whole house fan	–	15	–	–	15	15
Double glazing	–	–	–	–	–	25
Storm windows	–	–	–	–	–	15
Window film tinting	–	–	–	–	–	10
Furnace retrofit	–	–	–	–	19	15
Efficient gas water heater	–	–	–	11	15	13

Key:
* = measure offered in program, but no estimate available.
– = no estimate available or measure not offered in program.
[1]RCS = estimate used during the implementation of Residential Conservation Service Audits.

Table 4

USEFUL LIVES OF COMMERCIAL AND INDUSTRIAL ENERGY CONSERVATION MEASURES (YEARS)

Equipment Type & Description	BPA Median	PG&E	SCE	SDG&E	SCG
LIGHTING[1]					
Energy-efficient fluorescent lamp	5	5,8	3	5	–
Same as above with built-in ballast	2	–	2	–	–
Energy-efficient ballast	11	–	12	18	–
Electronic ballast	3	–	3	5	–
Metal hallide lamp	10	–	12	5	–
Low-pressure sodium lamp	5		3	–	–
High-pressure sodium lamp	5	20	3	–	–
Parabolic fixture	20	20	15	15	–
Dimming systems	20	–	20	15	–
On-off switching	7	–	20	–	–
Motion sensor	10	5	15	8	–
HVAC					
Economizer	11	–	15	15	–
Chiller strainer cycle system	15	–	15	–	–
Air-to-air packaged heat pump	10	–	15	–	–
Water-to-air packaged heat pump	15	–	15	–	–
Ice thermal energy storage	19	–	20	20	–
Water thermal energy storage	20	–	20	20	–
Plate type heat pipe recovery system	14	–	15	–	15
Rotary type heat recovery system	11	10	–	–	–
Heat recovery from refrig. condenser	11	10	15	–	–
Low-leakage damper	9	–	10	–	–
Variable inlet vane VAV	11	–	10	20	15
Variable pitch fan for cooling tower	13	–	15	10?	–
Make-up air unit for exhaust hood	10	–	10	–	–
Air destratification fan–paddle type	10	–	18	–	–
Air destratification fan–high inlet/low discharge	15	–	18	–	–
Air curtain	10	–	10	–	–
Deadband thermostat	13	–	15	–	–
Spot radiant heat	10	–	15	–	–
CONTROLS					
Computer logic EMS	13	–	20	15	–
Electronic controls	11	–	15	15	–
Time clocks	10	5	9	–	–

Table 4 (continued)

Equipment Type & Description	BPA Median	PG&E	SCE	SDG&E	SCG
MOTORS, DRIVES, & TRANSFORMERS					
Standard electric motor	15	–	18	–	–
High-efficiency electric motor	17	17	18	17	–
Variable-speed DC motor	18	–	20	–	–
Variable-speed drive–solid state	15	–	15	–	–
Variable-speed drive–belt type	10	–	10	10	–
Efficient AC electric transformer	15	–	30	–	–
DOMESTIC HOT WATER					
Heat pump water heater	10	–	13	–	–
Point-of-use water heater	12	–	15	–	–
Solar water heater	15	–	15	–	–
Change electric to gas booster	–	–	–	15	–
REFRIGERATION					
Unequal parallel refrigeration	14	–	15	15	–
Condenser float head pressure control	10	–	15	15	–
Auto cleaning system for condenser tubes	15	–	15	–	–
Hot gas bypass defrost	10	–	15	–	–
Polyethylene strip curtain	3	3	10	–	–
Refrigeration case cover	11	–	15	–	–
BUILDING ENVELOPE					
Double glazing	20	–	20	–	–
Heat mirror	18	–	20	–	–
Low-emissivity coating	14	10	15	–	–
Solar shade film (retrofit)	7	–	5	7	–
Tinted & reflective coating	14	10	20	–	–

[1]Lighting service lives initially reported in hours were converted to years using a factor of 4,000 hours/year. This was done for convenience in summarizing the lifetimes of all EMCs and does not reflect any assumed usage pattern of the equipment.

Sources: BPA median–Marjorie MacRae, Michael Rufo, Robert Goddat, and David Baylon. "Service Life of Energy Conservation Measures," *ASHRAE Journal*, December 1988, p. 25. Utility estimates were generally derived from their March 31 report or a special fax to Mike Messenger in November of 1989.

III. Measurement Plan Example

PURPOSE

In developing this appendix, each utility undertook the exercise of developing an illustrative measurement plan for a program that might be proposed for incentives. We have included an example of such an illustrative plan. Measurement plans submitted in March will necessarily include more detail.

DESCRIPTION OF EXAMPLE PROGRAM

A California utility may propose to implement a residential rebate program. This program would be designed to replace existing electric appliances with higher efficiency electric air conditioners, heat pumps, evaporative coolers, and/or heat pump water heaters in order to assist customers in lowering their electric bills.

While four measures would be included, similar pre-implementation evaluations and post-implementation measurement plans would be applied for each individual measure. Therefore, a single measurement protocol, applicable to each measure, would be provided.

EXAMPLE PLAN: PRE-IMPLEMENTATION MEASUREMENT PROCEDURES

Load Impacts

To estimate program impacts attributable to the program, a set of pre-program annual consumption and efficiency standards would be established. These standards would be used in comparisons with the appliances purchased by program participants. The pre-program standards would be composed of the prevailing standards for the various appliance categories.

In addition, basic system-wide load shapes would be evaluated for each end use. These load shapes would be obtained from the utility's Appliance End-Use Monitoring Sample of submetered appliances. These load shapes would be used in estimating program kW impacts over various time periods.

First year, annual. Engineering estimates and first-year penetration expectations would provide the basis for first-year annual consumption impact estimates.

Load shape. Engineering studies, previous utility studies, and judgment would be employed in estimating and expressing the load shape effects of the program in comparison with the basic end-use load profile.

Net-to-gross. Estimated gross savings would be adjusted by a net-to-gross ratio based on similar programs sponsored by the utility and other available information indicating what would have happened in the absence of the program.

Rebound effect. While post-implementation measurement would investigate the causes and magnitudes of customer actions that reduce available savings, no estimate of rebound effects would be offered in pre-implementation estimates of program impacts.

Useful life. As agreed by the Measurement Subcommittee, useful life (1) for high-efficiency residential air conditioners would be adopted as 20 years; (2) for high-efficiency heat pumps, as 15 years; and (3) for evaporative coolers, as 15 years. For heat pump water heaters, 13 years would be adopted as the useful life, as previously adopted and utilized by the utility.

Persistence. Persistence rate projections would be based on previous studies conducted by various utilities.

Participation Level

Annual participation expectations would be estimated from a combination of current and forecast appliance saturation data and the utility's experience with similar residential conservation programs.

Utility Costs

Projected utility costs would be developed in accordance with definitions associated with the Standard Practice Manual and would be based on implementation expectations.

Total Costs

Projected total costs would be developed in accordance with definitions associated with the Standard Practice Manual. Utility costs and measure costs would be identified separately. Utility costs would be estimated as described above. Measure costs would be presented by measure and in terms compatible with the average load impact per unit. Therefore, the product of the average cost per measure and the participation level for that measure would yield the aggregate measure cost for the specific measure.

EXAMPLE PLAN: POST-IMPLEMENTATION MEASUREMENT PROCEDURES

Load Impacts

All load impact estimates would be based on information on participants and their choices that is usually captured by the utility in an automated file containing records for the entire population of program participants. These data would be utilized in describing the basic program results.

First year, annual. A control group of nonparticipants (who purchase one of the relevant appliances) would be selected for comparison with the participant group, if sufficient numbers of nonparticipants would be identified. This control group would be surveyed to obtain information on the characteristics of the appliance they purchased. Differences between the control and program groups could then be used to estimate program impacts.

However, since the saturations of the subject appliances are low--ranging from 3% to 15%--there might be insufficient numbers of willing nonparticipants available for query. Also, nonparticipant understanding of the characteristics of the purchased appliance might be unreliable. In either of these

cases, other methods of estimating load impacts would have to be pursued.

If a control group were not feasible, the population of appliances sold in the retail markets available to the utility's customers would be compared with the population of appliances purchased by program participants to yield an alternate estimate of net program impacts. The annual consumption, SEERs, and quantities of the appliances sold might be available from organizations such as the Association of Home Appliance Manufacturers (AHAM). Utility participation records would provide information on program participants.

Load shape. Based on engineering estimates, estimated program impacts would be compared with the basic end-use load shapes. Once consumption effects were estimated, the kWh impacts would be allocated across the load shapes based on engineering knowledge and other studies pertaining to appliance and/or customer behavior.

Net-to-gross. If a control group were not employed, or if the distribution of appliances sold were not available in the required level of detail, a different technique would be necessary to estimate net impacts. This technique would involve a survey of a sample of participants in order to evaluate (1) effects of the rebate in the decision to purchase an energy-efficient appliance; (2) what would have been done in the absence of the rebate; and (3) the extent to which energy efficiency affected their decisions. This information would be used with other information, such as appliance standards and the information from participant records, to estimate net program impacts. This approach is not expected to be needed, since the other two approaches (to more directly measure net impacts) would likely be feasible.

Rebound effect. A survey of participants would include questions that are designed to identify causes and magnitudes of rebound effects. Information on replaced equipment and on customer behaviors which tend to reduce apparent savings would be sought.

Useful life. Pre-implementation expectations would be updated if and when new industry or utility data were obtained.

Persistence. Studies would be initiated to assess the consumption of a given sample of program participants over a specific period of time. If a control group were found to be feasible, similar studies might be conducted to estimate consumption of nonparticipants over the same period of time. Initially, these studies might be conducted at the program level rather than for each measure.

Participation Level

Program participation levels would be monitored and reported from the utility's data files containing records for the population of participants. Participation levels would be provided by measure and for the program as a whole.

Utility Costs

Utility costs would be reported from utility accounting records for the program, in accordance with definitions associated with the Standard Practice Manual and the DSM Reporting Requirements Manual.

Total Costs

Total costs would be reported in terms consistent with the Total Resource Cost test of the Standard Practice Manual. Utility costs would be reported as described above. Measure costs would be reported based on customer or manufacturer surveys. Customer operation and maintenance costs would be based on customer surveys and/or engineering-based estimates.

IV. Glossary

Conditional demand analysis. Conditional demand analysis (CDA) is a statistical method of developing end-use consumption patterns from whole-house consumption data and appliance saturation data, demographic and household data, weather data, and economic and market data (e.g., energy prices). CDA can utilize end-use metered consumption data, as well as whole-house consumption data. Typically, CDA utilizes regression analysis to develop the disaggregated end-use consumption estimates.

Control group. The control group is a set of customers selected for some experimental designs to isolate the effects of program participation from other factors that may affect energy use, such as building characteristics, customer income, weather, etc. Generally, a good control group is one which shares as many characteristics as possible with the test group, except for program participation.

Customer surveys. Customer surveys are used to collect data from utility customers. These customers may or may not be program participants, depending on research design. Surveys may be used to collect a variety of data used to develop and evaluate programs. For example, appliance saturation and building shell, attitude and preference, measure adoption, and other data are often collected through surveys. Survey methods include telephone, in-person, group, and intercept interviews, as well as mail questionnaires. Surveys usually involve statistical sampling techniques and may include control groups.

Energy efficiency. Energy efficiency is defined as reduced energy use for a comparable level of service. Level of service may be defined as the volume of a refrigerator, production output of a manufacturing facility, or lighting level per square foot.

Engineering estimates. Engineering estimates are estimates of energy (kWh or therms) or demand (kW) impacts based on engineering calculation procedures. Such estimates should address the change in energy use of a building or system that results from the use or installation of a given measure. Where more than one measure is installed (e.g., ceiling insulation and efficient air conditioner), an engineering estimate usually addresses the interactive effects of these measures. A variety of assumptions concerning appliance stock, appliance efficiencies, building shell (e.g., thermal) characteristics, household or occupant behavior, and weather are made for engineering estimates. These estimates often utilize computer-based simulation models, but may include existing technical resource data.

First-year annual load impacts. This term refers to estimated reduction in energy use, in kWh, therms, and/or kWh, for the first full year after the installation of a measure. The estimate should apply to typical installations of participants in the program.

Income effect. Income effects are changes in energy use of a customer that are induced by the increased amount of disposable income available to the customer due to lower energy bills. Examples include commercial customers who increase lighting levels or purchase more energy-intensive equipment after additional cash flow becomes available from a conservation investment. (See definitions of *rebound*, *substitution*, and *productivity effects*.)

Load shape. In general, load shape relates energy use to specific times during the day, month, and year. Load shape data are used to identify the impact of the program on the resource plan. More specifically, for this appendix, load shape is the conversion of first-year annual savings (kWh) into kWh and kW savings in different time periods for each end use. The time periods will normally be the same as those for which separate avoided costs are calculated.

Other market data. This term refers to a survey administered to manufacturers of products or equipment. Such surveys may be used to assess total program costs, identify technical data

(such as useful life estimates), to assess the nature of a new or existing market, and to identify the most appropriate means for implementing a program. Such surveys may also be administered to distributors, retailers, and other trade allies.

Metered data. Metered data are actual consumption data collected through a meter for a specific end-use or energy-using system (e.g., lighting and HVAC). Billing data are metered data, but are usually available only for the whole building or facility. For pre-implementation measurement, metered data refers to data collected in the utility's program or in similar programs. For post-implementation measurement, metered data refers to data collected from program participants (and possibly nonparticipants). Metered data may be collected over a variety of time intervals.

Net-to-gross impacts. Net-to-gross impacts indicate the degree to which the program induced the desired behavior, as opposed to behavior that would have taken place without the program. This effect is also termed the "free-rider" effect, although there may be slight distinctions between "free riders" and net-to-gross impacts for some programs.

Participation level. Participation level indicates the number of measures installed as part of a utility program. It encompasses measures that might have been installed in the absence of a program, as well as those installed solely as a result of the program. Depending on the nature of the measurement technique, participation may also mean the number of customers participating in the program.

Persistence. Persistence (and decay) refers to any decline in energy-saving effectiveness that may take place over a measure's useful life. Persistence is a function of two factors--equipment degradation and consumer behavior. Equipment efficiency often degrades over time, especially if it is not well maintained. For example, if filters get dirty or valves are not functioning properly, the energy efficiency of the equipment may deteriorate. Consumer behavior also affects energy savings. For example, if the customer removes the efficient equipment for any reason, the persistence of the program's energy savings

goes down. Persistence is often reported as a percentage of the first-year impacts, where each year may have a different value.

Pre-post. A pre-post experimental design compares data collected *before* the implementation of the program with data collected *after* program implementation. The difference between the pre and post data points may be interpreted as the impact of the program, unless significant differences in factors external to the program exist between the pre- and post-program periods. The experiment may use one or more groups. Typically, if two groups are examined, one group will be a *control group* (or comparison group—see definition), and the other would be the *test group* (see definition). Members of the control group would not have participated in the program, while members of the test group would have participated.

Productivity effect. This effect refers to potential changes in the level of commercial or industrial production levels indirectly caused by conservation investment. Increased production levels are considered to be "directly" caused by increased cash flow resulting from lower utility bills through conservation investments.

Rebound effect. A rebound effect is a situation in which the customer responds to an increase in the energy efficiency of his/her home or business by consuming more energy. The increased consumption may be due to changes in consumer behavior, defined as income effects, substitution effects, or a combination of the two. Examples of the rebound effect include customers turning up their thermostats after a weatherization investment, or purchasing more energy-using equipment with the increased disposable income that results from efficiency investments. For load management programs, a rebound effect may involve reactions by customers or equipment which offset some of the kW or kWh savings of the program. For example, a direct load control on peak-period use of residential central air conditioners may cause some consumers to buy a room air conditioner or may cause the central air conditioner to run longer in non-peak hours. (Refer to definitions of *income*, *productivity*, and *substitution effects*.)

Statistical (bill) analyses. Statistical, or bill, analyses refer to a variety of techniques for analyzing customer billing information to estimate the impacts of a measure or program on energy use. Such analyses may be fairly simple—e.g., comparing the means of a "control" group versus a "test" group—or fairly complex, for example, econometric analyses. Other methods that may be used—alone or in combination—include conditional demand analysis and pre-post studies. Such analyses often require additional data that may be collected through other means, including customer surveys.

Substitution effect. Substitution effects are changes in energy use of a customer induced by changes in the relative price of energy services (such as comfort or lighting) provided by gas and electricity. The adoption of a conservation measure changes the relative price of the service and therefore might change the quantity the consumer desires of the energy service. In addition, increases in the price of gas might encourage a person to increase consumption of services provided by electricity. (See definitions of *income*, *productivity*, and *rebound effects*.)

Test group. The test group is a set of customers that participated in a program. Test groups are part of experimental designs that are developed to isolate the effects of program participation from other factors that may affect energy use, such as building characteristics, customer income, weather, etc. In some experiments, there may be several test groups, each with different program treatments, thereby allowing for the testing of different program elements.

Total costs. Total costs refers to all costs included in the Total Resource Cost test defined in the Standard Practice Manual. These costs are program costs paid by both the utility and the customer. These include all equipment costs; installation, operation and maintenance; cost of removal (less salvage value); and administrative costs. Tax credits are considered a reduction to costs.

Useful life. Typically, useful life is defined as the period of years that a piece of equipment remains serviceable—i.e., it still provides the services for which it was designed and installed.

Utility costs. Utility costs are costs incurred by the utility which are included in the Utility Cost test defined in the Standard Practice Manual. These include initial and annual costs, such as the cost of equipment, operation and maintenance, installation, program administration, and customer dropout and removal of equipment (less salvage value).

Utility accounting records. Records maintained by the utility which provide data on items such as costs and program participation are referred to as utility accounting records.

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(END OF APPENDIX C)

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(R.91-08-003 and I.91-08-002)

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