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Decision 83 08 032 August 3, 1983

ORIGINAL

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

In the Matter of the Application of Southern California Edison Company for Approval of the Demand Subscription Service (DSS) Program.	Application 82-08-10 (Filed August 2, 1982; amended October 21, 1982)
In the Matter of the Application of Southern California Edison Company for authority to increase rates charged by it for electric service.	Application 61138 (Filed December 18, 1981)

(See Decision 82-12-055 for appearances in Application 61138.)

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Pamela A. Summers, for Coachella Valley Association of Governments, interested party.
Freda Abbott, Attorney at Law, for the Commission staff.

O P I N I O N

Procedural Background

Southern California Edison Company (Edison) in Application (A.) 82-08-10 seeks approval of its Demand Subscription Service (DSS), a form of residential load management, for implementation throughout its service territory. Edison seeks only approval of the DSS program in A.82-08-10, as funding for that program was requested in its 1983 test year general rate case in A.61138. A.61138 was reopened and consolidated with A.82-08-10 for hearing.

Edison originally requested approval of DSS in A.61138. Edison anticipated that a decision on the merits of the proposed DSS program would be reached in A.82-08-10 before the issuance of D.82-12-055 dated December 13, 1982 in A.61138, and that funding

would be authorized in that decision. However, A.82-08-10 was delayed because hearings were postponed at the request of Edison until the application was amended. D.82-12-055 (at mimeo page 128) denied the request of Edison and our staff that expenditures proposed for DSS in 1983 be approved in that decision and the amount set aside pending a decision in A.82-08-10. That decision further states that program funding for DSS, if warranted, would be established in this decision.

Several exhibits and portions of the record in A.61138 were incorporated into the record in A.82-08-10 at the request of Edison. D.82-12-055 states that issues concerning DSS raised by California Public Safety Radio Association (CPRA), Toward Utility Rate Normalization (TURN), Professional Community Management and Mutual Housing Corporations Inside Leisure World (Leisure World), and Coachella Valley Association of Governments (CVAG) have either become moot or address program details more appropriately reviewed in A.82-08-10.

Summary of Decision

We authorize Edison to establish a second experimental DSS program. The existing experiment has not yielded information sufficient to determine the cost-effectiveness, load reduction, or customer acceptance of the large-scale 75,000 unit program proposed by Edison. The total cost of this new experiment is $6.867 million. Funding during 1983 is to be obtained from the conservation and load management contingency account established on July 12, 1983 in Commission Resolution E-1969. That account contains $2,277,483 which is more than sufficient for 1983 expenditures. For 1984, funding shall be through the attrition allowance mechanism.

Public Hearing

Public hearing in A.82-08-10 was held in Los Angeles on September 14, 1982 and in the consolidated proceeding on November 15, 16, and 17, 1982 in San Francisco. The consolidated proceeding was

submitted upon receipt of concurrent briefs filed by Edison and the Commission staff on December 10, 1982.

Evidence was presented on behalf of Edison, the Commission staff, and CVAG. Exhibit 1 is the response statement of CVAG presented at the initial hearing in which that organization opposed the original program. Exhibit 5, received at the hearing on November 15, 1982, is a letter from the executive director of CVAG stating that the CVAG Executive Committee had reexamined its position and asked that its response statement in Exhibit 1 be withdrawn. CVAG supports the revised DSS program described in the amended application.

Leisure World filed a statement dated November 8, 1982 in which it expressed concern that the DSS program ultimately would become a mandatory program similar to that originally proposed.

Issues raised by other parties in A.61138 not discussed herein are moot because the DSS program is changed from a mandatory to a voluntary program, and is limited at this time to a small experiment.

Description of Edison's Proposed Program

The primary objective of the DSS program is to reduce Edison's residential peak kilowatt (kW) load during critical periods of system capacity shortages while providing residential customers a rate incentive to reduce their utility bills. Edison projects that the 75,000 unit program would allow approximately 150 megawatts (MW) to be reduced from the Edison system peak by the summer of 1985.

The DSS service will be activated during the summer months of May through October. Edison's residential customers who used an average of 40 kilowatt-hours (kWh) of electricity per day or more during at least three of the six previous summer billing periods, as defined in the tariff, would qualify for the program. Edison proposes to install 75,000 DSS devices, which represents

approximately a 50% saturation of the potential customers using 40 kWh or more per day.

Eligible customers would be required to subscribe to 2 kW or more below a calculated kW level based on prior kWh usage.

During an activation period, Edison will transmit a communication signal to the DSS device at the customer's residence. A Customer Alert Device (CAD), which can be plugged into any household outlet, will provide an audible signal to alert the customer of the peak capacity shortage period.

If the customer's kW demand at the time of activation exceeds the subscribed level, a second audible signal (approximately two minutes long) will alert the customer to reduce electrical usage. In the event the customer's reduction still does not bring the kW demand to (or below) the subscribed level, the DSS device will automatically interrupt service. However, service can be immediately restored following the appropriate reduction in electrical demand by then manually resetting the DSS device. If no one is home at the time of DSS activation and the kW demand exceeds the subscribed level, the DSS device interrupts service temporarily until the end of the activation period when service is automatically restored.

The participating customer would receive $5 per summer month for each kW by which the subscribed demand level is below the calculated kW demand level, shown as a credit on the customer bill during each summer billing period regardless of activation.

The DSS device will be a meter-adapted, self-contained control module installed in the meter socket of the customer's electrical panel. The installation of the device will not require any additional wiring of the customer's electrical panel or appliances. It will have an adjustable kW demand level setting, a tamper indication light, and the capability of remote activation.

At the suggestion of Energy Conservation Branch (ECB) staff, Edison selected an AM radio broadcast communication system for controlling the systemwide DSS installation. The life expectancy of the DSS and CAD devices has been estimated at 15 years by manufacturers. The equipment will be covered by a five-year warranty from the manufacturer who will be under contract to provide maintenance service on the radio communication equipment as well.

Description of Existing Experimental Program

Edison has tested the DSS concept for the past two summers through a small experimental program. Results of the 1981 summer test were presented in this proceeding as support for the proposed systemwide expansion.

The existing DSS test program used customers who live in newly constructed single family homes, because Edison originally planned to limit DSS to new homes. Since there were no electricity usage records for the new homes, the anticipated peak demand for each house was estimated based on the appliance mix.

Housing developments in four Edison administrative districts were chosen as experiment locations. The four districts lie in three of the five weather zones which were used at that time for other Edison load management tests. Participation was restricted to approximately 500 customers in each district whose annual electricity consumption was estimated to be at least 4,900 kWh. Customers were offered one of three maximum demand subscription levels, depending on their appliance mix. The customer could subscribe to lower demand levels if desired.

Edison tested three levels of incentive payments in the form of monthly bill reductions of $1.00, $1.50, or $2.00/kW throughout the year, or $12.00, $18.00, or $24.00/kW/year. The 1 kW incentive was given for subscribing to the maximum demand level allowed, and proportionately greater incentives were given for subscription levels below the maximum level.

Edison tested two duration periods, a "short duration" of 5 hours per activation, and a "long duration" of 10 hours per activation, which was reduced to 8 hours per activation after June 22, 1981. Edison also assigned customers to either a "low-frequency" group with the potential for up to 30 activation days per year or a "high-frequency" group with up to 60 activation days per year. In actuality, the DSS devices were activated on only 8 to 10 days during the summer of 1981, depending on the district.

Edison selected 300 of the 2,000 DSS participants, called the treatment group, to have magnetic-tape recorders attached to their meters to record energy usage and DSS activation data. In addition, 100 Edison customers who did not participate in DSS but who agreed to allow Edison to attach recorders to their meters to record energy consumption data were selected as a control group.

The DSS devices were activated on four to six days in June 1981, depending on the district, two days in July, and two days in August. On nonactivation days, some devices were activated accidentally. While most nonactivation days saw little such activity, on eight nonactivation days between June 1 and September 15 the devices were activated an average of at least two hours per customer in at least one of the four districts.

Problems also occurred in achieving activation on activation days. Although the reported experimental results rely largely on performance in the moderate zone, significant activation occurred in that zone only on the two activation days in August. In addition, long duration customers in the very hot zone never approached the planned number of hours of activation. The devices worked best in the hot weather zone.

Evidence of Applicant

Applicant presented evidence in support of its proposed mandatory systemwide program as part of its evidence in support of its general rate case in A.61138. While the general concept of its

DSS program proposed in A.82-08-10 remains the same as its original program, the current proposal is a voluntary program. The evidence on DSS adduced in A.61138 was incorporated into the record in A.82-08-10.

Because of the shift from a mandatory to a voluntary program, the size of the program is no longer fixed. Evidence was presented on the economic aspects and cost-effectiveness of programs of different sizes. The data presented by applicant included results of the existing DSS experiment, a description of the proposed program, the need for the program, technical and cost information concerning the DSS and CAD devices, copies of the tariffs proposed to be filed, schedules for implementation of DSS at different program levels, and calculations regarding the cost-effectiveness of DSS at different program levels.

Evidence of the Staff

The staff presented the testimony of four witnesses. Witness Amaroli commented on the technical and functional aspects of the DSS and CAD devices. At a production level of 132,000 units, Amaroli estimated that a unit consisting of a DSS and a CAD device can be made for $157. At a production level of 75,000 units, the average vendor's unit price would be approximately $260. At lower program levels the unit costs would be greater. Amaroli recommended that Edison be authorized to implement the DSS program at a level of at least 75,000 units installed over a two-year period. Amaroli estimated that a program of this recommended size would produce a 150 MW reduction in peak demand.

Witness Cavagnaro presented testimony in support of a slightly different plan. He recommended that the 75,000-unit program be slowed so that it would be implemented over a longer period of time. Cavagnaro also recommended greater discounts to participants than proposed by Edison, as he believes the program benefits will

exceed those estimated by Edison. Cavagnaro addressed several other aspects of the proposed program.

Witness McIlvain also addressed the cost-effectiveness of the proposed program. The witness developed tables showing that at his estimated avoided cost of $138/kW/year, the capacity benefits range from $351 for ½ kW average reduction to $3,370 for a 6 kW average reduction. The witness recommended that the conservation program be implemented now, even though additional capacity may not be necessary for Edison's service territory between now and 1985. The witness also recommended that the program not be delayed beyond 1985, because of the risk of capacity shortages after 1985. McIlvain deemed the incentive of $30/kW/year to be reasonable and did not recommend escalation of that incentive. The witness's overall recommendations were that program operating and maintenance costs be reduced; that the program revenue requirements should reflect the lower costs; and the project should be implemented with 75,000 participants and should be spread over a three-year period, as recommended by Edison.

Witness Benjamin presented an analysis of the effect of a two-year delay in implementation of the program on the cost-effectiveness of the program. According to the witness, Edison will have minimal need for or benefit from the additional capacity which DSS would provide before 1986. According to the witness, a two-year delay would increase the net benefits of DSS to nonparticipants roughly 30%, without materially changing the societal benefit/cost ratio.

The Issues

The issues presented in this proceeding are:

1. Would the proposed program provide the predicted load reduction?
2. Is participation of 75,000 customers obtainable?

3. Is the proposed load reduction needed?
4. Would the proposed program be cost-effective?
5. What should be the size of the program?
6. How should the calculated demand be determined?
7. What should be the level of incentives?
8. What will be the program costs and how should they be recovered in rates?

Would the Proposed Program Provide the Predicted Load Reduction?

Edison projects that the 75,000 unit program would allow peak load reductions of at least 150 MW, or 2 kW per installed device. Edison's marketing goal is to obtain an average subscription level of 5 kW, which is 50% of the average calculated demand for those customers eligible for DSS. Attainment of the marketing goal would result in peak load reductions of 3.5 kW per device, or 262.5 MW systemwide.

The significance of determining likely load reductions is twofold. First, the load reduction per customer bears a direct relationship to the cost-effectiveness of the proposed program. Second, an assessment of total load reduction is needed to allow incorporation into the utility resource plan and deferral of other capacity commitments replaced by the program.

Edison's minimum goal of a 2 kW load reduction per participant is based on results of the 1981 experiment. Edison performed a statistical analysis intended to control for variations in demographic characteristics between the treatment and control groups. The resulting estimates of demand reduction during activation periods in each month, based on demand differences between treatment and control customers, are shown in Table 1. The average reductions are weighted by the number of potential DSS participants in each zone.

TABLE 1

ESTIMATED AVERAGE DEMAND REDUCTION DURING ACTIVATION PERIODS

(kW)

Long-Duration Group	Moderate	Hot	Very Hot	Average
June	2.6	0.6	0.6	1.7
July	1.5	0.2	0.8	1.0
August	2.7	0.6	0.3	1.8
Short-Duration Group				
June	2.8	0.3	0.3	1.2
July	1.8	0.2	0.4	0.9
August	3.4	0.7	0.0	1.6

As Table 1 shows, the demand differences exhibited in the moderate zone are much greater than those in the hot and very hot zones. Hour-by-hour data indicate, in fact, that a significant demand difference persists throughout the night in the moderate zone. The differences in the demand of control and treatment groups were generally found to be statistically significant only in the moderate zone.

From the results in Table 1, Edison concludes that, with the potential of much greater economic savings to the customer and with an aggressive marketing plan, a 2 kW on-peak average reduction per customer can be reasonably expected.

We see several problems with Edison's use of the cited experimental results to predict an average systemwide load reduction of 2 kW per customer.

First, customers who signed up for the DSS program exhibit what Edison calls selection bias. As the most obvious example of selection bias, customers who are conservation-conscious, or those who know that their on-peak usage will be low, are more likely to sign up for DSS than are other customers. Yet Edison attributes all

differences in demand between treatment and control customers, even that which persists throughout the night in the moderate zone, solely to participation in the DSS experiment. It is not at all clear what is cause (participation in DSS or lower demand) and what is effect (lower demand or participation in DSS). The validity of Edison's statistical analysis in evaluating differences due to demographic characteristics was not challenged by staff. However, such an analysis cannot capture totally the effect of selection bias.

Another concern we have is that Edison averages the experimental results for the three tested weather zones and further applies these results to the "mild" and "super hot" zones. The weighted averages rely heavily on the larger demand differences shown in the moderate zone, even though significant DSS device activation occurred there only on the two activation days in August. Two days' data in one weather zone do not seem to us to provide sufficient substantiation upon which to base program expansion.

Importantly, the study did not evaluate differences between the new homes evaluated in the experiment and older homes. No information is in the record about comparability of electricity demand patterns in new and old homes. A fairly obvious, common sense observation is that there may be significant differences in demand patterns between old and new residences due to such factors as home construction characteristics and the education and income levels of occupants. Edison witness Bales indicated that one of the reasons that Edison originally planned DSS to be applied only to new residences was that customers in new residences would be more likely to talk to Edison about load management.

Staff witness McIlvain recognizes that the experimental results "appear to be too weak to stand alone as support for the future programs; therefore staff has not relied only on them for its analysis or recommendations." (Exhibit 9, p. 5.) However, staff does not provide any other basis for its belief that a reasonable

minimum load reduction to consider in evaluating cost-effectiveness is 2 kW per device. Absent any evidence other than the experiment results, we cannot conclude that the asserted load reduction of 2 kW per DSS customer is likely. Since this assumed load reduction is an integral part of the cost-effectiveness analysis of the proposed program expansion, the credibility of the analysis is seriously in question.

Edison asserts that its marketing goal of an average subscription level of 5 kW would result in peak load reductions of 3.5 kW per device. In Exhibit 12, Edison presents an analysis of hourly load data of certain control customers in support of this conclusion. Staff witnesses also relied upon this exhibit in their evaluation of program cost-effectiveness if a 3.5 kW load reduction is achieved. However, close examination shows that this exhibit contains assumptions about subscription levels which are more stringent than the average 5 kW claimed. Further, Edison assumes that each customer individually would reduce its actual peak demand by a minimum of 2 kW, regardless of how the actual observed peak demand for that customer compares to the calculated demand level, due to behavioral changes resulting from participation in DSS. Edison's use of the experimental results as support for this assumption is marred by the selection bias problem already discussed.

Achievability of Edison's marketing goal depends on what witness Bales describes as "not unrealistic" subscription levels. Thre is no evidence in the record indicating that these subscription levels are any more likely than any number of less optimistic scenarios. We therefore conclude that there is insufficient basis in the record to find that the proposed program is likely to provide the predicted load reduction.

Is Participation of 75,000 Customers Obtainable?

Edison estimates that 50% of the approximately 154,000 eligible residential customers would participate in the DSS program. The sign-up rate achieved affects sign-up costs and capacity savings. Edison believes this sign-up rate can be achieved, notwithstanding the availability of Edison's air-conditioning cycling (ACC) program as an alternative choice to approximately 50,000 of the potential DSS customers.

Edison has cited survey results and participation in other load management programs as support for its assumed 50% sign-up rate. However, the bulk of this evidence does not support Edison's assumption as strongly as claimed.

Edison notes that it achieved a 60% penetration rate - six sign-ups for each 10 in-house customer visits - in the DSS experimental program, even though participants received yearly incentives of only $12 to $24 per kW of demand reduction and were informed that their service could be interrupted up to 60 times per summer and for up to 10 hours per interruption.

Edison's witness was cross-examined concerning the testimony of Edison's vice president Myers in A.61138, which indicated that the company had found it necessary to make five telephone calls in order to obtain each sign-up for the experimental DSS program. The witness differentiated between telephone calls and the on-site customer contact addressed in the final results, noting that each region of the service territory had set up visits differently. Some had sent out letters to eligible customers; some had simply called on customers without advance notification. The witness did not know the number of contacted customers who declined in-house interviews. Lacking this information, the record regarding the experimental DSS program is not particularly helpful, except to

imply an upper limit of 60% for customer participation based on in-house customer visits.

Edison's witness testified that Edison has achieved good penetration rates with other load management programs in the super hot zone. In Hemet, the company achieved 70-98% sign-up rates for its ACC program in 1981. No evidence was presented regarding retention of these customers during the testing program.

Edison also presented information concerning two recent surveys it has conducted. One survey of 200 larger residential customers in the mild/moderate and hot zones indicated that 14% of the customers surveyed would definitely participate in the DSS program and that 31% would probably participate. This survey did not present customers with the option of participation in other load management programs such as ACC.

Edison states that a second survey of approximately 400 customers in the Palm Springs area who would qualify for DSS indicates that 74% would participate in a load management program such as DSS, if given the opportunity. However, a reading of the survey procedure and results, contained in an appendix to the application, reveals a somewhat different picture. The interviewer explained to the customer that the survey regarded a new program Edison may offer in the future:

> "Customers would be asked to voluntarily limit the use of some household equipment on some weekdays during periods of peak use in order to share the available electricity. In return, participating customers would receive a discount on their electric bills. Based on what I have told you, how interested would you be in participating in a program like this?" (Emphasis added.)

Of the respondents, 74% said they would be either "definitely interested" or "probably interested." Very little

information was given to the customer regarding what participation would entail. The response could be applied to DSS or to other load management programs such as ACC.

Edison argues that, even if there were substantial rejection of DSS in the hotter zones in favor of ACC, there would still be about 100,000 customers in the moderate/mild zones eligible for DSS but not for the ACC program. As the staff brief points out, in the marketing research survey of potential DSS customers described above, only about 50% of the customers contacted in the moderate/mild zones indicated that they either "definitely" or "probably" would participate in the DSS program. Thus, any substantial inroads in DSS participation due to the ACC program in the hotter areas could seriously impair Edison's ability to obtain 75,000 DSS participants.

Staff discusses a weakness concerning the surveys of prospective participants which might be termed the Wisconsin Experiment Syndrome. Staff witness Weiss, in A.61138, testified with reference to an experience affecting the Wisconsin Electric Power Company in which a marketing survey was conducted and marketing expertise employed to test customer attitudes about an electric water heater load management device. As a result of that survey, approximately 150,000 devices were obtained; however, only 50% or 55% of the devices were distributed.

The staff brief states that reliance on the surveys conducted for Edison would not necessarily produce results similar to those experienced by the Wisconsin Electric Power Company. Nevertheless, the staff states that Weiss's testimony underscores an obvious truism: that what people say they will do - or say they may be willing to do at some future time - is not necessarily a reliable indication of what they in fact do. The staff argued that the

similarity between the types of devices, and their purpose so far as curtailing customer demand, appears obvious.

In sum, the evidence on customer participation rates for DSS is inconclusive. However, the indications are that a 50% sign-up rate may be optimistic. Edison should use the further experimentation approved today to gather more definitive information on the acceptance of a systemwide program and on the effect of overlap of the DSS and ACC load management programs.

Is the Proposed Load Reduction Needed?

The DSS program is designed to reduce summer peak load requirements as an alternative to acquiring additional capacity. Edison states that it has ample capacity to meet expected peak load requirements through 1985, but that it must curtail its peak load requirements after that period through load management tools or acquire additional peaking capacity through construction or purchase.

The DSS program is designed to replace approximately 150 MW of summer peak load. Under the implementation schedule proposed by Edison and our staff, the DSS program would be fully in place by the end of 1985. The DSS program is not a large element in Edison's resource plan.

Staff limited its detailed review of Edison's loads and resources as they relate to the need for the proposed DSS program to the period through 1985. Staff agreed with Edison that there will be adequate reserve margins through 1985. Staff notes that Edison's development of capacity payments to small power producers assumes capacity purchases through 1985, but the need for a combustion turbine installation in 1986.

Edison's demand forecast and resource plan through 1992 are contained in Exhibit 11. They show reserve margins between 17.5% and 20.1% in the 1986 to 1992 period. While these reserve margins do not indicate whether there is a need for peaking capacity to improve

system operations, they do show that sufficient capacity will likely exist to meet system needs through 1992, whether or not 150 MW of demand reduction is obtained from DSS.

We take official notice of the June 2, 1983 decision of the California Energy Resources Conservation and Development Commission (CEC) in Docket Number 82-LMR-1. In that decision, the CEC adopts its staff's recommendation that experimentation be continued for some Pacific Gas & Electric Company (PG&E) load management programs rather than large-scale implementation at this time, based partly on expected large reserve margins during the next ten years. Since the two utilities' systems are interconnected, the expected excess capacity in the PG&E system gives us further confidence that reliance on DSS is not needed in the near future.

Would the Proposed Program be Cost-Effective?

Cost-effectiveness data were presented by Bales (Exhibits 2 and 3) for Edison; and by Cavagnaro (Exhibit 18), McIlvain (Exhibits 7 and 19), and Benjamin (Exhibit 10) for staff.

Two differences in costs between Edison's and staff's estimates are discussed in McIlvain's Exhibit 7 at page 10. The first difference, concerning the one-time costs for testing of DSS devices, was agreed to by Edison and is reflected in Edison's revised cost-effectiveness calculations in Exhibit 3.

The second difference, a reduction of $37.50 per customer in estimated customer contact costs made by McIlvain (Exhibit 7, page 10), relates to the fact that when customers who live in the hot, very hot, and super hot climate zones of the Edison service territory are contacted, they would be given the choice of participation in either the company's DSS or ACC program, since those customers would be eligible for both programs. Accordingly, McIlvain recommended that part of the contact cost be allocated from

DSS to ACC. In making that recommendation, staff witness assumed that the ACC program would receive full funding in A.61138. Edison does not reflect this proposed reduction in its projected program costs in Exhibit 3.

Another difference between Edison's and staff's cost-effectiveness calculations lies in their avoided cost assumptions. Edison maintains that, over their expected 15-year life, the DSS devices will result in the Edison system avoiding costs of $108/kW/year, on a levelized basis. This is the payment which Edison had also proposed to make to cogenerators and small power producers who agree to provide firm capacity to the Edison system for 15 years beginning in 1984. Staff witness Cavagnaro believes that the DSS program costs should be compared to the capacity cost of a combustion turbine which he places at $138/kW/year. Witness McIlvain also uses the full cost of a combustion turbine in his analysis.

Table 2 compares the cost-effectiveness results presented by Edison in Exhibit 3 and by staff witness McIlvain in Exhibit 19. Edison concludes that DSS is cost-effective from all perspectives except the nonparticipant's; staff results show the program as cost-effective to the utility, the participant, the nonparticipant, and society.

Table 2

Cost-Effectiveness of DSS Using Edison and Staff Estimates

	Edison		Staff	
	(Minimum)	(Goal)		
Capacity Savings (kW/year)	2	3.5	2	5
Utility/Society Perspective				
Benefit/Cost	1.58	2.76	2.45	4.29
Benefit-Cost	$324.87	$989.48	-	-
Nonparticipant Perspective				
Benefit/Cost	0.88	0.92	-	-
Benefit-Cost	-$121.84	-$131.00	$383.87	$694.51
Participant Perspective				
Benefit-Cost	$496.71	$1,120.49	$447.61	$1,190.03

As set forth in staff witness Cavagnaro's Exhibit 18, a discount of $7/kW for reductions above the 2 kW minimum level would increase the yearly incentive payments to $186 per device at the 5 kW reduction level. This would decrease the benefit-cost differential shown in Table 2 for the nonparticipant to $497.12 and increase the benefit-cost differential for the participant to $1,387.60.

Staff witness Benjamin compared implementation of DSS in 1984 or in 1986 with construction of a gas turbine in 1986. He concluded that, compared to the combustion turbine option, DSS would show the following advantages if implemented by 1984 or 1986:

	1984	1986
Societal Benefit/Cost	1.71	1.80
Nonparticipant Benefit/Cost	1.28	1.42

We agree with Edison that the actual savings to ratepayers should be used in evaluating the cost-effectiveness of any resource addition, including DSS. The question of what the savings are has been hotly contested in other proceedings. While we have rejected Edison's method of calculating avoided capacity costs in D.82-12-120 and now use the cost of a gas turbine as a proxy for payments to cogenerators and small power producers, we have invited future filings to refine the concept. We note that Edison now provides capacity payments of $113/kW/year to cogenerators and small power producers signing 15-year contracts with operation beginning in 1984, based on its estimate of the full cost of a gas turbine.

We note that the total incentive payments used by Edison and staff in their evaluation of the cost-effectiveness of the 2 kW reduction scenario are the minimum possible. The incentive payments for Edison's "marketing goal" scenario are similarly understated. Thus, the reported costs to nonparticipants are also underestimated.

Another assumption critical to cost-effectiveness calculations is the capacity response ratio (CRR). The CRR measures the amount of generation capacity which can be avoided as a result of each kW of load reduction achieved from DSS and is based on changes in the system loss-of-load probability. Edison and staff assume that a load reduction of 2 kW per DSS customer will occur on all summer afternoons due to behavioral changes, regardless of DSS activation status. This results in a CRR of 0.87, which is larger than would be obtained if an assumption of load reduction only on control days were made. This assumption should be reexamined in the second experiment authorized by this decision.

As discussed previously, the unresolved issues of realizable load reduction per device and customer participation rates undermine any cost-effectiveness calculations for the systemwide program. We conclude that it is not possible at this time to determine whether or not the proposed systemwide DSS program would be cost-effective.

There is no precise information in the record regarding the cost-effectiveness of the experimental program authorized today. The primary objective of continued experimentation is to obtain more accurate information to allow a more credible evaluation of systemwide program cost-effectiveness. Experiments are seldom cost-effective by themselves. This case is likely to be no exception.

What Should Be the Size of the Program?

The proposed DSS program calls for 75,000 new devices to be purchased and installed prior to the summer season of 1985. At the request of the staff, Edison provided in Exhibits 11, 14, and 17 unit and program costs for programs consisting of 3,000, 8,000, or 25,000 units installed by 1984 and programs of 75,000 units to be installed by 1985 or 1986. The estimated program costs and revenue requirements for the years 1983 and 1984 for each program as shown in Exhibit 17 are as follows:

Program Size			Costs ($000)		Revenue Requirements ($000)	
DSS Devices	Cells	Implementation Date	1983	1984	1983	1984
3,000	24	1984	4,296	2,501	4,340	2,527
3,000	16	1984	4,052	2,383	4,093	2,407
8,000	192	1984	9,379	10,872	9,475	10,983
25,000	-	1984	3,943	8,604	1,972	4,211
75,000	-	1985	2,212	21,225	1,714	7,350
75,000	-	1986	4,036	10,765	2,014	4,923

The balance of the costs for portions of the 75,000 unit programs installed after 1984, and of the revenue requirements for both the 25,000 unit program and the 75,000 unit program due to rate base treatment and on-going operation and maintenance costs are not shown. However, total equipment and installation costs of the 75,000 unit program can be estimated at $26.5 million. No incentive payments are included, since they would be recovered within the residential customer class through rate design. For the 75,000 unit program, incentive payments would be in the range of $4.5 million to $11.25 million per year, depending on the demand levels to which participants subscribe.

Edison urged that its proposal to install 75,000 units will take advantage of the economies of scale associated with the purchase of the DSS and CAD devices. Unit costs of these devices diminish when large scale manufacture takes place. At the 75,000 unit program level the devices may be purchased at an approximate cost of $218 per unit as a low bid; at the 10,000 unit program level the devices would cost approximately $550 per unit. Edison argued that the increased cost would have a substantial negative impact on the cost-effectiveness of the DSS program. In addition, Edison points out that its commitment to reduce 150 MW from its system peak load is predicated upon the installation of 75,000 devices by 1985.

Staff witness Amaroli supported Edison's purchase of 75,000 devices. Staff witness Cavagnaro believed that it may be possible to achieve the 150 MW reduction in peak load in 1985 with installation of 50,000 devices by 1986. Cavagnaro's testimony was that the Commission should rely upon Amaroli's analysis of economies of scale through larger purchases to determine program size.

As indicated in the staff brief, none of the staff witnesses favor a new DSS test program. Benjamin stressed that unit costs go down dramatically as the number of devices ordered increases.

Despite unanimous support by Edison and the staff witnesses, we conclude, as discussed elsewhere, that the information in the record in support of the proposed 75,000 unit DSS program is too flawed to allow such a large scale program to proceed at this time.

We continue to believe that load management can and should be used to improve system operation and to defer the construction of new generation facilities when it is cost-effective to do so. We have been generous in our support of a wide range of load management experiments, and have allowed expansion if the experiments yielded favorable results. In D.82-12-055, we approved load management expenses for Edison of $11,459,000 in 1983 and included an additional $3,589,000 in equipment costs in Edison's rate base.

We are not willing, however, to commit $26.5 million in initial program costs and many millions more in on-going incentive payments and operation and maintenance costs to the 75,000 unit DSS program, based on the poor quality of this record. We do believe that the DSS concept warrants further experimentation, and expect Edison to improve the experiment design, as discussed in the next sections, and perform rigorous analysis of experimental results. Edison should report DSS results to the Commission as part of its routine load management filings. Any proposal to expand DSS should be based upon these results.

Design of a Further DSS Experiment

At staff's request, Edison has presented information regarding costs of a 3,000 unit experiment and an 8,000 unit experiment. The larger experiment would test the following four variables:

a. Four Economic Incentive Levels

$3, $5, or $7 per month for each kW by which the subscribed demand is below the calculated level based on past energy usage, and a demand-and-energy charge similar to the originally filed program and tariff design.

b. Two kWh Usage Levels - low: 800 kWh to 1,200 kWh, and high: greater than 1,2000 kWh per month.

c. Four Weather Zones - Mild/Moderate, Hot, Very Hot, and Super Hot. (Edison has reclassified its weather zones so that there are now four zones instead of five.)

d. Six Activation Strategies - 15 or 30 occurrences per summer with up to two, six, or eight hours per occurrence.

This experimental design would require 192 separate "cells" of control variable combinations (4 incentives x 2 usage levels x 4 weather zones x 6 activation strategies = 192). To statistically validate the findings of this experiment, Edison states that it would be necessary to have 40 customers in each "cell." Also, Edison assumes that a control group of 240 non-DSS customers would be used for comparative purposes.

Both the DSS customers and the control group would have load-research recording devices installed on their electric meters to record usage levels during the experiment period. Thus, 7,920 recording devices would be needed. The total cost of this experiment would be about $20.3 million plus incentive payments.

Edison also presented cost information for a 3,000 device experiment. It would test only two economic incentive levels ($3/kW and $5/kW) and one activation strategy (15 occurrences per summer, with up to six hours per occurrence). The number of weather zones (four) and kWh usage levels (two) tested would remain the same as in the larger test.

Thus, there would be only 16 "cells" in this smaller program (2 incentives x 2 usage levels x 4 weather zones x 1 activation strategy = 16). To record the electricity usage of 40 customers per cell and to have a control group of 240 customers, 900 recording devices would be needed. This experiment would cost about $6.4 million plus incentive payments.

During the hearing, Edison developed cost data for a third experimental program. In it only one incentive level would be used, and six activation strategies would be tested in the four weather zones. The test would be limited to customers averaging over 1,200 kWh usage per month. Thus, there would be 24 cells. The experiment would include 3,000 DSS devices and its cost would be $6.867 million.

In staff witness Cavagnaro's prepared testimony, he recommended that, if an experimental program were chosen, it should be limited to one incentive level and to customers with usage greater than 1,200 kWh per month. He further advised that there is no need to test all six activation strategies proposed by Edison in the larger experiment.

We agree with Cavagnaro that testing should be limited to high usage customers. Further, we agree with Edison that testing should occur in all four weather zones.

Before evaluating the other two experimental variables enumerated above, one other element of the program design must be discussed. This is the method by which the Calculated Demand is obtained. DSS participants must agree to subscribe to a demand level

2 kW or more below the Calculated Demand. The incentive payment is based on the amount by which the subscription level is below the Calculated Demand.

Edison proposed that the customer's Calculated Demand be determined by applying a constant load factor of 25% to the customer's average summer daily kWh usage. Staff witness Cavagnaro noted that the individual residential peak loads may not coincide with Edison's system peak. Therefore, Cavagnaro proposed an adjustment to the Calculated Demand to account for lack of coincidence between the individual residential peak demands and the system peak demand. Edison accepts the staff's position in principle; however, Edison believes that the staff proposal would be difficult for Edison to administer.

A customer's Calculated Demand is a function of the customer's prior average summer daily use and the load factor. Edison's proposed formula is as follows:

$$\text{Calculated kW Demand} = \frac{\text{Average Summer Daily kWh}}{\text{Load Factor (25\%)} \times \text{Daily Hours (24)}} = \frac{\text{Average Daily kWh}}{6}$$

(The Calculated Demand will be rounded to the nearest whole number.)

Staff proposed reducing the Calculated Demand by either one or two kW depending on the level of the Calculated Demand. For example, staff would reduce the Calculated Demand of a 40-kWh-per-day customer by one kW from seven kW to six kW. An 80-kWh-a-day customer's Calculated Demand would be reduced by two kW from 14 to 12 kW. Edison concurs with staff's reason for lowering the Calculated Demand, that is, to account for the noncoincidence of residential demand peak with system peak demand. However, Edison believes that the reduction of the Calculated Demand can be accomplished more directly by simply increasing the load factor. Such an adjusted load

factor could be called a utilization factor. A utilization factor of 29% would achieve approximately the same results as suggested by staff and would be easier for Edison to administer.

Edison's proposal to apply a utilization factor of 29% to modify its customer Calculated Demand formula to account for the noncoincident system and residential peaks is reasonable and should be adopted.

What Incentive Levels Should be Tested?

Edison proposed a constant $5/kW/month for the six summer months ($30/kW/year) incentive payment for each kW of demand reduced below the customer's Calculated Demand. Edison derived its $5/kW/month for the six summer months after considering the following four factors:

1. Short-term emergency power purchases from the California Power Pool ($24/kW/year).
2. Incentive payments under Schedule TOU-8-I to interruptible industrial customers ($36/kW/year).
3. Edison's cost-effectiveness calculations.
4. The marketability of the DSS program.

Edison chose the $5/kW/month ($30/kW/year) value as the amount of incentive which it believes most closely matches the benefits which will be derived from the DSS program while still offering a sufficient benefit to customers to entice their participation.

Staff proposed that the level of incentive be increased for the incremental kW of demand reduction. Staff suggests that for a customer with a Calculated Demand of 7 kW, the first 2 kW below the Calculated Demand should be valued at $5/kW/month and all incremental kW of reduction should be valued at $7/kW/month. A larger customer with a Calculated Demand of, for example, 15 kW would receive a $5/kW/month incentive payment for the first four kW and then receive a $7/kW/month payment for any further demand reduction.

Although Edison believes that its recommended level of incentive payment is appropriate and consistent with the value of capacity from other sources as stated above, Edison believes that, with the modifications to calculating the Calculated Demand outlined above, the avoided capacity contribution by a participating DSS customer will result in a greater value to Edison. Also, Edison recognized that the expectation of demand reduction by a customer subscribing to the lower levels of service is greater than the expectation of demand reduction for a customer subscribing to higher levels. Therefore, Edison accepted the principle that staff's graduated payment schedule would result in a closer alignment of the economic incentive to the expectation of demand reduction.

Edison, however, believes that the application of this tariff design must be consistent with the other DSS program objectives of:

1. Minimizing the revenue transfer requirement by considering the impact on the nonparticipants.
2. Providing equity in level of service versus economic incentive to customers at all consumption levels.
3. Providing a tariff design that is administratively straightforward and readily understood by the residential customers so as to enhance the marketing success.

Edison accepted the two-tiered tariff design as proposed by Cavagnaro. Edison provided a matrix approach for the Commission's consideration which it states satisfies the above objectives as follows:

Edison's Revised DSS Tariff Design

Calculated Demand	Incentive Level	
	Apply $5/kW to:	Apply $7/kW to:
6 through 9 kW	first 2 kW below calculated demand	all remaining kW down to the subscription level.
10 through 12 kW	first 3 kW below calculated demand	all remaining kW down to the subscription level.
13 through 15 kW	first 4 kW below calculated demand	all remaining kW down to the subscription level.
16 through 18 kW	first 5 kW below calculated demand	all remaining kW down to the subscription level.
19 through 21 kW	first 6 kW below calculated demand	all remaining kW down to the subscription level.
22 through 24 kW	first 7 kW below calculated demand	all remaining kW down to the subscription level.
25 through 27 kW	first 8 kW below calculated demand	all remaining kW down to the subscription level.
28 through 30 kW	first 9 kW below calculated demand	all remaining kW down to the subscription level.
31 through 33 kW	first 10 kW below calculated demand	all remaining kW down to the subscription level.
34 through 36 kW	first 11 kW below calculated demand	all remaining kW down to the subscription level.
37 through 39 kW	first 12 kW below calculated demand	all remaining kW down to the subscription level.
40 through 42 kW	first 13 kW below calculated demand	all remaining kW down to the subscription level.

This matrix of incentive payments should be tested in the experimental program approved today. Since the level of incentive payments is critical in determining nonparticipant cost-effectiveness and since this schedule can result in incentive payments above those contained in the interruptible Schedule TOU-8-I, it is important that other incentive options be tested as well. For comparison to the graduated $5/$7 matrix, Edison should test a fixed incentive payment of $5/kW, regardless of the level of subscribed demand. We also instruct Edison, with staff review, to develop another incentive schedule with payments below those contained in the table. Edison may determine whether this schedule should be a constant amount for each kW of demand reduced below the Calculated Demand or a graduated matrix comparable to the one provided.

The earlier DSS proposal filed in A.61138 contained a completely different rate design. The large experimental program described by Edison also would have tested this rate design. Rather than use of a Calculated Demand and incentive payments for demand subscriptions below the Calculated Demand, separate demand and energy charges would be used. The customers would pay a set price for each kW of demand subscribed for during a DSS activation period; during all other periods the customer could have any load level without additional payments. In return for the demand charge, customers would receive energy at a lower price than that charged other residential customers.

Such an approach has some conceptual advantages over the discount incentive payments now proposed. A demand-and-energy tariff would charge customers directly for the demand they subscribe to during control periods which is when the costs of meeting customer demands are highest. This more accurately models the costs of operating a utility system and provides a narrowly focused price signal. Further, this structure would allow easy adjustment of demand subscription levels if a customer's load increases or decreases due to changes in such factors as household size or

appliance mix. We instruct Edison, with staff assistance, to develop such a demand-and-energy tariff for testing in the experimental program approved today. Edison and staff should determine whether the accompanying discount in electricity prices should apply only to a set amount of kWh consumption each month. Edison should also measure whether and to what extent this price discount creates an incentive to use more electricity than would be consumed otherwise.

How Many Activation Strategies Should be Tested?

Edison has proposed testing extensive activation strategies: 15 and 30 occurrences per summer with durations up to 2, 6, and 8 hours. Staff witness Cavagnaro has advised against testing all 6 combinations.

Activation of DSS up to 30 times a year seems excessive. Fifteen occurrences per year is more consistent with other load management programs in California.

Similarly, activation for 8 hours is longer than would usually be needed and seems certain to adversely impact customer acceptance. On the other extreme, two hours is probably too short. Edison could stagger two-hour activations of different customers to obtain system load reductions during longer periods, but this would greatly increase the cost of load reduction.

Edison should test a six-hour activation period and also choose and test an additional activation duration of greater than two hours but less than six hours. The devices should be activated up to 15 times per summer. We expect activation to occur close to these limits in order to test customer acceptance.

To summarize, an experimental program is authorized to test four incentive/rate design options and two activation strategies in all four weather zones for customers who use at least 1,200 kWh per month for at least three of the six summer months. This results in 32 cells in the experiment design.

The record does not address how many DSS devices are needed for a 32-cell experiment. Such estimates are provided only for experiments with 16, 24, or 192 cells. Edison's proposed 192-cell experiment would use 8,000 DSS devices which is 42 devices per cell. Edison states that this number is needed to statistically validate the findings. Yet the 24-cell experiment uses 3,000 DSS devices, which is 125 devices per cell, and the 16-cell experiment also uses 3,000 devices or 188 per cell.

Evidently, Edison views a 3,000-device experiment as the minimum size needed, regardless of the number of cells tested. If this size were maintained for the 32-cell experiment we approve today, this would result in 94 devices per cell, well above the 42 devices per cell which Edison states are needed to statistically validate the results. Thus, we conclude that the use of 3,000 DSS devices should be adequate to obtain statistically accurate results.

Since the size of a 32-cell experiment was not addressed in this proceeding, we will not limit testing to 3,000 devices, even though this size appears to be adequate. However, we will limit the level of funding authorized today to that needed for 3,000 devices. Edison has discretion, as established in D.82-12-055 in Edison's last rate case, to reallocate funds from other load management programs to increase the size of the DSS experiment if it determines that this is desirable.

The Problem of Selection Bias

One of the problems with the existing DSS experiment is that it did not control for or measure selection bias. The validity of results from the second experiment authorized today will also depend on the manner in which selection bias is addressed.

The potential experiments discussed in the record are designed similarly to the existing experiment with no modification proposed to reduce or measure the selection bias exhibited by the existing experiment. We expect Edison to modify the experiment

program design, with staff oversight, to reduce and/or measure selection bias to whatever extent possible.

Should the Discount Be Limited to the Base Rate Charge?

Edison proposed a condition in the tariff that limits the amount of the discount to the base rate component of the customer's bill, without allowing application to any of the balancing account components such as the Energy Cost Adjustment Clause (ECAC) rate. Staff has recommended that this provision be deleted. Edison believes the limitation is important from an administrative viewpoint. Edison argued that imposition of the proposed limit will not occur under normal circumstances since the customer must have both substantially reduced consumption and have signed for a very low demand subscription level before the provision would be effective. Edison also argued that it is consistent with provisions which currently exist in other Edison tariffs which include discounts and would be consistent with Edison's recommendation on minimum bill provisions included in its general rate case. In D.82-12-055 the Commission adopted Edison's proposal for a minimum charge of $2 per month applicable to base rate charges only. It is appropriate to apply similar minimum charge provisions to its DSS tariff.

Funding of DSS

We authorize a DSS program with 32 experimental cells. As discussed in a prior section, it appears that 3,000 DSS devices will be sufficient to carry out this experiment.

Edison has estimated that the revenue requirements of a 24-cell experiment using 3,000 DSS devices would be $6.867 million, or $4.340 million in 1983 and $2.527 million in 1984 based on a February 1983 decision date. Funding requirements for the 32-cell experiment authorized today would likely be somewhat higher than this amount. However, we also note that Edison's cost estimates assume that all equipment is purchased new for this experiment. Some equipment, in particular the 400 magnetic-tape recording devices used in the

earlier DSS experiment, should be available for reuse in this second experiment. Since Edison estimates that the magnetic-tape recorders cost $1,500 each, significant cost reductions should be possible.

We authorize today a total expenditure level of $6.867 million for this second DSS experiment in 1983 and 1984. Due to the delay in reaching today's decision, funding requirements during 1983 should be substantially less than the $4.34 million specified in Edison's estimate assuming a February 1983 decision date.

On July 12, 1983, in Resolution E-1969, we approved allocation and expenditure of funds which Edison has carried over unspent from 1982 conservation and load management programs. A contingency fund of $2,277,483 was established by that resolution for Edison's use as needed during 1983 for conservation and load management programs. Funding needed during the remainder of 1983 for this second DSS experiment should be obtained from that contingency fund.

For 1984, funding for the DSS experiment authorized today should be through the attrition allowance mechanism. As part of its attrition filing, Edison shall file its estimate of 1983 expenditures for this second experiment and request the remainder of authorized program funds with the total spent during the two years not to exceed $6.867 million.

Findings 98 and 99 of D.82-12-055 dealing with funded conservation and load management programs are pertinent here. The findings are as follows:

> "98. Consistent with D.93887 for PG&E, it is reasonable to give Edison management discretion to reallocate base rate funds in amounts up to $2.5 million among individual conservation and load management programs, as long as funds are not reallocated to or from the three major categories of Residential Conservation, Nonresidential Conservation, and Load Management without prior Commission approval.

"99. It is reasonable to allow the carry-over of unspent conservation and load management funds to the following year to supplement that year's budget allotment, and to give Edison management discretion to allocate the unspent funds without prior Commission approval if they are no more than $2,500,000 and if funds are not reallocated to or from the three major categories.

If additional funding for DSS is needed in 1984, it may be requested or reallocated following the procedure established in these Findings.

D.82-12-055 (mimeo. 126) determined that load management incentive payments should be recovered through rate design. The decision states that if the incentive payments are disbursed in a manner other than through a specific rate tariff, such payments are treated for ERAM purposes as a reduction in the actual base revenue amounts calculated each month. In general, incentive payments to customers in each customer class in load management programs are treated as "transfer payments" to the participants from the nonparticipants in that class only, and are recovered through that class's rate design. Base rates should be adjusted in this manner in Edison's attrition proceeding to provide for incentive payments during the 1984 summer DSS test. D.82-12-055 should be made final.

Radio-Control Problems

Both Edison's DSS system and its ACC system now use radio signals to activate the load management devices on the customers' premises. Two types of problems have been experienced in the demonstration stage of programs using the custom-built prototype devices now installed: (1) difficulty in achieving adequate coverage of all parts of Edison's service area, and (2) interference with certain public safety radio communications.

Edison states that it has experienced some operating difficulties because the very high frequency (VHF) frequency-modulated (FM) signaling system now being tested has not worked as well as desired due to the diverse topography of its extensive southern California service area. As a result, Edison has investigated other radio-control alternatives. One of these, a system which uses an amplitude-modulated (AM) radio signal, has been under study; but, according to Edison, the study period has not been sufficient to provide a reliable evaluation nor has the FCC granted Edison a license for AM transmission. Another alternative Edison has under study would use subcarrier control-signal transmission by standard FM broadcast stations. The use of powerline carrier transmission has also been under investigation. At the present time, however, Edison has had no field experience with either the FM broadcast subcarrier or the power-line carrier systems of load management control.

In A.61138 the staff has recommended that 5% of the 1983 DSS budget be allowed in expenses to continue the study of nonradio-controlled DSS, with a proposed requirement that Edison submit a report to the Commission by October 1984. That proposal was not renewed in A.82-08-10 as it appeared that Edison had overcome its major problems in this area. This staff proposal will not be adopted.

The California Public Safety Radio Association (CPRA) complains that operation of the load control devices already installed by Edison has caused radio interference problems with some of the FM communication systems operated in the VHF band by its member agencies, which include safety organizations providing fire, police, and emergency medical services.

According to CPRA the interference experienced from Edison's equipment is caused by the operation of relatively high power level load management transmitters on the 154.46375 Megahertz (MHz) channel. This VHF channel is close in frequency to certain

channels assigned by the FCC to public safety agencies in Edison's area. Operation of Edison's load control transmitters sometimes desensitizes the public safety receivers thereby impairing their ability to receive signals from low-power hand-carried radio sets and from some less powerful vehicular-mounted radio units.

CPRA urges the Commission to deny Edison an allowance in test period revenue requirement to cover expansion of any load management operations which utilize the frequency 154.46375 MHz. because of present interference and the increased interference which CPRA alleges would accompany expanded use of this frequency by Edison. CPRA further urges the Commission to prohibit Edison from procuring any additional load management devices capable of using the frequency 154.46375 MHz.

Radio interference is, in fact, produced by Edison's load control equipment; nevertheless, that interference may result, in whole or in part, from inadequate signal strength from public safety transmitters and/or lack of adequate frequency discrimination by public safety receivers. The evidence is clear that Edison's load control system is transmitting on an FCC-assigned frequency and that it is operating in full compliance with applicable FCC rules and regulations. Radio frequency assignments and the technical performance of radio equipment are matters under the exclusive jurisdiction of the FCC; therefore, CPRA should seek from that federal agency such relief as may be warranted in the circumstances.

The use of AM broadcast radio would, of course, mitigate the above concerns. Therefore, due to this advantage and the wide area coverage possible with AM broadcasting, Edison should evaluate carefully the potential use of AM radio as the communication system for the DSS experiment approved today.

Conclusion

Our denial of systemwide expansion of Edison's DSS program should not be construed as a weakening of our past support for Edison's load management efforts. We continue to view load management as a viable alternative to generation capacity expansion. However, we are not willing to approve relatively large expenditures for load management programs whose ability to reduce system loads in a cost-effective manner is not known. We expect the utilities to design effective experiments and to perform rigorous analysis of the experimental results before we permit large-scale expansion of programs such as DSS.

The quality of the record in this proceeding is inadequate, for a variety of reasons discussed in this decision, to support program expansion at this time. However, we do believe that the DSS concept is promising enough to warrant further study, and we approve funds to do so.

The apparent adequacy of generation capacity in California at least for the remainder of the decade allows time for careful exploration of load management options. We expect our staff and Edison to use this time to determine the most cost-effective ways in which load management can be implemented.

Findings of Fact

1. The proposed DSS tariff is a voluntary tariff available to all Edison residential customers who consumed 40 or more kWh per day during three of the prior six summer billing months of May through October.

2. The proposed DSS program provides Edison's residential ratepayers with an option to reduce their summer electric bills.

3. The existing DSS experiment is limited to customers residing in newly constructed single family homes.

4. In the existing DSS experiment, Edison estimated the customers' anticipated peak demand based on the appliance mix, not on past usage.

5. In the existing experiment, DSS customers were chosen on a volunteer basis and control customers were chosen on a random basis independently of their willingness to participate in DSS.

6. The DSS device has not been tested in Edison's mild and super hot weather zones.

7. Problems occurred in achieving DSS device activation during activation periods in the summer of 1981.

8. Differences in demand characteristics exhibited by the treatment and control customers were generally statistically significant only in the moderate weather zone.

9. Differences in demand characteristics exhibited by the treatment and control customers cannot be attributed solely to participation in the DSS experiment.

10. In the existing DSS experiment, 60% of customers who had in-house interviews agreed to participate in the experiment.

11. In a survey of large residential customers in the mild/moderate and hot weather zones, 44% of the customers surveyed indicated that they would either definitely or probably participate in the DSS program.

12. In a survey of potential DSS customers in the Palm Springs area, 74% of the customers surveyed indicated that they were either definitely or probably interested in participating in some load management program.

13. The survey results do not reliably indicate the level of participation in a large-scale DSS program.

14. Edison's resource plan includes sufficient generation capacity to meet system needs through 1992, whether or not DSS is implemented.

15. Evidence in this record regarding the existing DSS experiment is not sufficient to determine the load reduction, customer acceptance, or cost-effectiveness of the systemwide expansion proposed by Edison.

16. Further experimentation with a second installation of DSS devices can yield useful and more reliable information regarding load reduction, customer acceptance, and cost-effectiveness of a systemwide DSS program and should be authorized.

17. A utilization factor of 29% accounts for the lack of coincidence of residential peak demand and system peak demand as well as the load factor of participating customers.

18. The modified method proposed by Edison of determining Calculated Demand is reasonable and should be adopted.

19. A second DSS experiment costing a total of $6,867,000 for 1983 and 1984 as described herein is reasonable and should be authorized.

20. The minimum charge of $2 against base rates adopted in D.82-12-055 should also apply to Edison's DSS schedule.

21. Funding of 1983 expenses for the second DSS experiment through the contingency fund established in Resolution E-1969 is reasonable and should be authorized.

22. Funding of 1984 expenses for the second DSS experiment through the attrition allowance procedure adopted in D.82-12-055 is reasonable and should be authorized.

23. Edison is operating its load-control radio equipment on an FCC-assigned frequency and in accordance with FCC rules and regulations.

24. The staff proposal to devote 5% of the 1983 DSS program budget to the investigation of nonradio-controlled DSS equipment is not reasonable.

Conclusions of Law

1. Edison should be authorized to implement the DSS experiment as described in this decision.

2. The 1983 and 1984 revenue requirement of $6,867,000 for the DSS experiment should be recovered in base rates in the manner described in this decision.

3. Edison should report DSS experimental progress and results to this Commission as part of its routine load management filings.

4. The FCC, not this Commission, assigns radio frequencies and promulgates rules and regulations for the operation of radio-controlled equipment.

5. D.82-12-055 in A.61138 should be made final.

6. This order should be made effective today to permit Edison to meet the time constraints for procurement of the necessary equipment for timely implementation of the DSS experiment.

O R D E R

IT IS ORDERED that:

1. Southern California Edison Company (Edison) is authorized to undertake the Demand Subscription Service (DSS) experiment as specifically set forth in this decision.

2. Edison may recover the 1984 program revenue requirement set forth in this decision in base rates in the attrition adjustment proceeding authorized in D.82-12-055.

3. Decision 82-12-055 is made final.
This order is effective today.
Dated AUG 3 1983, at San Francisco, California.

LEONARD M. GRIMES, JR.
President
VICTOR CALVO
PRISCILLA C. GREW
DONALD VIAL
WILLIAM T. BAGLEY
Commissioners

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

Joseph E. Bodovitz, Executive Director

ALJ/vdl ALT-VC

Decision 83 08 032 AUG 3 1983

ORIGINAL

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

In the Matter of the Application of Southern California Edison Company for Approval of the Demand Subscription Service (DSS) Program.	Application 82-08-10 (Filed August 2, 1982; amended October 21, 1982)
In the Matter of the Application of Southern California Edison Company for authority to increase rates charged by it for electric service.	Application 61138 (Filed December 18, 1981)

(See Decision 82-12-055 for appearances in A.61138.)

John R. Bury, David N. Barry III, Richard K. Durant, and Frank J. Cooley, Attorneys at Law, for Southern California Edison Company, applicant.
Pamela A. Summers, for Coachella Valley Association of Governments, interested party.
Freda Abbott, Attorney at Law, for the Commission staff.

O P I N I O N

Procedural Background

Southern California Edison Company (Edison) in Application (A.) 82-08-10 seeks approval of its Demand Subscription Service (DSS), a form of residential load management, for implementation throughout its service territory. Edison seeks only approval of the DSS program in A.82-08-10, as funding for that program was requested in its 1983 test year general rate case in A.61138. A.61138 was reopened and consolidated with A.82-08-10 for hearing.

Edison originally requested approval of DSS in A.61138. Edison anticipated that a decision on the merits of the proposed DSS program would be reached in A.82-08-10 before the issuance of D.82-12-055 dated December 13, 1982 in A.61138, and that funding