UTILITY MARKETING OF STATE CONSERVATION LOANS

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ABSTRACT

This paper details the results of a collaborative effort by the Sacramento Municipal Utility District (SMUD) and the California Energy Commission (CEC) to market state conservation loans.

The program provided loans at 8.89 percent interest rate to schools, local governments, hospitals and special districts for energy conservation projects.

The joint project marked a departure in the traditional relationship between the CEC and SMUD whose bonds where largely regulatory based on the state agency's review of the utility's conservation plans and programs. By sponsoring the loan program, SMUD, an all-electric utility, sought to reduce electric use particularly during its summer peak period. For its part, the CEC hoped the arrangement would achieve greater participation levels and reduce its administrative time.

The CEC incorporated several features to encourage utility involvement:

1. The use of utility energy audits as a precondition for loan applications;

2. The creation of two loan pools based on kwh costs; and

3. Guaranteed set-aside allocation of loan funds to participating utilities.

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INTRODUCTION

In December 1985, the Conservation Department of the Sacramento Municipal Utility District (SMUD) volunteered to act as a sponsor of an institutional loan program administered by the California Energy Commission (CEC).

This paper examines the advantages of this cooperative venture for both the CEC and SMUD and how the utility's participation affected the overall success of the program.

THE CEC LOAN DESCRIPTION

The state loan program created a $6.55 million fund to be distributed primarily to schools, hospitals, local governments and special districts for energy conservation projects. The CEC initially offered loans at 7.0 percent, but was later forced to raise the rate to 8.89 percent. Eligible participants could apply for two types of conservation loans: simplified and complex.

Simplified conservation loans covered such proven energy saving measures as those listed in Table I. These loans required the completion of an energy audit (EA) of the facility and standardized calculation forms to determine payback. The CEC reserved 60 percent of the total funds for this loan category.

Complex conservation loans included those modifications, listed in Table II, which the CEC determined would require both an EA and a technical audit (TA). The TA consists of a set of CEC forms which must be completed by a California registered engineer. The remaining 40 percent of program funds were allocated to this loan category.

Tables I and II. Energy conservation load measures.

SIMPLIFIED	COMPLEX
* Roof and wall insulation	* Thermal storage
* Exterior shading devices	* Cogeneration (60 kw or less)
* Lamp and fixture conversions	* Biomass and waste-to-energy
* Ballast replacements	* HVAC and lighting controls
* Automatic timers and switches	* HVAC modifications

LOAN MARKETING STRATEGY

In designing its strategy to market the loan program, CEC staff perceived several potential problems to successful implementation. First, the program had a very short timeframe--less than five months between the loan announcement in November 1985 and the April 1986 submission deadline.

Secondly, the CEC had limited staff available to administer, market and subsequently review loan applications. This limitation was largely inherent in the loan's enabling legislation, the California Energy Assistance Act of 1979, which restricted funding for administration.

The third potential problem involved the question of equity in the loan award process, which was originally based on a simple payback criteria for all state-wide applicants. Several attendees at a public workshop on the loan program felt that this method penalized applicants in low energy cost areas where paybacks would be generally greater than in higher energy cost areas.

The CEC staff responded to these potential problems by incorporating several program features that were designed to streamline the application process, encourage utilities to provide assistance and make the loan allocation process more equitable. These features included:

Use of Utility Audits - The CEC authorized the substitution of utility energy audits in place of the CEC's own EA forms for both simplified and complex loan applications. This was potentially a significant time-saver since utilities had already completed energy audits on the majority of their larger commercial customers.

Loan Pools - CEC staff addressed the simple payback equity question by creating two pools based on a range of kilowatt-hour costs. Municipally-owned utilities, including SMUD, constituted the lower cost pool (2-6 cents/kwh), while the state's investor-owned utilities with higher costs (7-13 cents/kwh) constituted the other. The $6.55 million was then divided between the two pools based on their relative share of the state's population. In this way, applicants from low kwh cost areas would compete for funds separately from those in higher cost areas. Table III provides a detailed breakout of this allocation.

Table III. CEC loan allocation pools.

Range of kwh Costs	Utility Areas Served (% of Population)	Simple (60%)	Complex (40%)	Total (100%)
< 6 cents	Municipals (15%)	$ 589,500	$ 393,000	$ 982,500
> 7 cents	Investor-Owned (85%)	3,334,050	2,227,000	5,561,050
TOTALS		$3,923,550	$2,620,000	$6,543,550

Set-Aside Allocation - The CEC further offered to negotiate specific allocation levels, or "guaranteed" funds within utility service areas if the utility agreed to act as a loan sponsor.

SMUD's set-aside allocation was $400,000 within the $982,500 pool reserved for municipal utilities. SMUD staff felt this figure was reasonably attainable after a review of the existing audits of eligible customers identified more than $2 million in potential loan projects.

SMUD SPONSORSHIP

As a sponsor of the program, the SMUD Conservation Department agreed to assist the CEC in four areas:

1. To market the loans among eligible customers,

2. To prepare all simplified loans on behalf of the applicants,

3. To assist the applicant in selecting an engineering consultant to prepare the TA and complex loan applications, and

4. To provide technical review of all the complex loan applications submitted in the SMUD area.

SMUD'S GOAL AND OBJECTIVES

As an electric-only utility, SMUD had one primary goal in sponsoring the loan program: to reduce electric energy use, particularly during summer afternoons when the utility's generation capacity was most critical.

To achieve this goal, SMUD staff outlined the following objectives:

1. To meet or exceed the CEC set-aside allocation of $400,000;

2. To maximize participation of the target loan groups;

3. To maximize participation of the local engineering community in the promotion and preparation of complex loans; and

4. To achieve 400 kw reduction in summer demand savings as a result of loan projects.

RESULTS

Loan Awards

In June, 1986 the CEC awarded $789,225 in conservation loans to applicants in the SMUD area--nearly twice the targetted $400,000. As shown in Table IV, this participation level represented nearly 13 percent of the state's loan total. By comparison, SMUD's percent share of state population is 4.6 percent.

Table IV. Summary of CEC loan awards.

	State-Wide Awards		SMUD-Area Awards		
Loan Type	Amount	% of Allocation	Amount	% of Allocation	Percent
Simplified	$2,404,954	61%	$181,320	76%	7.5%
Complex	3,719,490	142%	607,905	380%	16.3
TOTALS	$6,124,444	94%	$789,225	197%	12.9%

Complex loan applications far exceeded the CEC allocation projections, particularly in the SMUD area. In these cases SMUD staff shortened the loan processing and preparation time by providing EA's and technical review. Nonetheless, it is very likely that these loans would have been submitted even without SMUD's assistance.

On the other hand, simplified loan amounts fell below CEC allocation projections, although less so in the SMUD area. This total includes only final loan awards. An additional $113,000 in SMUD-area simplified loans were voluntarily withdrawn when the applicant elected to complete the projects with internal funds. These projects, along with the loan award projects, would not have occurred without SMUD's direct involvement in the loan program.

The Impact of Equity Schemes

The program ended up with more funds than loan requests. For that reason, the loan pool and set-aside allocation schemes designed by the CEC to improve equity did not have a direct bearing in the loan award process. Nonetheless, it is instructive to evaluate the impact on SMUD loans had they been forced to compete state-wide for limited funds. Table V shows that the SMUD simplified loans would have been in a distinct competitive disadvantage under these conditions. The average payback for these loans was 3.9 years--56 percent higher than the average 2.5 year payback for loans in the remainder of the state.

Table V. Simplified loans: average payback and percentage of applications by measure.

		% of Applications			
	Payback	Lighting	Timeclocks	Insulation	Shading
SMUD	3.9 years	100%	0%	0%	0%
State	2.5 years	97%	3%	0%	0%

The cost of electricity proved to be the key variable in paybacks for this group of loans primarily because of the nature of the measures. As shown in Table V, nearly 100 percent of the simplified loan applications were for some form of lighting modification--a measure which exclusively saves electric energy. Two other simplified measures which would have saved non-electric energy--insulation and timeclocks--proved unpopular with applicants. Loan participants found insulation to have limited application for most commercial buildings, and applicants investigating time controls preferred energy management systems (EMS), a complex loan measure.

Unlike the simplified loans, the complex loan measures in the SMUD area yield a simple payback 3.5 years, that was comparable with applications throughout the state. There appear to be two reasons for this:

1. The higher electricity charges tended to encourage complex loan projects with higher capital cost. As shown in Table VI, SMUD-area projects concentrated on EMS installations and heating and cooling measures. Applications in the higher kwh cost areas included such higher cost projects as thermal storage and cogeneration.

2. Approximately 74 percent of total savings from complex loan applications resulted from reductions in natural gas. This tends to equalize the payback periods since gas costs are comparable throughout the state.

Table VI. Complex loans: average payback and percentage of applications by measure

	Payback	EMS	HVAC	Thermal	Cogeneration
SMUD	3.5 years	100%	100%	0%	0%
State	3.4 years	33%	33%	38%	10%

Note: Percents are not additive since loan applications may include measures in more than one category.

Engineering Community Participation

Early in the loan program, SMUD staff surveyed local engineering firms to interest them in promoting and preparing complex loan applications. Thirty firms submitted 2-page resumes which were collected into packets and distributed among eligible loan customers. At the close of the loan program, however, only one firm prepared all of the complex loan applications in the SMUD area. The primary reasons for the lack of more widespread participation appear to be:

1. The short timeframe for soliciting and preparing complex loans,

2. Unfamiliarity with CEC procedures and TA forms in particular, and

3. Lack of close ties to the loan target sector.

By contrast, the firm which secured all of the complex loan contracts has specialized for 8 years in preparing CEC grant and loan applications for local school districts.

Loan Sector Participation

Table VII shows the relative importance of the loan target group as a SMUD energy customer. This group consumes approximately 410,106 KWH annually, or approximately 11.4 percent of the total annual energy use of SMUD's commercial customers. Nearly half of this use is consumed by widely distributed equipment which are not good candidates for conservation projects: Storm and waste water pumps, traffic signals and street lights. The remainder is divided among facilities operated by schools, local governments, hospitals and special districts (See Figure 1).

Table VII. Energy use by loan group.

Group	KWH/Year	% of SMUD
Hospitals	60,882	1.7%
Schools	81,389	2.3
Government Facilities	62,210	1.7
Pumps, Lights, Signals	185,780	5.2
Special Districts	19,845	0.6
TOTALS	410,106	11.4%

From a marketing point of view, one of the advantages of the loan target group is the centralization of its administration. Table VIII shows that while the individual electrically metered sites number more than 1,500, the actual administrative entities number only 30.

Table VIII. Loan participation by target sector and loan type.

Sector	Meters	#	Participation by Loan Type: Simple	Complex	Total
Schools	302	18	3	11	14
Hospitals	15	8	0	0	0
Local Government	1,200+	2	1*	0	1
Special Districts	4	2	0	0	0
TOTALS	1,500+	30	4	11	15

*An additional 4 loans were withdrawn.

Table VIII also tabulates the loan participation by target group. The most influential factor in program participation was access to internal funds or alternative loss cost money for conservation projects. This was the reason cited by the two groups that declined to participate--hospitals and special districts which include the Sacramento area airports and SMUD itself. Significantly, these groups derive their revenues from fees, airline leases and electricity charges and were therefore unaffected by California's Proposition 13 which limited property tax revenues.

Schools, the group most severely affected by Proposition 13, submitted the most number of applicants. This high participation level also reflects the influence of the local eniineering firms which approached each school district in the region with complex loan proposals.

The two local governments, the City and County of Sacramento, both worked closely with SMUD staff reviewing every major facility for potential loan projects. The City ultimately selected one project for submission--a major parking lot lighting conversion. The County reviewed 8 potential projects, settled on four and then withdrew these when it was decided to incorporate the projects among budgeted improvements for the 1986-1987 fiscal year. The loan process in this case served as a means of achieving energy savings even if it did not directly result in loan submissions.

It is unlikely that any of the applicants would have participated in the loan program had the CEC initially offered the higher 8.89 percent interest rate. Schools and local governments, for example, had access during this time period to 7.4 percent money for 5-year paybacks. Hospitals and special districts had access to even more favorable rates.

As of June 1986, applicants refused to a accept 6 of the 15 loan awards because of the unfavorable rates. It is significant that the applicants in each case intend to complete the projects with alternative funds. This suggests that the loan process provided needed impetus.

ENERGY SAVINGS

The loan program will result in 568 kw in reduced summer demand, exceeding the program's 400 kw objective by 42 percent. Table IX shows that 85 percent of this demand will be saved from the simplified loan applications and therefore directly related to SMUD participation. The equivalent of one full-time SMUD energy specialist worked on the four-month project with approximately 75 percent of the time spent in solicitation and preparation of simplified loans. Savings therefore exceeded 100 kw/auditor for each month.

Table IX. Energy savings resulting from CEC loans in SMUD area.

Loan Type	kwh	%	kw	%	Therms	%
Simplified	1,762,390	65.2%	485	85.4%	0	0.0%
Complex	940,110	34.8	83	14.6	170,945	100.0
TOTALS	2,702,500	100.0%	568	100.0%	170,945	100.0%

The program will also result in approximately 2,700 MWH electricity savings, of which 65 percent can be attributed to simplified loans. All of the 170,945 therm savings will result from complex loan projects. On a Btu basis, as shown Figure 2, electricity savings represent the majority (65 percent) of total energy savings.

For SMUD, as an electric utility with a severe summer peaking problem, the most beneficial projects are those that reduce afternoon summer demand between 1-8 p.m. Table X shows that the time when project demand savings will occur depends on the type of facility and the nature of the conservation measure. Using the SMUD criteria, the best projects are the lighting conversions at the city parking lot, correctional facility and courthouse, all of which reduce demand across the entire peak period. Beneficial, but less so, are the school lighting and compressor projects which reduce demand until 4 p.m. The projects with the least beneficial impact on summer peak demand are the night security light conversion at the correctional facility and the school EMS installations which reduce fan and pump operation during winter morning warmup.

Figure 3 graphically illustrates the combined hourly effect of the loan project demand reductions compared to SMUD's summer system load profile. The graph shows the influence of the school projects with the greater reductions occurring during SMUD's mid-late afternoon shoulder peak.

FIG 1: Energy Use by Loan Sector

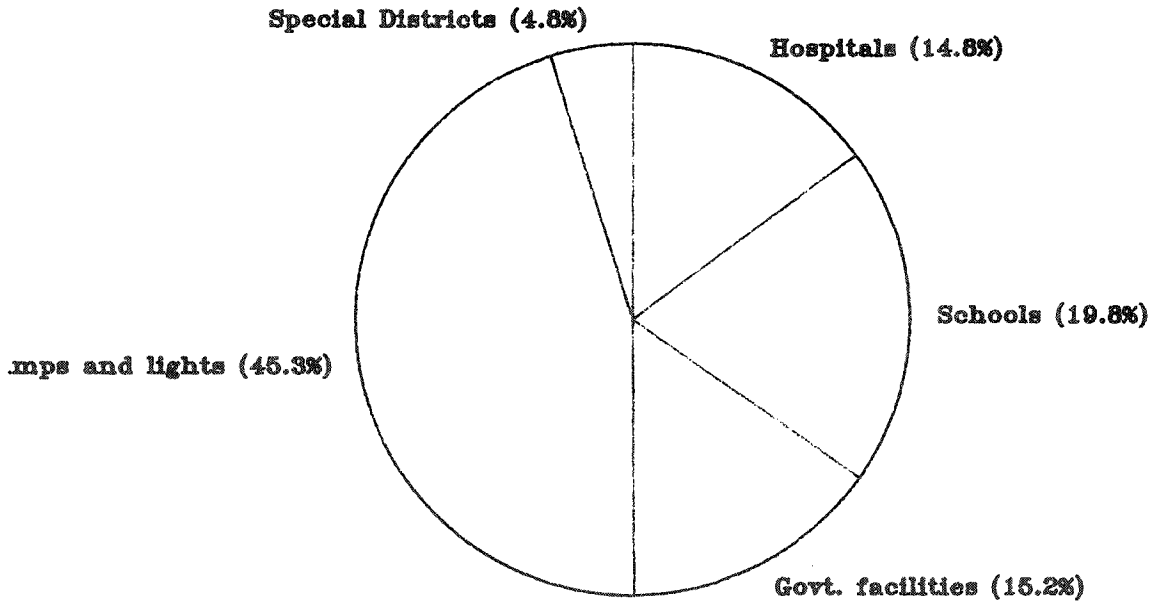

FIG. 2: ENERGY SAVINGS BY FUEL TYPE

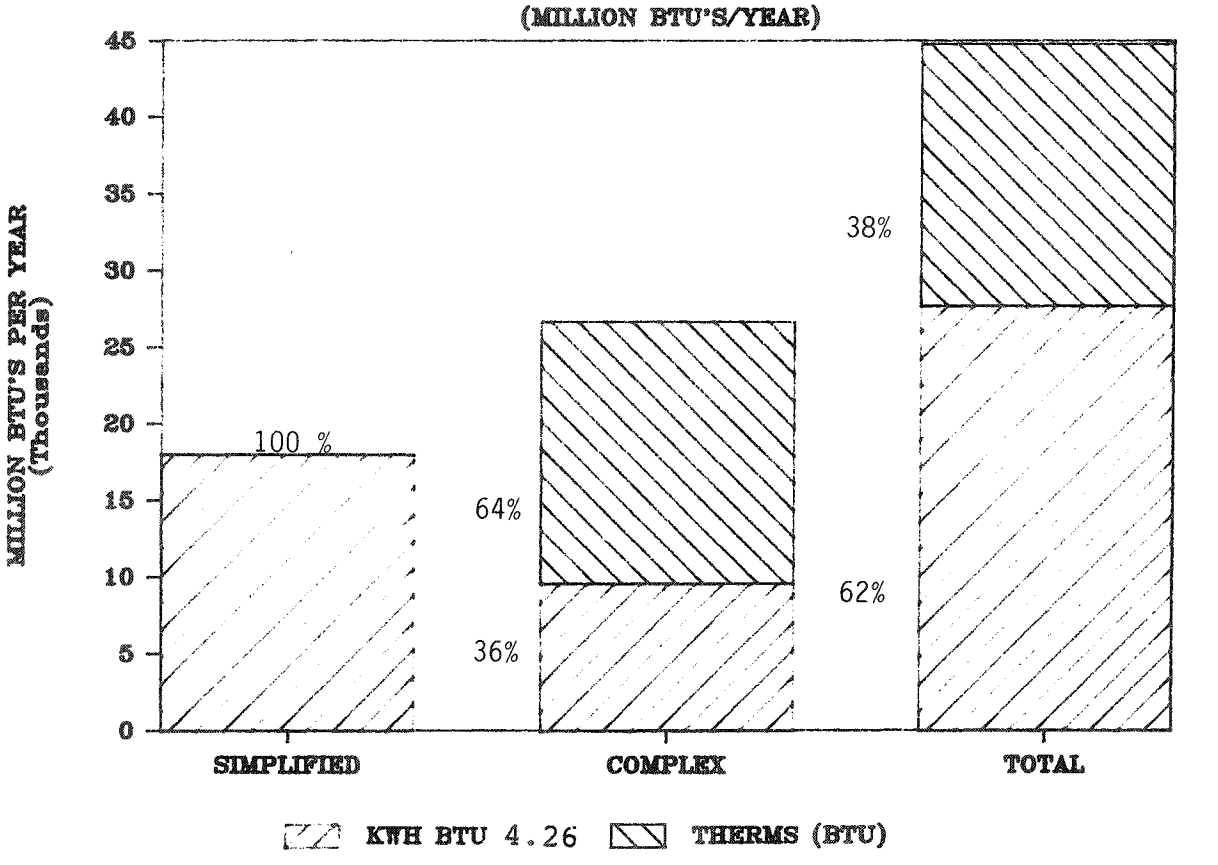

FIG 3: HOURLY DEMAND SAVINGS

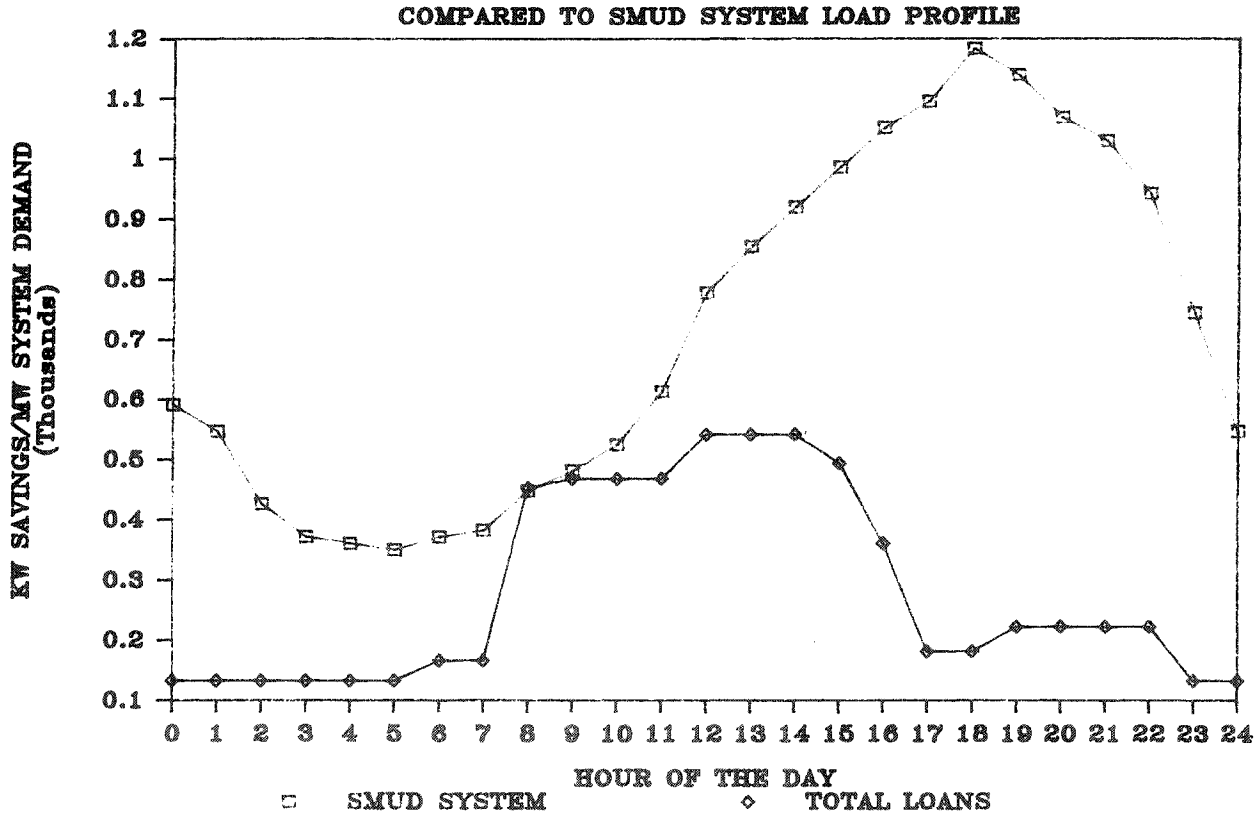

Table X. Hours of demand reduction for loan projects.

Loan Applicant	Measure	kw	Period of Reduction	
Simplified:				
City Parking Lot	Lighting	75	24-hour	Year-round
Correctional Center	Lighting (Interior)	18	24-hour	Year-round
Correctional Center	Lighting (Exterior)	41	8 p.m.-6 a.m.	Year-round
Schools	Lighting	160	8 a.m.-4 p.m.	Sep-Jun
Complex:				
Schools	Compressor Changes	57	12 p.m.-4 p.m.	May-Oct
Schools	Optimum Start	364	4 a.m.-7 a.m.	Oct-Apr

OBSERVATIONS AND CONCLUSIONS

- SMUD sponsorship of the CEC loan exceeded program objectives of boosting participation levels and achieving energy savings.

- Paybacks for simple loans, which favored electric savings, were significantly higher in the SMUD area, than the rest of the State. Paybacks for complex loans, which favored gas savings, were comparable.

- Complex loan applications were greatly dependent on the involvement of a consulting firm with existing experience with TA forms and established ties to the loan sector group.

- Participation depended upon access to other sources of low-cost funds. Schools had the highest participation levels. Hospitals and special districts did not participate.

- The loan program served as an impetus to project implementation even when the applicant chose not to submit loans or accept loan awards.

- Because of the preponderance of school projects, energy savings tended to peak in the mid-afternoon.