INNOVATIVE PEAK LOAD REDUCTION PROGRAM: PROGRAM RESULTS AND LESSONS LEARNED

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In response to the California energy crisis and skyrocketing wholesale prices for electricity, the California State Legislature passed Senate Bill X1 5 (SB 5X) and Assembly Bill X1 29 (AB 29X) that provided $859 million in funding for statewide energy efficiency programs. The California Energy Commission (CEC) was assigned the difficult task of administering some of the resulting programs and launched a variety of peak load reduction programs. One of the more successful programs initiated by the CEC was the Innovative Peak Load Reduction Program (IPLRP) – a catch-all program designed to tap into the creativity of the private market to facilitate projects that reduce peak demand. The IPLRP had several program elements, one of which was the Small Grants Program Element.

This report provides an overview of the Small Grants Program Element (hereafter referred to as "Program") of the IPLRP. Specifically, this report presents an overview of the following topical areas:

- Background
- Program goals and budget
- Program design
- Marketing
- Implementation
- Program results
- Lessons learned.

Background

The Innovative Peak Load Reduction Program (IPLRP) was launched during the Fall of 2000 in response to California's energy crisis. The IPLRP, initially funded by Assembly Bill (AB) 970 in September 2000 and augmented by Senate Bill (SB) 5X in April 2001, had the objective of rapidly achieving demand savings to avoid the rolling blackouts that were occurring with increased frequency during the crisis.

The California Energy Commission (Commission) outsourced administration of the Program to KEMA Inc. (formerly XENERGY Inc.). The contract between the Commission and KEMA was executed on May 15, 2001. Within weeks of obtaining the contract, KEMA launched a mass statewide marketing campaign, developed the Policies and Procedures Manual, drafted legal forms and other relevant program materials, and implemented a database tracking system. As a result of this rapid deployment, the Program was successful in fully subscribing the initial

$8.5 million in grant funding by July 2001 (the first application deadline), thereby enhancing the probability of achieving peak load savings in the summer of 2001. The funding was amended four times over the course of the Program for a final total budget of $13.1 million ($11 million in grant funding).

Program Goals and Budget

Subscription Goal

The overall objective of the Program was to reduce peak electricity demand. The explicit goal of the Program was to fully subscribe the grant funding and realize the first savings during the summer of 2001. The kW demand savings target for the Program's initial grant funding level of $8.5 million was a reduction of 34 MW. Additional funding allocated to the program increased the potential for peak reduction proportionally.

Administrative Budget Goal

SB 5X required that administrative costs be kept at or below 15 percent of the total program budget. As a result, another important goal of the Program was to keep administrative costs below the 15% threshold.

Program Budget

With an initial $10 million budget for the Program, the Commission increased funding by $4.04 million in response to the widespread early success of the Program. The funding was amended four times over the course of the Program for a final total budget of $13.1 million ($11 million in grant funding).

Program Design

The Program design allowed considerable flexibility with respect to the types of projects or end-use measures funded and eligible applicants. Additionally, the Program was unique in California in that it allowed multiple projects located within several utility service territories to be aggregated into a single application.

The Program was implemented in two phases, each with distinct program design attributes. The Program initially targeted small non-residential customers with projects in the 20-to-400 peak kW reduction size range. With the additional $4 million in funding in October of 2001 and the close of the CEC administered Large Grants portion of the IPLRP, the Program expanded eligibility to include large projects with peak savings greater than 400 kW. Table 1 compares the attributes for the two phases.

Table 1

	Phase 1	Phase 2
Start Date	May 2001	April 2002
Peak Period	2:00 p.m. to 6:00 p.m.	12 noon to 6:00 p.m.
Project size Minimum Maximum	 20 kW 400 kW or $100,000 incentives *(prior to 8/1/2001)* $4,000,000 incentives *(from 8/1/2001 to 3/31/2002)*	 15 kW or $1,000,000 incentives
Eligible Applicants	Commercial Industrial Local government Municipal water and wastewater facilities Residential (SF or MF) with minimum 20 kW savings	Same as Phase 1, plus Opened to state-owned buildings and state universities.
Application Deadline	July 31, 2001	June 28, 2002
Operational Date	June 1, 2002	June 1, 2003

To be eligible for the Program, the project had to reduce peak electricity demand or generate electricity using a waste energy recovery method. Each application was reviewed to determine the peak savings potential of the proposed project.[a] For the most part, KEMA utilized a calculated savings approach to determine peak savings. For some projects, short-term monitoring was required as a condition of the grant to assist in the determination peak savings. Diversity factors were applied, where appropriate, to the vast majority of peak load savings calculations.

Grant Agreements

Grants were awarded on first-come, first-served basis at $250 per average peak kW. Early in the program, a bonus incentive was offered to encourage early project completion at $1 per kW for each day the project was completed before September 30, 2001.

The Grant Agreement was the legal document committing funds to the project and was signed by the program administrator and the applicant. As program administrator, KEMA had authority to negotiate the terms and conditions of the grant and to issue the grant agreement without the Commission's involvement.

Grant payments were made after the project was completed and the grant recipient complied with the documentation requirements as outlined on the project completion form. The final grant amount was adjusted to reflect any changes in the peak kW savings that may have occurred due

[a] Peak demand reduction was defined as the average hourly reduction (or supply augmentation) in demand during the peak hours for non-holiday weekdays during the months of June through September.

to as-installed or verified conditions. Several projects came in with peak savings below their initial targets and the grant award was adjusted accordingly.

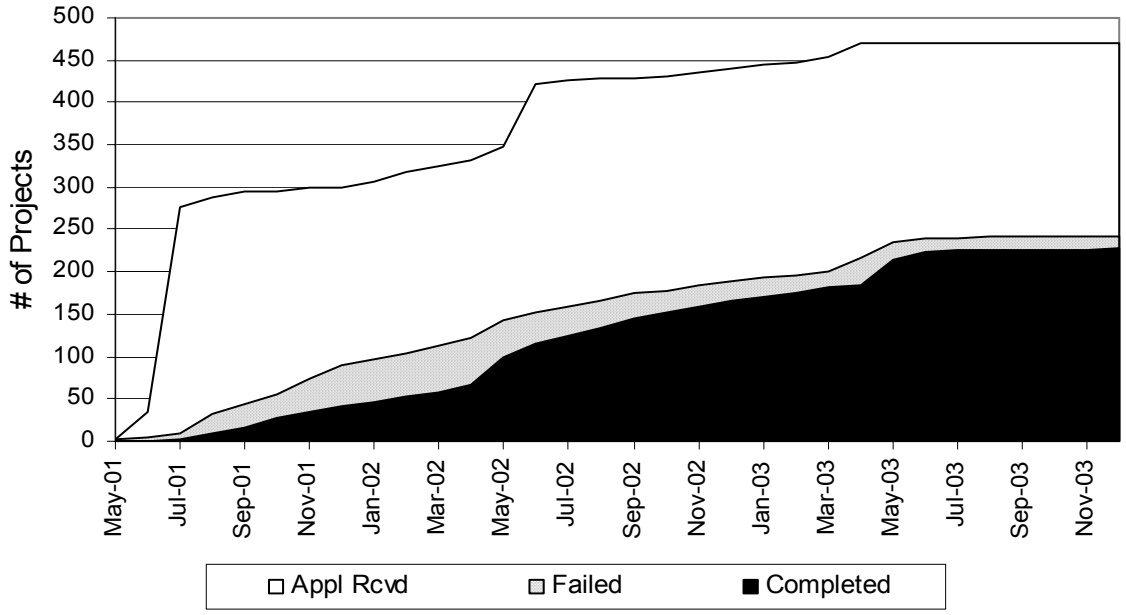
Marketing

KEMA developed a Marketing Plan for the Program that proved to be quite successful in soliciting sufficient participation in the Program to fully subscribe available grant funds in each phase of the Program. KEMA identified the largest lighting and HVAC contractors and specifically targeted them in the marketing efforts. Additionally, KEMA also established contact with key industry associations, businesses with multiple facilities throughout California, and utility account representatives in an effort to promote the Program. In the first phase of the Program, marketing activities also included direct mail and telemarketing campaigns.

Implementation

Figure 1 shows the cumulative number of applications received, projects completed, and projects failed in the Program. As displayed, applications were received for 475 projects, of which 229 projects were successfully completed and 246 projects failed or terminated their application. As is common is these types of programs, the number of applications received and project completions dramatically increased as the application submittal deadlines and project completion deadlines drew near. Additionally, project failures dramatically increased just prior to the project completion deadlines, despite the fact that many of the applicants provided assurances that their projects would be done by the deadline.

Figure 1

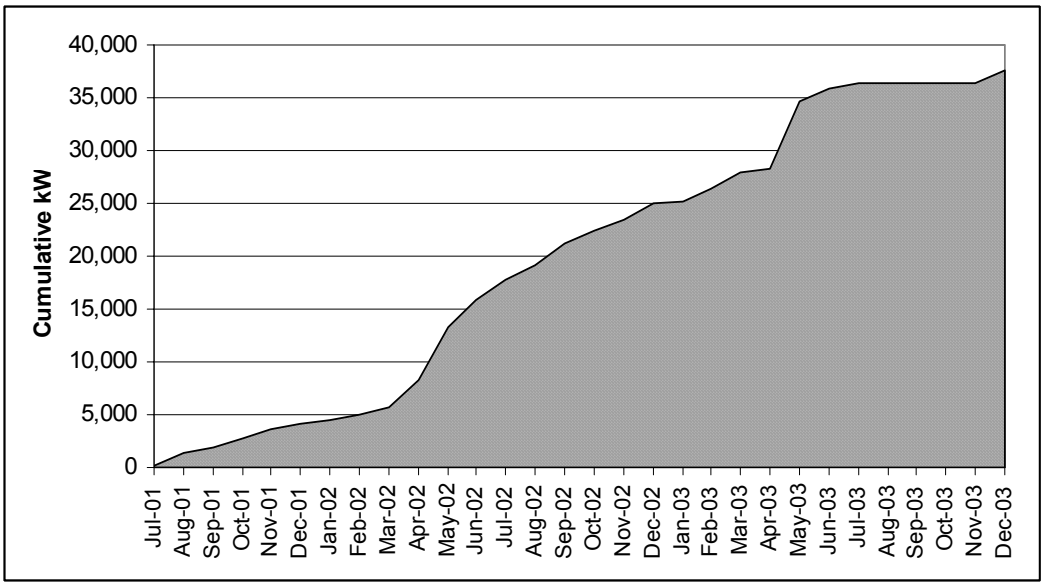


Program Results

Peak Savings Accomplishments

Figure 2 shows the cumulative achievement of the 38 MW, as estimated by KEMA staff using engineering estimates that adjusted for partial completion of the originally approved project scope for some projects. Demand reduction was achieved through the Program from June 2001 through December 2003. After the initial start-up period, the Program built sufficient momentum to achieve between 1 and 2 MW in peak demand savings per month. The sharp increase in project completions in the spring of 2002 and 2003 correlates with the Phase 1 and Phase 2 project completion deadlines. Due to a statewide budget crisis beginning in 2003, the Program was not able to accept new applications beyond April 2003. However, we presume that peak savings could have continued at the pace of 1 to 2 MW per month for at least another year and perhaps much longer if the Program had been allowed to continue.

Figure 2



Grant Funding

A total of $9.3 million of grant funding was awarded to participants during the two phases of the Program. Although the Program was fully subscribed for the vast majority of the Program duration, approximately $1.7 million in grant funding remained unspent. In the last year of the Program, more than $2 million of funding was released due to projects coming in below their awarded amount or due to projects dropping out of the program or failures. As applications dropped out of the program in the last three quarters of 2003, KEMA had no ability to write new Grant Agreements to maintain full subscription of the allotted grant funds. As a result, a significant amount of grant funding remained unspent.

Administrative Costs

The low cost of achieving peak demand savings was one of the most notable successes of the Program. The Program funded 229 projects for $9.3 million in grant awards for an estimated 38

MW in peak demand savings. Table 2 provides summary statistics regarding program costs and the average cost per peak kW saved. The peak reduction of 38 MW was attained at a cost of $247 per kW in grant funding plus $43 per kW of program administrative costs. Thus, the total cost of the Program is estimated to be approximately $290 per kW. This final outcome is consistent with the budget established for the Program and the 15% administrative budget cap.

Table 2

Total Grant Funds Awarded	$9,333,648
Total MW Savings	37.774
Average grant ($/kW)	$247
Average administrative cost ($/kW)	$43
Average cost per kW reduced ($/kW)	$290

Program Costs

Table 3 shows the Program budget and actual expenditures. Total program costs were approximately $2.1 million below the budget. As displayed, KEMA was successful in keeping administrative costs below 15% of the total Program budget (14.9%).

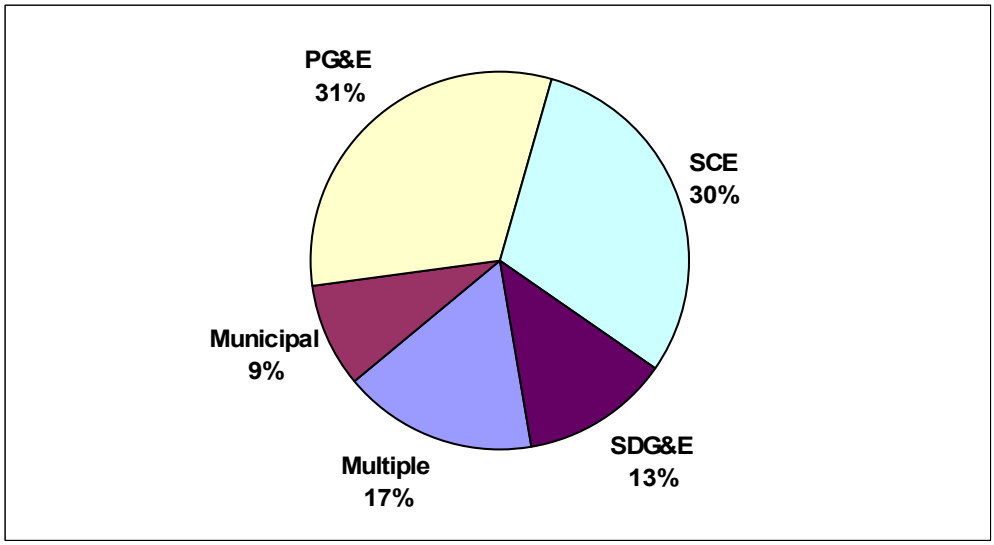
Table 3

	Original Budget	Amended Budget	Actual	% Difference Actual vs. Budget
Date Effective	May-01			
Direct Labor	**$1,150,716**	**$1,975,015**	**$1,591,481**	**81%**
Total Other Expenses	**$49,261**	**$101,221**	**$39,105**	**39%**
Total Administrative Costs	**$1,199,977**	**$2,076,236**	**$1,630,587**	**79%**
Estimated Grants To Be Awarded	**$8,500,000**	**$11,014,516**	**$9,333,648**	**85%**
TOTAL CONTRACT BUDGET	**$9,699,977**	**$13,090,752**	**$10,964,234**	**84%**
Projected Admin Costs as % of total Program Budget			**15%**	

Participant Characterization

Figure 3 illustrates the breakdown of participants by location in each of the major investor-owned utility's service territories and a variety of municipal utility service territories. Notably, 17 percent of the applications were for projects with multiple sites located in several utility service territories.

Figure 3



The applicant pool represented a diverse group of businesses located throughout California. Figure 4 shows that the Program was successful in recruiting participation statewide.

Figure 4

Measures Funded

The program was open to all projects that did not qualify under one of the other more specific Peak Load Reduction programs offered by the state through AB 970, SB 5X, and AB 29X. As a result, there were a wide variety of technologies and measures implemented to reduce peak demand. Figure 5 provides the breakdown of types of projects funded through the Program.

Figure 5

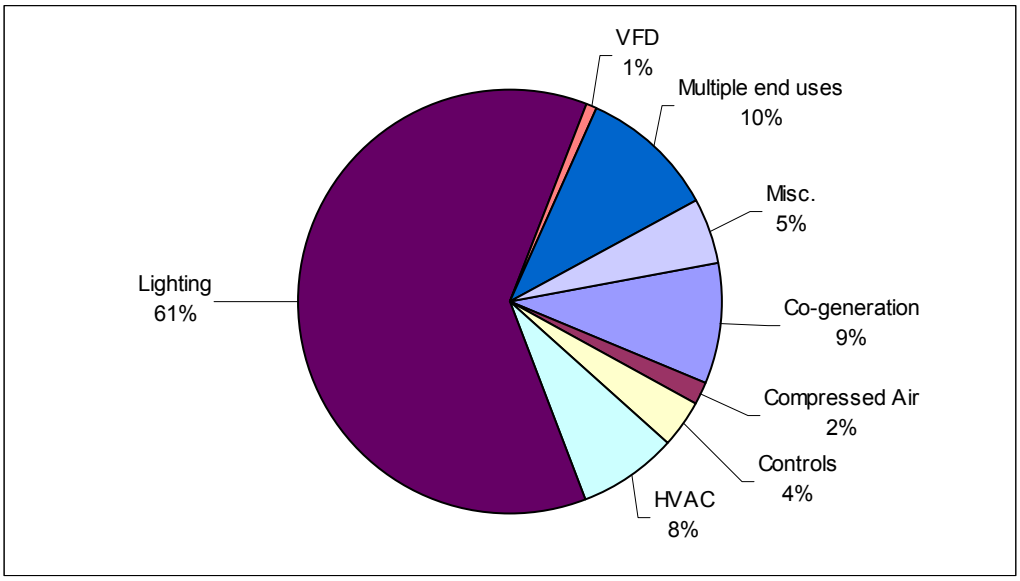


Table 4 displays the total savings and number of projects (Grant Agreements) by technology. As displayed, the simple average savings per project was 167 kW. Cogeneration projects tended to be large, with an average of 579 kW savings per project. Lighting represented the majority of the projects and achieved 62 percent of the total program savings. The average size for a lighting project was surprisingly high at 168 kW per project.[b] Lighting measures included mainly T12-to-T8 fluorescent retrofits, some incandescent-to-compact fluorescent retrofits, and lighting controls such as occupancy sensors.

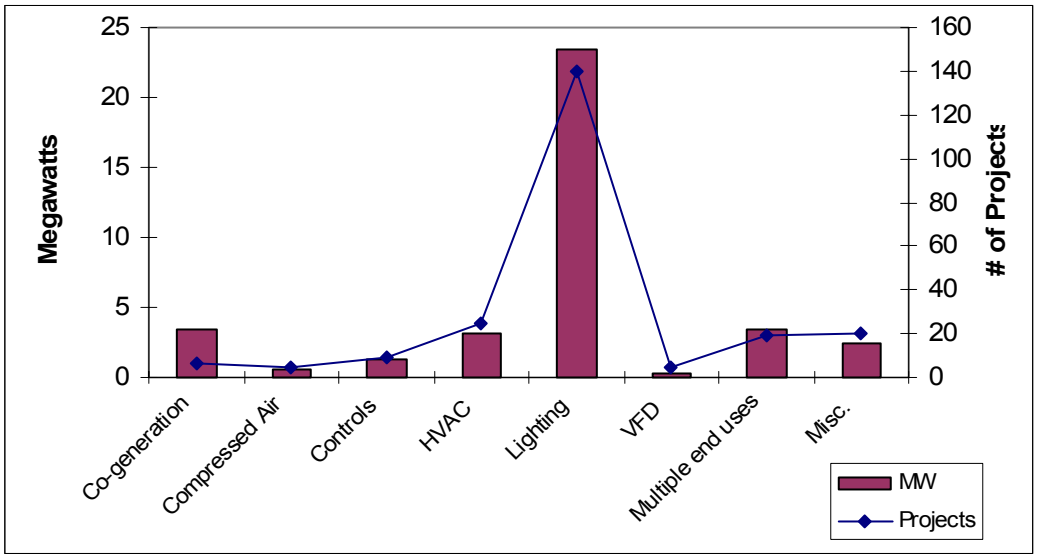
Table 4

Technology Category	MW	%MW	Projects	% of Projects	Avg kW
Co-generation	3.48	9%	6	3%	579
Multiple end uses	3.47	9%	19	8%	183
Lighting	23.50	62%	140	61%	168
Controls	1.35	4%	9	4%	150
HVAC	3.12	8%	25	11%	125
Misc.	2.41	6%	20	9%	120
Compressed Air	0.56	1%	5	2%	113
VFD	0.27	1%	5	2%	53
Total	38.15	100%	229	100%	167

[b] In this discussion, a project refers to a Grant Agreement. It's important to note that the Program allowed projects at multiple sites to be aggregated into a single Grant Agreement. Many of the lighting projects involved the multiple sites.

Figure 6 illustrates the megawatt savings and number of projects by technology funded through the Program.

Figure 6



Measurement and Evaluation

The entire portfolio of the Innovative Peak Load Reduction Program (IPLRP) was evaluated under a contract with Nexant [1]. Each of the elements of the PLRP was evaluated for the peak load reduction claims, the cost effectiveness of the program, and the process. The results of the EM&V Report found a 93.4 percent realization rate for this program component.

Program cost effectiveness was calculated in terms of simple costs and levelized costs. The EM&V Report found the Program (Small Grants Program Element) to have a simple cost of $238 per kW and a levelized cost of $19 per kW per year. Note that the evaluation was concluded prior to the completion of this program element.

Lessons Learned

The following discussion highlights the key lessons learned with respect to program design, marketing, implementation, and program results.

Program Design Lessons Learned

Aggregation of projects helped to reduce hassle and market transaction market barriers. The Program was unique in that it allowed multiple projects located within several utility service territories to be aggregated into a single application. Although aggregation of projects is allowed under similar utility-sponsored programs in California, no other program allowed aggregation of

projects across multiple utility service territories. As a result of this unique program feature, the Program was quite successful recruiting the participation of retail chains with multiple project sites located in different utility service territories throughout California. Additionally, third-party contractors found this aspect of the program quite useful in helping to facilitate business with retail chains and other small business customers who could be aggregated to meet the minimum threshold. Several third-party contractors aggregated small projects from multiple small commercial customers to meet the minimum 20 kW project size requirement. Therefore, aggregation projects allowed for greater market penetration of smaller customers who are considered to be hard to reach and underserved by traditional utility energy-efficiency programs.[c]

In crisis situations, streamlined administrative and bidding processes enable rapid deployment of programs and earlier results. The language in SB 5X that allowed streamlined administrative and bidding processes proved to be a critical component to allow the rapid launch of a widespread effort to reduce peak load in California during the summer months to avoid rolling blackouts. The Energy Commission was able to quickly outsource program components of the portfolio of peak load programs to third-party contractors who had the staff and resources available to rapidly deploy programs. By streamlining the contracting process, third-party firms were hired and deployed much earlier than would otherwise have been possible, thereby enhancing the probability of achieving peak load savings earlier. Third-party firms benefited in that they could avoid the expense and risk associated with a competitive bid process.

Marketing Lessons Learned

Supply-side actors can be effectively leveraged for marketing and outreach support. Marketing to lighting and HVAC contractors and equipment suppliers proved to be an extremely effective strategy. KEMA identified the largest lighting and HVAC contractors and specifically targeted them in the marketing efforts. Additionally, KEMA also established contact with key industry associations, businesses with multiple facilities throughout California, and utility account representatives in an effort to promote the Program. Through successful networking, we were able to successfully leverage the sales forces of several third-party contractors who were active in promoting our Program to their clients.

Breakfast seminars proved to be effective marketing strategy. As part of the outreach efforts, KEMA conducted 13 free morning seminars throughout the state to educate contractors and end-users about the Program and the application process. The seminars were offered early in the morning (7:00 a.m.), and a hot breakfast was served. Prior to the seminars, a direct-mail and telemarketing campaign was conducted to recruit attendees. These breakfast seminars, along with the direct-mail and telemarketing campaigns, proved to be an extremely effective method of recruiting contractors to participate in the Program.

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[c] The CPUC Energy Efficiency Policy Manual defines nonresidential ~~"~~hard-to-reach~~"~~ (HTR) ~~as those~~ customers as those who do not have easy access to program information or generally do not participate in energy efficiency programs.

Implementation Lessons Learned

Anticipate the need for increased resources immediately following an application deadline. Establish policies and procedures on how to prioritize applications received on the same day and clearly specify evaluation criteria. The application deadline served as a strong incentive to program participants to complete and submit their applications. In the 2 days before the Phase I deadline, 193 applications were received with grant requests well over the available funding level. Generally, applications were processed on a first-come, first-served basis. The large influx of applications just prior to the deadline resulted in a situation where we had insufficient staffing to process all the applications in a timely manner. On future programs, the resource plan should include additional staffing immediately following an application deadline period.

All applications were date stamped so they could be processed in the order that they were received. However, the date stamp proved insufficient to help prioritize applications that were received on the same day. Since the amount of funding requested on the last day of the application period well exceeded the grant funds available, we had to establish a way to prioritize the processing of applications received on the deadline. This experience confirmed the importance of establishing clear policies on how to prioritize processing applications received on the same day. Additionally, the evaluation criteria should be clearly specified in the application and in other program materials.

Technical support is a key program component. We have found that a greater emphasis on education and technical support was required for smaller projects. Our telephone hotline and website proved to be effective customer support tools that were initially heavily used by prospective applicants. Many of the smaller customers or third-party contractors did not know how to do the savings calculations that were required to be submitted with the application. Engineers were available to provide support via telephone and/or e-mail. However, our scope of services did not include technical assistance in the field, i.e., audits or feasibility studies.

Budget for monitoring and verification for small percentage of projects. Monitoring and verification was required in some instances to determine verifiable savings. While, for the most part, a calculated savings approach could be used to determine the peak savings and grant amount, in some cases pre- and/or post-monitoring was necessary to determine the peak savings resulting from the project. Therefore, when planning a program, allow budget for monitoring and verification activities.

Account management strategy proved effective and efficient. The account management strategy proved to be extremely efficient and was well received by the applicants. An engineer was assigned to each project to perform technical review and account management. As an account manager, the engineer was responsible for managing the project through completion. Additionally, when multiple applications came in from a contractor, they were assigned to the same engineer. This system generally provided one point of contact at KEMA for a given

contractor who had submitted multiple applications to the Program, resulting in efficiencies in communications and procedural activities.

Program Results – Lessons Learned

Program savings could have been enhanced if there had been flexibility to oversubscribe grant funding to allow for project dropouts and failures. Future programs should consider establishing a reserve fund to allow for flexibility to oversubscribe funding levels in the early stages of the Program. In the last year of the Program, over $2 million of funding was released due to project dropouts. However, there were not enough waitlisted applications to account for all of the released funding. If we had oversubscribed the funding to account for project failures and cancellations, the program would have achieved greater peak demand savings. For future programs, we recommend setting up a reserve fund to allow flexibility in oversubscribing the program. This fund could be set at a conservative level relative to the anticipated dropout rate, say 10-20 percent, yet allow for more projects to be funded at any given time. In this way, as projects drop out, the program stays on track to fully subscribe the funding and achieve the maximum potential peak demand savings. If all the projects funded materialize, the program has the risk of an overrun equal to the reserve fund. However, the more likely scenario is that projects will drop out and reserve fund will never be spent.

The program design was not conducive to achieving peak savings in a rapid manner. The average time it took from when an application was submitted until project completion was over 10 months. The Program was effective in achieving savings at a steady pace beginning about 6 months after the original application deadline. After the initial start-up period, the Program built sufficient momentum to achieve between 1 and 2 MW in peak demand savings per month. Had funding levels been steady and open to new applications in the later half of 2003, we estimate that the Program could have achieved an additional 7 to 10 MW in peak demand savings. Thus, the Program was effective as an intermediate step in achieving peak demand savings, but not particularly effective in achieving peak savings in the first 6 months.

Conclusions

The Program was able to capture significant peak load reduction, 38MW, at a relatively low cost of $290 per kW. This compares quite favorably with other incentive programs, as well as supply-side resource options.

The Program design proved to be a successful model with respect to achieving peak load savings at a steady pace beginning about six months after program launch. By the end of the first year, the Program had gained sufficient momentum and required very little marketing to solicit new applications. Projects were being completed at a pace to achieve approximately 25 MW in peak savings per year. Grant funding at $250/peak kW saved proved to be sufficiently high to maintain a steady stream of peak load reduction projects over the course of the two-year funding cycle.

The Program successfully leveraged the sales forces of participating contractors. The initial training seminars, held in numerous locations throughout the state, proved successful in recruiting the participation of contractors. The vast majority of the projects came in through a small cadre of contractors that worked to promote the Program almost exclusively to their clientele. KEMA developed strong working relationships with these contractors, which helped to facilitate additional applications.

Key conclusions regarding the Program are as follows:

- The Program achieved 38 MW of peak load reduction at the relatively low cost of $290 per kW;
- The Program model proved to be viable for achieving peak savings, particularly after a 6 month start-up period;
- The Program was successful in keeping administrative costs below 15% of the total program budget;
- Grant funding at $250/peak kW proved to be sufficiently high to stimulate interest among participating contractors over the two-year funding cycle;
- The Program was successful in recruiting the active participation of numerous contractors who submitted multiple applications on behalf of end-use customers;
- Program outsourcing worked efficiently and effectively.

REFERENCES

[1] Final Report- Evaluation of the California Energy Commission's AB29X and SB5X PEAK LOAD REDUCTION PROGRAM elements, May 5, 2002, Nexant.