Report on a Successful Initiative in Residential Lighting Program Design

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The Southern California Edison Company (SCE) is currently running a residential lighting DSM program that promotes the purchase of compact fluorescent bulbs through a combination of innovative approaches. Rather than providing incentives directly to consumers through rebate coupons or subsidized catalog programs, SCE has opted to give incentives to manufacturers to minimize overhead and to let the retail market function normally. SCE invites manufacturers to compete with each other for shares of a rebate pool on the basis of product and marketing performance.

During three years of operation, the SCE "Compact Fluorescent Bulb" (CFB) program has resulted in significant reductions in the shelf prices of CFBs in the SCE service territory. The average $5/unit incentive offered by SCE has often translated into retail price reductions of up to $15. The number of retail outlets carrying CFBs in the SCE service territory have increased dramatically, as have the average amount of retail space devoted to CFBs in each outlet. Finally, consumer purchases of CFBs also have risen strongly.

This paper reports on SCE's experience with the CFB program and explores issues involved with the successful development and implementation of the manufacturer rebate approach.

Introduction

In late 1991, SCE tried a radically different approach to stimulating consumer demand for compact fluorescent, In contrast to conventional utility residential lighting DSM programs, which typically offer incentives for efficient lighting products to consumers, SCE went directly to manufacturers and offered to "buy down" the wholesale prices of CFBs. Manufacturers were invited to submit proposals to SCE that included product technical specifications, willingness to match SCE's incentives with their own wholesale price reductions, and consumer retail distribution capabilities. These proposals were scored and shares of the total rebate allotment were awarded on the basis of relative score. Manufacturers who were awarded a share of the rebates agreed to pass the full amount of the incentive on to retailers, and agreed to meet a schedule for product delivery and marketing.

During three years of operation, the program has resulted in significant reductions in the shelf prices of CFBs, relative to both the previous coupon program and to the non-rebated CFB market. The number of retail outlets carrying CFBs in the SCE service territory increased dramatically, as did the average amount of retail space devoted to CFBs in each outlet. Finally, consumer purchases of CFBs have also risen strongly and the transition from incandescent to fluorescent lighting as the consumer choice for home lighting appears to be well under way in the SCE service territory.

Program Description

In December of 1991, after unsuccessfully testing a residential compact fluorescent bulb (CFB) program which provided rebate coupons to utility customers, SCE's DSM program planners determined that a total program change was needed. The coupon program pilots had not been cost-effective. Overhead had run at about 70% of total program costs and only about 100 retail outlets in SCE's service territory carried CFBs[1]. SCE had filed, and the California Public Utilities Commission (CPUC) had approved, plans to encourage the use of compact fluorescent lighting by residential customers. However, the CPUC required that overhead be limited to no more than 30% of total program costs. The company needed a

program design that could be quickly implemented, would not be expensive to administer and, most of all, would get CFBs into the homes of residential customers.

Manufacturer Rebate

At the end of December, SCE tried a three week pilot that used a dramatically different approach. The company went directly to manufacturers and "bought down" the wholesale prices of a selection of their products to be sold through retail outlets by offering a rebate of $5 per unit. The assumption was that even though CFBs might be cost-effective purchases for residential customers, the high price differential between CFBs and conventional incandescent light bulbs was preventing customers from purchasing them. Therefore, the most effective method to sell CFBs was to reduce the price to consumers.

The mathematics of retail distribution created an opportunity to develop an effective method to lower retail prices without increasing utility DSM expenses. Retailers typically calculate retail prices for products by multiplying the wholesale price by some percentage. Therefore, an incentive applied at the wholesale level is also multiplied by the retail markup percentage. At the typical retail markup rate of 67% (corresponding to a 40% gross margin), each utility dollar spent can result in a reduction of about $1.67 in retail price. SCE also found that it was possible to convince manufacturers to match some percentage of the utility incentive with a discount to the distributor or retailer, further reducing wholesale cost and gaining an even greater decrease in retail cost. A comparison between the effects of a conventional coupon based program and a manufacturer incentive program on retail prices might go as follows:

Direct Consumer Rebate Example

$10.00	Manufacturer wholesale price
+ $6.67	Typical retail markup (67% of $10.00)
- $5.00	Utility incentive (mail-in or Point of Purchase coupon)
$11.67	Net Consumer Price

Manufacturer Incentive Example

$10.00	Manufacturer wholesale price
- $5.00	Utility incentive (direct to manufacturer)
- $1.50	Typical manufacturer matching incentive
+ $2.33	Typical retail markup (67% of {$10.00 - $5.00 - $1.50})
$5.83	Net Retail Price

Product Selection

All CFB manufacturers were eligible to receive incentives under the SCE program. The only minimum requirement for CFBs to be eligible for consideration was Underwriter Laboratory listing. CFBs with magnetic, electronic and hybrid ballasts were all eligible. Manufacturers were required to submit modular CFB products to the market as a 'unitary package, i.e., lamp and ballast packaged together.

To participate, manufacturers responded to a "Request for Information" issued by the company. The Request for Information invited manufacturers to submit proposals detailing the extent to which they were willing to match the company's incentive with a discount to retailers, the characteristics of their retail distribution, and the technical specifications of their products (a discussion of scoring criteria is included in Appendix A). Manufacturers proposals were scored on the basis of their responses and initial allotments made from the total pool of available incentives based on relative score. Manufacturers with the highest scores got the largest initial allotments, however all manufacturers that both submitted proposals and signed agreements with SCE to carry out those proposals, received some percentage of the total incentives.

An allotment award authorized the participating manufacturer to sell a specific number of CFBs during the program. The allotment award consisted of specific wattage CFBs and/or wattage groups of CFB units. The following are the wattage groups that are being considered for the 1994 CFB program:

Watt Group A: 5 watt to 15 watt CFBs
Watt Group B: 16 watt to 22 watt CFBs
Watt Group C: 23 watt and greater

Manufacturer Agreements

Participating manufacturers signed an agreement that required them to sell a specified percentage of their initial allotment awards during three sales periods: 30% within three weeks, 60% within 8 weeks and 100% by 12 weeks from the start of "sales operations". If a manufacturer was not able to meet its sales goal for week 3, 8 or 12 it forfeited the allotment remaining for that period only back to SCE. All manufacturers started each sales period with a "clean slate". Forfeited allotments were immediately redistributed to manufacturers who had met their sales milestones. This mechanism created a significant incentive for manufacturers to work with their distributors and retailers to maintain sales.

As part of the agreement SCE committed, upon manufacturer submittal of proof-of-performance, to provide an incentive of up to an average of $5/unit. The manufacturer agreed to pass the full incentive amount, plus any additional manufacturer discount included in its proposal, along to the CFB retailer or wholesaler in the form of a reduced wholesale cost to the distribution channel. Incentive payments were made by SCE to the participating manufacturers upon submittal of an invoice and "Proof of Performance" documentation.

Manufacturers agreed to include a customer response card in program packaging. The cards were return addressed to the manufacturer and asked a limited number of questions about the customer's use of the CFB being purchased. The manufacturers accumulated these cards during the year following the program year of the agreement and provided the customer data to SCE. Manufacturers also agreed to inform the wholesalers and retailers they dealt with of SCE's goals and guidelines, and also to report discrepancies. The flow of incentives, products and information in the SCE CFB program process is portrayed graphically in Figure 1.

1992 SCE CFB Program

In July of 1992, SCE launched a full blown version of the CFB program. The company issued a request for proposal to manufacturers offering a pool of rebates at $5 per CFB. The RFPs were sent to 35 manufacturers. Sixteen firms responded and nine of them eventually signed agreements with SCE.

Due to the success of the program, supplementary CFB Program funds were budgeted in June and again in October and additional allotment awards were made to bring the total number of $5 allotments to approximately 800,000 CFBs. When the units that were sold under the pilot at the end of 1991 are included, about 970,000 CFBs were distributed under the 1992 CFB program. The cost to SCE was approximately $5.4 million in incentives to manufacturers and overhead. Estimated gross energy savings were 56 million kWh/yr based on program assumptions for the typical wattage of the incandescent replaced, the CFB usage profile, and the typical application .Overhead expenses were approximately 10% of total program costs. Overhead expenses consisted of the salaries of the program manager, program administrator, and three field inspectors and minimal program promotion during the year.

The market responded strongly to the CFB program. Twice as many manufacturers participated in the 1992 program which began in July as did in the pilot in December of 1991. The number of retail outlets in the SCE service territory carrying program products increased to about 400. Resellers included do-it-yourself, mass merchandise, hardware, lumber and grocery stores with a handful of lighting/electrical distributors.

Large increases in shelf space and product "facings" were experienced compared to the situation prior to the SCE program. Manufacturers reported increased awareness by lighting department managers, store owners, and electrical and lighting buyers at chain retail stores. Manufacturers also reported noted that "off-program" products also saw slightly stronger sales during this same period and that more shelf space was being devoted to CFBs in general. The number of CFB models and styles available in the Southern California marketplace increased for 10-15 to over 100.

1993 SCE CFB Program

The 1993 CFB program started in August and ran through November. Eleven manufacturers signed agreements with SCE to supply products. Allotment awards were made for approximately 467,000 CFBs. This number was less than the previous year due to program expense reallocations by SCE. The cost to SCE of the CFB in 1993 was approximately $2.6 million in incentives to manufacturers and overhead. Estimated gross energy savings were 27 million kWh/yr based on program assumptions for the typical wattage of the incandescent replaced, the CFB usage profile, and the typical application.

Overhead was estimated at less than 10% of total program costs. In the 1993 program year, now that the foundation for the program had been laid, the program administrator was able to significantly reduce his hours spent on the CFB program and assume other program management responsibilities. The market for CFBs in the SCE service territory stayed stable, relative to the previous year. In 1992 however, one of the manufacturers provided CFB surface-mount fixtures exclusively under the program.

Discussion

One drawback of the manufacturer rebate approach is that because CFBs are sold through normal retail channels, it is impossible to guarantee that CFBs which are sold in SCE's service territory will be installed there. Review of the customer response data indicates that about 13% for products sold under the CFB program that "leak" out of SCE's service territory. However, because overhead and incentive levels are kept low, the program is quite cost-effective even when the program energy savings are adjusted to include leakage. A nominal cost per conserved kWh can be calculated as follows in Equation (1) where:

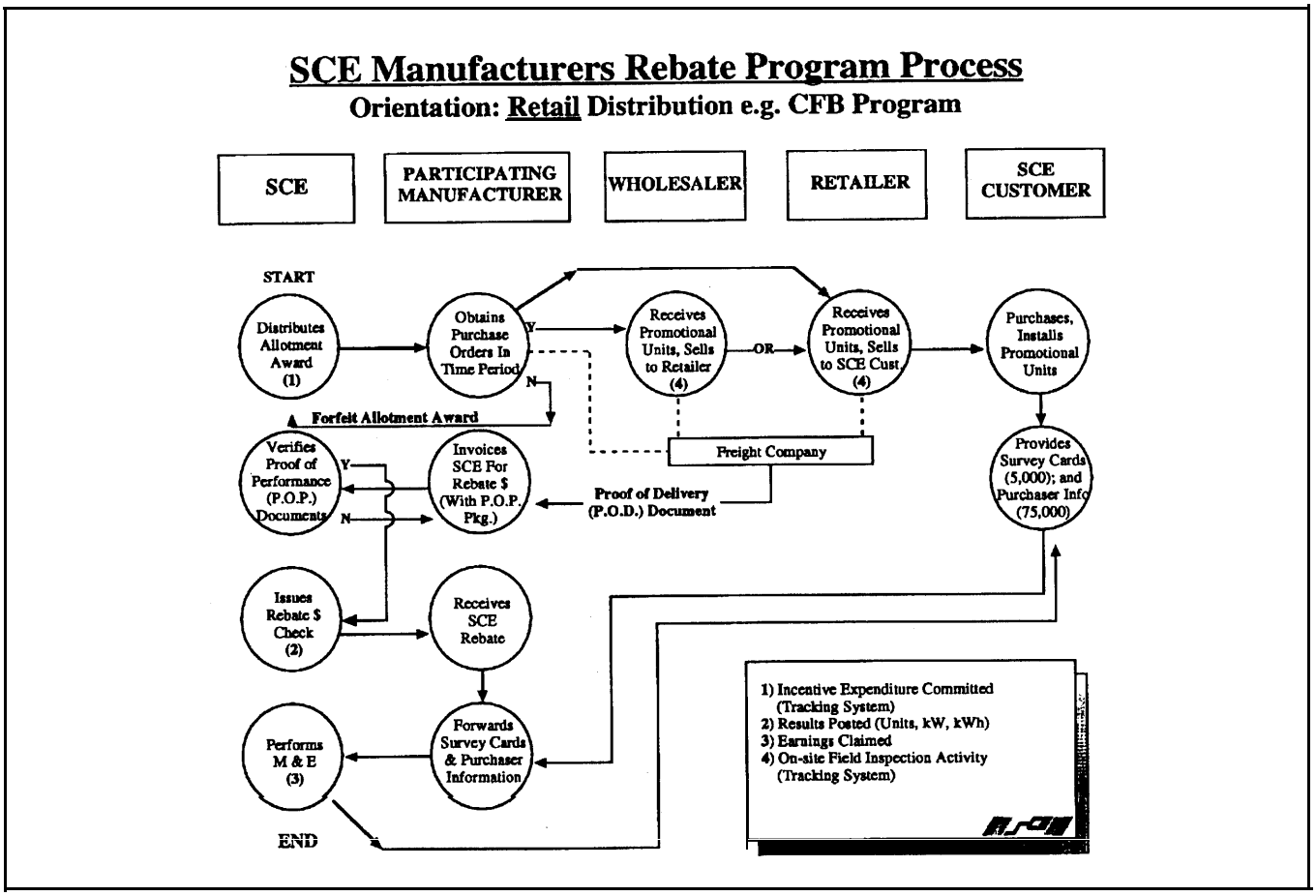

Figure 1. SCE Manufacturer's Rebate Program Process

$$\$/Conserved\ kWh = \frac{Program\ Costs}{\left[\begin{array}{l}(kWh\ Savings\ per\ CFB\ per\ Year)\times\\(CFBs\ sold)\times(CFB\ Lifespan)\times\\(1-Leakage\ Rate)\end{array}\right]}$$

then:

$$1993\ CFB\ Program\ Cost\ per\ Conserved\ kWh = \frac{(\$2.6\ mil.\ Total\ Program\ Costs)}{\left[\begin{array}{l}(58\ kWh/yr)\times(467{,}000\ CFBs)\times\\(6.5\ Years)\times(1-.13\ Leakage)\end{array}\right]} =$$

$$\$0.017\ per\ Conserved\ kWh$$

One of the ways that SCE is trying to mitigate the leakage problem is by convincing its sister utilities in California to adopt similar programs. San Francisco based Pacific Gas and Electric Company has recently adopted the manufacturer rebate concept and some of the associated tools for their own residential compact fluorescent bulb program. San Diego Gas and Electric has launched a similar residential compact fluorescent bulb program utilizing the manufacturer rebate approach. Other utilities in the Pacific Northwest and Wisconsin are now evaluating this program idea for implementation and the Bonneville Power Administration has stated that it may be a way to make residential compact fluorescent bulb programs cost-effective for its member utilities.

Soon, the manufacturer incentive approach to CFL DSM programs may promoted on a national scale through the Consortium for Energy Efficiency (CEE). CEE is a national, non-profit organization dedicated to encouraging new, energy efficient technologies. CEE has been working with lighting experts from all over the country to develop a national compact fluorescent initiative based on many of the same principles as the SCE program (Granda et al. 1994).

SCE has also begun applying the lessons learned during the residential CFB program to other projects involving different customer classes and technologies. The company launched a pilot CFB program for non-residential customers in 1993. The pilot included a variety of CFB product types such as screw base lamps, hard wired fixtures, and retrofit kits and was limited to the Palm Springs area of the SCE service territory. In 1993 the pilot moved 425,000 compact fluorescent products to the lighting and electrical distributors who sell to SCE's commercial

customers. In 1994 SCE will operate both the residential and non-residential CFB programs throughout the company's service territory. SCE is also transferring the manufacturer rebate concept with the associated "tools" to a commercial, industrial, and agricultural energy-efficient electric motor program currently underway.

Conclusions

In the five years prior to the CFB manufacturer rebate program, SCE purchased several million CFBs for distribution programs. These programs enjoyed varying degrees of success in moving energy efficient lighting into customers homes, but the wholesale price remained high enough that the consumer retail channels were not developed. Competition for a retail store buyer's time and purchasing budget had not entered the equation. Neither had the fight for best shelf placement, better packaging designs, competitive manufacturer promotional programs like co-op advertising, and freight/delivery cost concessions. Years of distribution program, and a million CFBs sold did not change the fact that the high first cost of the CFB presented an important market barrier to commercialization.

Some utilities with direct rebate or direct mail programs provide customer rebates of up to $16 per CFB to achieve the same effective retail price as SCE's $5 manufacturer incentive. These programs stimulate the demand for CFBs but, at best, strengthen the market for CFBs as an expensive niche product. Most utilities are under growing competitive pressures and are being forced to reduce DSM incentives in their programs. When utility incentives are removed from a conventional CFB consumer rebate program, prices can increase dramatically because the market mechanisms that work to keep prices low are not in place.

Today, in the SCE service territory retailers compete with each other to purchase products under the SCE CFB program. When low-priced program products run low, retailers will purchase CFBs at regular wholesale prices and discount them as long as the program products are still on the shelf. This "free driver" effect has been known to continue for up to 8 weeks following a chain retailer's low and out of stock condition at the end of the program year. All manufacturers can participate in the CFB program. The performance of their products and marketing determines the share of incentives they receive and encourages them to compete. Thus, market forces encourage manufacturers and retailers to contribute their own resources to SCE's incentives.

Endnotes

1. Southern California Edison's service territory covers 50,000 mi^2 of central southern California bounded by San Diego County in the south and Santa Barbara and Mammoth Lakes in the north. It surrounds, but does not include the city of Los Angeles.

2. Manufacturer's Proof of Performance consists of: (1) a copy of the wholesaler/retailer's purchase order, (2) the manufacturer's packing slip, (3) the bill of lading, (4) invoice, (5) freight company's proof of delivery (POD) with receiver's signature for stores in SCE's service territory.

3. SCE estimates that the CFB program is running at about 58 annualized kWh per unit. Burn time for CFBs under the program is estimated to be about 1,000 hrs. per year and lifetime to be about 6,500 hrs. on average (which takes removals into account).

Reference

Granda, Christopher A., Charles Stephens, Christopher Calwell, William Grimm and William VonNeida. 1994. A *Residential and Small Commercial High Efficiency Lighting Initiative.* Proceedings of the 1994 ACE^3 Summer Study.

Appendix A

Table 1 details the scoring criteria used for ranking compact fluorescent products under the SCE 1994 CFB program. To derive a score, the appropriate value in the metric in the second column is multiplied by the weighting factor in the third column.

Table 1. SCE 1994 CFB Program Manufacturer Scoring Criteria

SCORING CRITERIA	METRIC	WEIGHT
AREA OF INTEREST I: SCE Incentive Matching Capability		
Direct Wholesale Cost Reduction	$/CFB	1,000
Manufacturer's Own Media Advertising Budget	$	0.05
Manufacturer's Co-op Advertising Budget	$/CFB	1,000
Other Program or Process Contributions	$/CFB	100
AREA OF INTEREST II: Distribution Characteristics of CFBs in Program		
More than 5 Defined Target Retail Chains	Y=1, N=0	2,500
More than 2 Wholesale Distributors	Y=1, N=0	1,500
Reasonable 1993 Distribution Performance	Y=1, N=0	1,500
AREA OF INTEREST III: CFB Technical Specs.; Product and Packaging Features		
Percent Average Power Factor	%	1,000
Percent Average Total Harmonic Distortion	%	1,500
Average Lamp Lumens per Watt	lpw	15
More than 50% of products have modular lamp/ballast	Y=1, N=0	500
Lamp/ballast min. life more than 9,000 hrs average	Y=1, N=0	500
Average Color Temp. 2,700-3,000 Kelvins	Y=1, N=0	500
Published Product Warranty	Y=1, N=0	750
CFB Recycling Plan	Y=1, N=0	250
UPC Bar Code on packaging	Y=1, N=0	500
Achieved 15% return rate for response cards in 1993	Y=1, N=0	2,500
Consum/Green Economics on packaging	Y=1, N=0	250
Recycled/Reused Paper in packaging	Y=1, N=0	250
Free-standing merchandise displays provided	Y=1, N=0	500
Harp Extenders included	Y=1, N=0	250
Disclaimer Warranty on packaging	Y=1, N=0	250