

APPENDIX 4.3 A: MARKET ANALYSIS FOR LOAD-SHEDDING BALLASTS

Introduction

Market penetration for a load-shedding ballast and its associated communication link is a function of the incremental cost of the ballast/communication link and the potential customer savings on their electric bills from participation in load management programs or reducing monthly demand. Some portions of the country (mainly the northeast and west coast) also offer the customer a payment (conservation rebate) for installing load-shedding devices. **Table 1** presents an analysis of possible customer savings from seven utilities for instituting load shedding.

This analysis examines these conservation rebates but does not use them in determining the maximum incremental cost of a load-shed ballast in the marketplace. The offering and amount of conservation rebates changes frequently and should not be relied upon in determining market penetration. Load management programs are in their infancy. Their use and value to customers are expected to grow over the next five years as the deregulated electricity market matures and stabilizes.

Bottom line - If a load shed ballast and its associated communication link can be sold to the customer for an incremental cost of \$9 or less over an instant-start ballast (the most common ballast used today), the market for this ballast would be approximately 10% of all ballasts sold into the new construction/remodeling market.

Customer Savings/Payments

There are three possible revenue streams from which the customer can receive a savings or payments for reducing their peak electric demand. These payments come from the utility or state agency that offers conservation rebates or from the utility or transmission system operator for participation in load management programs. Customer savings are from reducing demand and thereby reducing the monthly electric bill.

Conservation Rebate Programs

There are some locations within the U.S. where customers are offered rebates if they install load-shedding equipment. Most of these rebates can be found in the northeast or west coast. The rebates vary widely and are subject to change or program cancellation/suspension annually. Current rebates range from approximately \$5 to \$40 per ballast in those locations where they are offered.

Because of the transitory nature of conservation programs and rebates, it is recommended that these incentives to customers not be included in determining market penetration of load-shed ballasts. Where the rebates are available, they will assist in the early years of adoption of the technology and, therefore, increase sales projections.

Load Management Programs

Load management programs exist either through a utility's load curtailment rates or through the transmission system operator payment to the customer for shedding load. However, not all utilities or transmission operators have these kinds of rates or programs in place today.

Assuming a 20% to 30% reduction in wattage for each light fixture equipped with a load-shed ballast, the customer can expect to receive between \$0.30 and \$1.50 per year per ballast in payments for reducing their lighting load. It is expected the value for load shedding will rise in future years by as much as 50% as the deregulated electric marketplace begins to place stronger values on load management.

Demand Reduction Savings

A customer who can control his/her monthly peak demand will garner savings through reduced electric bills. Assuming a 20% to 30% reduction in wattage for each light fixture equipped with a load-shed ballast, the customer can expect to save, with today's electric rates, between \$1.03 and \$8.03 per year per ballast installed. The amount depends on the electric utility's demand charge and how many months the customer is willing to control his or her demand. For example, Consolidated Edison of New York's demand charges are much higher than those found at Public Service Electric and Gas in New Jersey.

A customer participating in a load management program cannot double count the demand reduction for that program with savings on their electric bill associated with controlling monthly peak demand. Therefore, the customer's benefits for reducing demand is either the amount available from a load management program OR from reduced electric bills. In most cases, the greater savings today comes from controlling the monthly peak demand and obtaining a savings on the monthly electric bill. This savings averages about \$3.20 per year per ballast.

Ballast and Communication Link Costs

It is assumed a customer would be willing to accept a three year payback on the investment of a load-shed ballast. The customer savings associated with a demand reduction of 20% to 30% of the light fixture wattage is approximately \$9 based on the net present value of an annual saving stream of \$3.20 and a 6% discount rate. Therefore, the ballast and its communication link must cost the customer (not manufacturing cost) no more than \$9 over what he/she would have paid for a ballast without the load shedding capability. For the new construction/remodeling market, the \$9 is incremental to the price of a standard ballast. For the retrofit market, the customer would only be willing to pay a total ballast cost of approximately \$12, \$9 for the load shedding and a \$3 premium to obtain a new ballast.

Market Analysis

Based on the above information, the new construction/remodeling market across the country would be the primary market for the load-shed ballast. Currently, such a ballast would have to

be sold based on reducing monthly demand and thereby reducing monthly electric bills. Future changes in the deregulated electric industry may produce greater customer savings associated with load management programs. A conservative market penetration of 10% of ballasts sold into the new construction/remodeling market is anticipated within five years of ballast introduction. In Connecticut, this 10% market penetration would translate into 10,000 ballasts per year. The market size is not known for the remainder of the country.

The retrofit market of existing/operational ballasts would be included only where conservation rebate programs exist. These programs are within Connecticut, Massachusetts, New York, New Jersey, California, Oregon, Washington, Wisconsin, and a few other states. Other than Connecticut, where there are about 6 million ballasts within commercial floor space, the size of this market is unknown. Penetration into the retrofit market is expected to be smaller. An approximation of about 1% of all existing ballasts by year five is considered reasonable for those states in which conservation rebates are available.

Table 1. Analysis of possible utility customer savings for instituting load shedding.

UTILITY	Rebate Incentive for Ltg or Controls	LOAD SHEDDING DIVIDEND (or What the Customer is willing to Pay for Load Shedding Controls)				# Hours Required by Load Reduction Pgm
		Load Reduction Program Payments	Normal Billing Demand Reductions	3 Year Load Shedding Dividend		
ConEdison	\$12.12 per ballast from NYSERDA program	\$0.75/yr./ballast from NY-ISO	\$4.01 to \$8.03/ yr./ ballast Rate 9, 6 mo to 12 mo. reductions	\$22.84 to \$33.56/ ballast. Dependant on # mo. curtailing	4 hr./day. Must be available every day	
Ohio Edison	none	none	\$2.64 to \$5.28/ yr./ ballast Rate GS-Large, 6 mo to 12 mo reductions	\$7.06 to \$14.12/ ballast. Dependant on # mo. curtailing	Assumed 8 hrs/mo or 96 hrs per yr.	
ComEd (Chicago)	none	Curtailable Coop \$1.05/yr./ballast	\$1.47 to \$4.95/yr./ballast Rate 6L, 3 mo to 12 mo reductions	\$3.93 to \$13.20/ ballast. Dependant on # mo. curtailing	Max. required 120 hrs during 3 summer mo	
Georgia Power	none	\$0.45/yr./ballast Real Time Pricing Rate	\$1.80 to \$3.60/ yr./ ballast Rate PLL-3, 6 mo to 12 mo reductions	\$4.81 to \$9.62/ ballast. Dependant on # mo. curtailing	Assumed 8 hrs/mo or 96 hrs per yr.	
CT Light & Power	50% of cost of ballast differential	\$0.30/yr./ballast from ISO-NE	\$1.49 to \$2.98/ yr./ ballast Rate 55, 1 mo to 12 mo reductions	50% cost of ballast plus \$3.98 to \$7.97/ ballast. Dependant on # mo curtailing	ISO unspecified # hrs Assumed 8 hrs/mo or 96 hrs per yr.	
PSE&G (New Jersey)	\$40/ballast	\$0.75/yr./ballast from PJM or \$1.17/yr. / ballast from PSE&G Curtailable Load Rider	\$1.03 to \$2.81/ yr./ ballast Rate LPL, 4 mo to 12 mo reductions	\$42.75 to \$47.51/ ballast. Dependant on # mo. curtailing	PJM unspecified # hrs Curtailable Rider, about 25hr./yr Assumed 8 hrs/mo or 96 hrs per yr.	
PG&E	\$22/ballast	\$1.50/yr./ballast from CA-ISO	\$2.12 to \$2.60/yr. / ballast Rate E-19 TOU, 6 mo to 12 mo reductions	\$27.67 to \$28.95/ ballast. Dependant on # mo curtailing	Max. 24 hrs/mo, all mo. Assumed 8 hrs/mo or 96 hrs per yr.	

Notes:

Information is from current published electric rates or conservation programs of each utility, ISO or state energy agency.
 Each load shed ballast can reduce demand by 30 watts based on T-8, electronic 3 lamp fixture
 In these examples, the customer is assumed to want to recover their initial investment in 3 years.
 Payments will come from either the ISO or utility load reduction program or from reducing demand on the normal rates but not from both.
 The 3 year load shedding dividend is the sum of any rebate and the NPV (3 yrs./6%) of the higher of load reduction program of reducing demand under normal rates.
 Therefore, the amount the customer is willing to pay for a load shedding ballast is shown in the 3 year load shedding dividend column.