

Reducing Non-Heating Electric Use Among Low-Income Customers: The Detroit Edison Low-Income Customer Service Program

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Introduction

In May 1991, Detroit Edison initiated a project to help low-income customers reduce electric usage and improve their level of bill payments. Development of effective programs was especially important due to cuts in the availability of general and energy-specific aid to low-income families.

Phase I of the project consisted of research to count and characterize low-income, high-use customers, and to identify opportunities for usage reduction. In Phase II, which began in November 1991, Detroit Edison has mounted a set of pilot programs to test approaches to usage reduction.

Key Research Findings

Research for the project included:

- an in-home survey of a random sample of 391 low-income electric customers;
- a review of Detroit Edison materials and statistics on low-income customers.

The Extent of the Problem

Detroit Edison classified households with incomes below 150% of the federal poverty guideline as "low-income". Based on the results of the customer survey and other demographic analysis, it was estimated that 20% of Detroit Edison's residential customers--350,000 households--fit the low-income description.

Table 1 summarizes estimates of the number of low-income customers who experienced high consumption (defined as 8000 kWh per year) and related payment and affordability problems. Note that over 21% of low-income non-heating customers paid more than 10% of their gross annual income for electricity.

Opportunities for Energy Savings

The survey contained a comprehensive inventory of end uses in each home. These inventories were analyzed to identify common opportunities to reduce usage and to quantify the level of achievable savings.

Reducing discretionary uses: The level of discretionary electric end-uses was much higher among high use customers than among those using less than 8000 kWh per year. Figure 1 shows these comparisons. Freezers were counted as a discretionary use for families with five or fewer members.

Increasing Efficiency: The survey and inspections identified the following opportunities to increase efficiency.

- **Use of compact fluorescent bulbs:** Over 57% of high-use customers had five or more incandescent bulbs on for at least three hours per day. Many customers left indoor bulbs on continuously for security.
- **Primary refrigerators:** Seventy-eight percent of the refrigerators examined were over ten years old; the average age was 13 years. According to Detroit Edison load research data, refrigerators of this vintage used an average of 1680 kWh per year. The most efficient standard models now available use an average of 750 kWh per year.

Potential Savings Quantified

Using assumptions derived from the survey, engineering data, and other studies, the average annual reduction for each potential energy measure was calculated. These assumptions were then applied to the end-use inventories to produce an potential energy saving estimate for each home in the sample. This estimate did not include savings from replacement of the primary refrigerator. Table 2 shows the distribution of sample households by potential savings. Among high-use households, an estimated 47% could save over 1920 kWh per year. This translates to annual bill reductions of nearly \$200.

Table 1. Dimensions of the High Base Use Problem

- Number of low-income customers	350,000
- Number of low-income, high-use customers (> 8000 kWh/Yr)	47,000
- Number of low-income customers with arrears over \$200	47,850
- Number of low-income customers who pay 10% or more of their annual income for electricity.	73,800

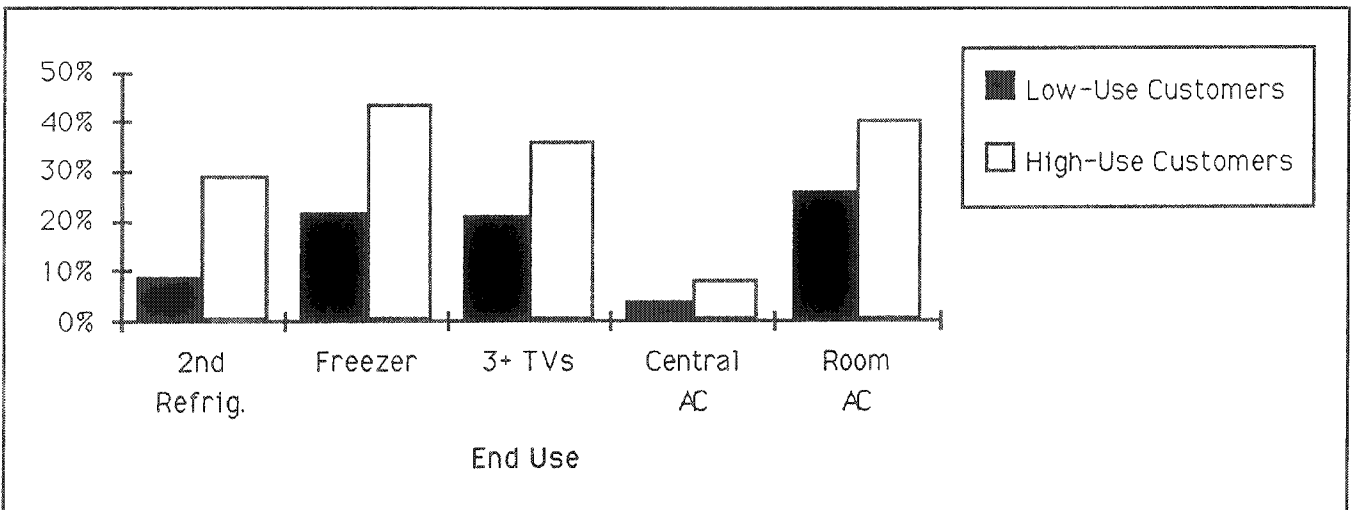


Figure 1. Percentage of Customers with Discretionary End Uses, by Use Level

Table 2. Distribution of Sample Households by Total Potential Savings (in % of Households in kWh Use Group)

Projected Annual Savings in kWh	Low-Use Customers (< 8000 kWh/Year)	High Use Customers (> 8000 kWh/Year)
0 - 480	20%	7%
481 - 960	30%	12%
961 - 1,440	25%	16%
1,441 - 1,920	10%	18%
1,921 - 2,400	9%	32%
2,401 -	6%	15%

Customer Knowledge and Attitudes

Many of the electric savings opportunities identified require active cooperation by the customer to achieve. However, a number of studies have shown that many low-income customers have little understanding of how their choice of end uses affects their bills or of what they can do to lower their bills. In this they resemble their more affluent peers. For low-income customers, however, the financial consequences of this condition are much more severe.

Lack of knowledge about energy was associated with lack of interest in various kinds of programs. Nearly 60% of high-use respondents reported that they would not be interested in participating in energy efficiency programs, no matter how they were delivered.

Given these findings and the results of evaluations of other pilot low-income programs, it was clear that a successful pilot would need to include strong motivational and educational elements.

Energy Options: A Comprehensive Response

Working with an Advisory Committee composed of state and local government officials, as well as neighborhood housing activists, Detroit Edison developed a pilot program designed to address the specific energy saving opportunities and market barriers identified in the study. The program, Energy Options, offers the following components.

- Direct installation of low-cost electric conservation measures. Replacement of incandescent with compact fluorescent bulbs; cleaning air conditioner filters and refrigerator coils.
- Removal of second refrigerators and underutilized freezers.
- Replacement of inefficient refrigerators. Homeowners are offered the opportunity to buy efficient replacement refrigerators for \$100; landlords for \$200.
- Intensive energy management education. Participants receive a three-session, in-home energy education service.

- Feedback and performance incentives. Participants receive reports with each bill comparing current usage with their usage from the same month one year ago. Furthermore, outstanding arrears are reduced by \$0.20 for each kWh of usage reduction, provided the customer pays his or her bill on time.

Early Evaluation of Energy Options

Key Findings and Results

Detroit Edison initiated delivery of Energy Options in November 1991. Two hundred eleven customers were enrolled in the program. As of the end of May 1992, approximately 170 customers remained enrolled in the program, and virtually all of these customers had completed the full sequence of three visits. Sixty customers had applied to purchase efficient refrigerators; 15 had rendered the full \$100 payment for these appliances and had accepted delivery.

Electric Savings. As of April 17, 1992, Detroit Edison had processed 597 monthly electric bills for Energy Options customers. Of these, 362 (70%) were lower than they had been in the same billing period in the previous year. Average monthly bill reductions among the customers who realized savings were \$34.15, roughly 330 kWh or 30% of usage during the same period for the previous year. These results must be treated as preliminary pending more formal billing history analysis.

Changes in Bill Payment Behavior. Energy Options participants had paid 47% of their bills on time. While this record is still considered problematic, it is considerably better than participants' performance for the previous year. The improvement can be attributed in part to Edison's making clear that service would be cut off or restricted through an amperage limiting device if timely payments were not made. On the other hand, some participants have substantially reduced their arrearage by making payments in excess of current usage.