LESSONS FROM UTILITY EXPERIMENTATION WITH APPLIANCE EFFICIENCY INCENTIVE PROGRAMS

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INTRODUCTION

Reviews of conservation incentive programs completed in the early 1980s found little conclusive evidence that financial incentives increase the level of program participation [1,2]. To some extent, this conclusion reflected the lack of valid experiments testing the value of financial incentives. But in the past three years, a number of utilities have conducted experimental incentive programs. These experiments typically involve different treatment groups (e.g., high incentive, low incentive, information only, and control groups) with collection of sales data and/or surveys used for assessing the effect of each treatment. Performing experiments of this nature is important because many utilities are proceeding with efficiency incentive programs [3].

This paper reviews the experiments with appliance efficiency incentive programs by four utilities. The focus is on how the financial incentive influences program participation and the value of incentives in relation to promotion and other factors affecting purchase decisions. Some of the experiments examined other issues such as the attitudes and demographic characteristics of program participants and nonparticipants, and program cost effectiveness. These issues are not addressed in this brief review.

REVIEW OF INCENTIVE PROGRAM EXPERIMENTS

New York State Electric and Gas Corporation

New York State Electric and Gas (NYSEG) conducted a major pilot program to promote the purchase of efficient refrigerators in 1985-86 [4]. Efficient refrigerators were considered to be the 25% most efficient models offered by the industry at the time. Sales data were collected for both pre-program and program periods in four different geographic areas: 1) control area; 2) information and advertising (info/adv) only area; 3) info/adv plus $35 rebate area; and 4) info/adv plus $50 rebate area. Info/adv consisted of bill inserts, point-of-puchase displays, and radio and newspaper ads. The four areas contain over 300,000 households. Besides collecting sales data from appliance dealers, researchers conducted surveys of participants and nonparticipants.

Table I shows NYSEG's results in terms of the market share of efficient refrigerators in each treatment area. During the program period, the market share for efficient refrigerators was nearly 60% in the info/adv plus $50 rebate area, compared to 49% in the info/adv plus $35 rebate area, 35% in the info/adv only area, and 15% in the control area. Surveys indicated that none of the treatments induced

additional purchases of refrigerators. Also, dealer cooperation and promotion of efficient models was higher in the rebate areas, and was considered critical to achieving high levels of consumer participation [4].

Niagara Mohawk Power Corporation

Niagara Mohawk Power Corporation (NIMO) tested different incentive levels to promote the purchase of efficient residential appliances in 1986 [5]. Two samples of customers were selected, each received either a high or low rebate offer on four appliances: electric water heater, refrigerator, freezer, and room air conditioner. The offers involved sliding rebates that increased with the efficiency of the model. No general advertising or promotion was conducted in conjunction with the rebate offer.

To evaluate this pilot program, NIMO collected purchase data and other information from both treatment groups as well as a control group. Preliminary findings show higher levels of purchase of efficient appliances by those receiving the higher rebate offer relative to those receiving the lower offer. Both groups bought models that on average were significantly more efficient than those bought by the control group.

NIMO also tested different ways of distributing low-cost conservation measures such as water heater blankets and fluorescent light bulbs. As expected, they found far greater acceptance of the measures when they were offered free of charge compared to either half price distribution or providing a zero interest loan [5].

Consolidated Edison Company

Consolidated Edison (ConEd) conducted pilot rebate programs to promote the purchase of high efficiency air conditioners, refrigerators, and light bulbs in 1985 and 1986 [6]. The air conditioner and refrigerator programs involved a control area, information only area, and an information plus rebate area (based on zip code). In the 1985 air conditioner program, the rebate offer was $6 per 1000 Btu of capacity for models with an EER rating of 9.0 or greater. The refrigerator rebate offer was $25-50 for roughly the 25% most efficient models listed by manufacturers. The information treatment consisted of an educational booklet distributed through the mail. All treatment groups were supposedly representative of ConEd's customers as a whole.

ConEd did not collect sales data for the different treatment groups, so it was impossible to determine the net impact that the different treatments had. But of those eligible for the rebate who made a purchase, about 28% of air conditioner buyers and 20% refrigerator buyers bought qualifying models and applied for a rebate. A post-program telephone survey following the air conditioner program indicated that rebate recipients purchased models with significantly higher efficiency ratings than purchasers in the control or information only areas [6]. There was no difference in efficiency between air conditioners purchased in the control and information areas. The pilot program for refrigerators was not evaluated in this manner.

ConEd's pilot lighting incentive program involved the utility selling compact fluorescent light bulbs to residential customers through the mail at full price ($17) in one area and at a discount ($10) in another area. An information booklet on lighting efficiency accompanied both offers. A pre-program survey indicated that no households were purchasing these bulbs on their own, so a control area was not included. The result of this experiment was three times as many bulb orders per household for the group receiving the discount offer compared to the group receiving the full price offer. Overall, however, only 0.5-1.1% of eligible households participated during the three months when the offer was in effect [6].

Bonneville Power Administration

The Bonneville Power Administration (BPA) conducted a three year pilot program beginning in 1984 to promote the purchase of solar and heat pump water heaters [7]. Four treatment groups were established: 1) low promotion and low incentive; 2) high promotion and low incentive; 3) low promotion and high incentive; and 4) high promotion and high incentive. The low incentive was either the Oregon tax credit (25% of the installed cost up to $500) or $200. The high incentive was the tax credit plus $300 or $500. Eleven local utilities served by BPA participated in the program; each was assigned to one of the treatment groups.

Table II shows the results two years after BPA began its program. Although total sales of these alternative water heaters are relatively low, there is a substantially greater rate of sales within the high incentive, high promotion treatment group. Also, the incentive appears to influence purchasers more than the level of promotion [7].

CONCLUSION

The experiments by these four utilities clearly demonstrate that financial incentives can significantly increase purchases of high-efficiency appliances and other conservation measures. The experiments generally show higher levels of program participation as the amount of the incentive increases. Collection of sales data in many of the experiments proved especially useful for conclusively determining program impacts.

Most of the utilities used the experiments to determine response rate, evaluate cost effectiveness, and improve program design at the pilot program stage prior to commiting large sums of money to full-scale program implementation. Research of this type was absent from many of the large utility incentive programs initiated in the past [3,8]. While conducting such research could potentially improve the effectiveness of utility incentive programs, whether this is the case remains to be seen.

One utility, NYSEG, was able to achieve a high rate of investment in energy-efficient equipment as part of their experiment. This result was attributed to offering a financial incentive together with advertising and involving appliance dealers in the program [4].

Many issues have not been resolved by the limited number of incentive program experiments that have been conducted. The variation in participation rates between programs, for example, indicates that many factors affect overall program impact. Thus, it is impossible to state categorically how large an incentive is necessary to obtain a given level of participation, or to state how large an incentive is optimal. More research is required on different program designs and delivery mechanisms, as well as on ways to minimize the number of "free riders" (i.e., unecessary subsidies). But it now seems reasonable to conclude that financial incentives are a valid means for promoting greater investment in energy efficiency.

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Table I. Results of the NYSEG pilot refrigerator rebate program.

Treatment group	Market share of efficient refrigerators* (%) Pre-program	Program
Control area	4.7	14.7
Information and advertising area	2.1	34.8
Info./adver. plus $35 rebate area	5.0	48.6
Info./adver. plus $50 rebate area	8.8	59.7

* Fraction of all refrigerators sold meeting efficiency criteria.

Table II. Results of the BPA pilot program for solar and heat pump water heaters.*

Treatment group	Number of sales	Sales per 1000 households
Low incentive, low promotion	4	1.9
Low incentive, high promotion	57	3.3
High incentive, low promotion	38	11.0
High incentive, high promotion	319	41.2

* Based on first two years of the program.