

Effect of Price Increases on Electricity Conservation-- Experiments with Customers in Sweden

Christina Svalstedt, Vattenfall AB

Introduction

The Price and Marketing Experiment aimed to investigate two questions. First, does price level determine the demand for electricity, or does price have little impact on demand? Second, are information campaigns and marketing inputs more effective than price in influencing the behavior of customers? Or is the most effective way of influencing customers' acceptance of electricity conservation to make use of both?

Research Approach

The experiment was premised on Sweden running short of electricity at some point in the future. Prices in the experiment were supposed to reflect the future price level, after investments in new production facilities have been made. The price levels selected were an increase of 50 to 100 percent on production price which represented a rise of about 25-85 percent for the customers.

Ethical questions are important in studies of this kind. Participation was voluntary and commercial customers received compensation during the fiscal year as well as interest on their money. Customers were informed about how they were going to be compensated before they participated in the experiment. No extra measuring equipment was installed. Only interviews and existing meters were used for our results analysis. With the exception of the price increase, no active attempts were made to get the customers to save electricity. Those who got in touch with Vattenfall on their own initiative, however, were given advice and help.

The Sample

A random sample of commercial customers, including sports halls, churches, restaurants, hotels etc., was taken in one of Vattenfall's regions. First, they were organized by electricity consumption and the kind of activity they pursued in the premises. The sample was then divided into three groups: one with 50 percent price increase, one with 100 percent increase and one control group. Each group consisted of 54 customers.

Approximately 15 percent of the customers refused to participate in the two experimental groups. Those customers are spread throughout the matrix and we would suggest that the sample can be regarded as representative of commercial customers in the region.

Results and Discussion

The First Year

During the first year, the control group neither increased nor decreased its overall use of electricity. Certain customers used less, others used more and they cancelled out each other.

The two experimental groups, with their electricity price increased, used on average 5,000 kilowatt-hours less per customer. This difference between the control group and the experiment groups is relatively small as a whole, and thus it is difficult to claim that the price increase has in fact had any effect on total consumption. A closer look at the customers in the experimental groups shows, however, that one third of them (34 percent) constituted 89 percent of the total reduction. It is difficult to see any pattern emerging in this group. There is no real difference between those who experienced a 50 percent increase and those with a 100 percent increase. In fact, the group with the 50 percent increase is more highly represented. About half of the "savers" are privately and the other half are publicly owned. The different kinds of activities are also evenly distributed. Large customers and those who use barely 20,000 kilowatt-hours are both represented amongst the savers.

Combined Boilers

Fifteen customers saved more than 20,000 kilowatt-hours during the first year. Ten of them own combined boilers and can switch from electricity to oil, which they did. During the initial inquiry they were asked whether they were used to using the conversion option. Only one out of

ten said that he had never done so. The other nine had, to a greater or lesser extent, already used the option to switch between heating systems. As a whole, 47 percent of the customers with combined boilers in the experiment took the opportunity to use another fuel instead of electricity.

Contact With the Utility

No significant increase in demand for energy conservation was observed during the first year, but nine of the customers contacted Vattenfall.

Of the five customers who reduced their electricity use during the first year, two contacted Vattenfall for advice about electricity conservation measures. In one case the reduced use was due to changed business activity. Among the other four it seems probable that the increased price of electricity had at least to some extent contributed to the reduction in use of electricity.

The Second Year

The control group as a whole increased its use of electricity by ca. 4,000 kilowatt-hours/customer. This trend is the same as the previous year, i.e. big customers increase their consumption, while those who already only use little, decrease theirs. Publicly-owned users that already consumed a lot of electricity increased their consumption.

The experimental groups as a whole increased their use of electricity somewhat between 1989, the year the study started, and 1991, but the increase is so insignificant that you could say that their use of electricity just returned to 1989 levels. Consumption increased in about 50 percent of the customers and it decreased in the other 50 percent, in both experimental groups.

Those who increased their use of electricity further increased it during the second year, and a number of customers who reduced theirs heavily over the first year did not do so the second year. Known reasons are building and expanded activity among some customers who conserved a lot the previous year. Eleven customers saved more than 20,000 kilowatt-hours during the second year. Seven of them use combined boilers, so the number of combined boiler users who made use of the conversion option decreased from ten to seven. None of the customers in the experiment contacted Vattenfall during 1991 for advice about electricity conservation.

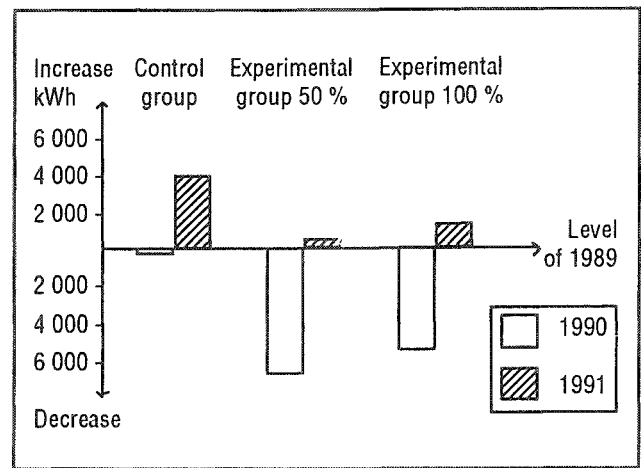


Figure 1. Variation in Electricity Consumption Compared to the Level of 1989

Conclusions

In the short term, there is a certain price sensitivity among a small section of commercial customers in this region in Sweden (20 percent during the first year). It is mostly customers who have the possibility of switching fuels who account for the decreased demand for electricity. The price increases have not triggered any amount of electricity conservation so far.

Price sensitivity tends to diminish as early as the second year of the experiment. The reasons for this may be:

- 1) Customers get used to the higher price level and return to their former pattern of electricity consumption.
- 2) Customers have taken action on energy conservation but at the same time widened the scope of their activities, and therefore their use of electricity has not decreased or it has even increased.

It should be noted that the use of electricity increased in spite of the fact that the recession bottomed out in 1991. The recession's impact on commercial customers seems to have been small in the short term.

In the Price and Marketing Experiment, we also conducted a study in the U.S. in two regions that had experienced similar price increases over the last 10 years. Almost 40 percent of the 54 companies interviewed claimed not to have any interest whatsoever in electricity issues.

In one region where the utility did not have any conservation programs, fewer measures were taken and the awareness of opportunities to conserve electricity was lower than in the other one, despite steeper price increases and higher overall price level. This indicated that conservation programs have a greater effect on conservation than high prices.

The U.S. study and our other case studies in Sweden have made us aware that many customers need assistance in identifying technically and economically feasible actions, as well as requiring financial support for investments.