

A Critical Look at Residential Electricity Conservation Campaigns in a Developing Country Environment

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Introduction

In Brazil the residential sector consumes 20% of total electricity and has a high coincidence factor with the evening peak of most utilities. Most of the efforts in residential electricity conservation campaigns held by utilities rely heavily on dissemination of information by means of brochures, manuals and guides which show ways to conserve electricity in homes. While it is important to inform households about the importance of energy conservation, perhaps we have explored too much this type of campaign.

Experiment

The area studied was Cosmópolis, a town of approximately 7,000 residential customers and total population of 29,000, located about 120 km north of the city of São Paulo. Its total annual residential consumption was 15 GWh in 1990. Two stratified samples of 315 consumers were selected, and divided into five categories of monthly consumption levels (see Table 1).

Prior to the start-up of the campaign, the first sample was interviewed in order to characterize the energy consuming behavior for each end-use (10 end-uses were investigated). During two months an intensive awareness campaign was conducted by the utility following their traditional experience: leaflets, a conservation contest, information mailed directly to households. A public "energy fair" was held where the local population could see videos and be assisted by the utility's technical staff on energy saving measures. After this two month period the second sample was selected and interviewed (Campos Filho et al. 1992).

The main characteristics of the population surveyed represented a typical picture in Brazil in terms of electricity consumption, equipment ownership and load curve.

The Results

The analysis of the first sample results (prior to the campaign) already showed that the population had good knowledge of the most energy efficient ways to operate

their appliances. Between 80-90% of the households interviewed declared an "efficient" consuming behavior for the three main end-uses. The same questionnaire used in the second survey showed very similar results, as depicted in Figure 1.

In spite of the fact that the conservation campaign focused on many end-uses, consumers paid more attention to save electricity on three end-uses: (a) lighting, (b) ironing and (c) television, none of which are major consuming categories. Prior to the campaign nearly 50% of households in all consumption classes saw some potential for energy conservation in their homes. After the campaign similar results were obtained, except for households consuming 51-100 kWh/month. Nearly 70% of the consumers in this category did not believe that such potential existed. This result is an indication that even if households know the best ways of using their electrical equipment, this does not mean that they act that way as shown by the fact that perceived conservation opportunities remained unchanged. Households in the higher consumer categories might know the possibilities for conservation, but their motivation was not enough to change their habits (Figure 2).

Electricity prices seem to offer little incentive to energy conservation, as can be seen from Figure 3. Energy bills are considered reasonable by 60% or more of households consuming below 200 kWh/month, the categories above this level show greater concern with conservation and have a slightly higher percentage of consumers declaring that their energy bills are high. We believe that electricity prices are still considered low and do not demand a more aggressive initiative from the consumer.

Discussion and Conclusions

In Brazil, residential electricity consumption is concentrated in a few end-uses (Jannuzzi and Schipper 1991) and there is little to be done with respect to the way the customer operates their appliances. Most of the work in conservation, in our view, should be directed to improving the efficiency of the equipment itself and to ensuring good marketing and financial backing in order to have

Table 1. Residential Electricity Demand: Brazil and Cosmópolis

Consumption Class Wh/mo)	Brazil		Cosmópolis	
	% Consumers	% Demand	% Consumers	% Demand
51--100	19.6	9.6	22.4	7.9
101--150	19.9	16.0	28.2	20.9
151--200	13.8	15.5	20.3	22.7
201--300	14.2	22.0	11.2	17.0
Above 300	10.3	33.4	11.3	26.8
Total	27.43x10 ⁶	51.0 TWh	7159	15.08 GWh

Source: Eletrobrás, CPFL.

Note: We have excluded consumers with less than 50 kWh/month.

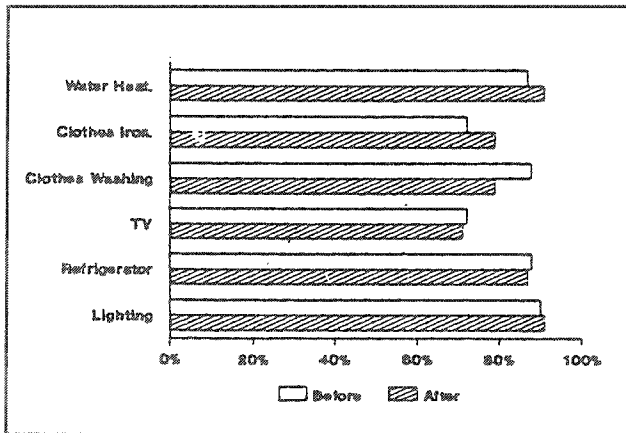


Figure 1. Households Declaring More Efficient Ways of Using Appliances by Main End-Uses (in %) Before and After the Campaign

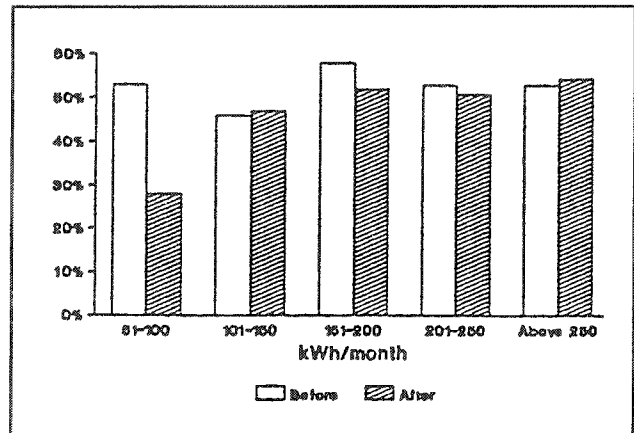


Figure 2. Households Declaring a Subjective Potential for Electricity Conservation in Their Homes, Before and After the Campaign (in %) by Consumption Class

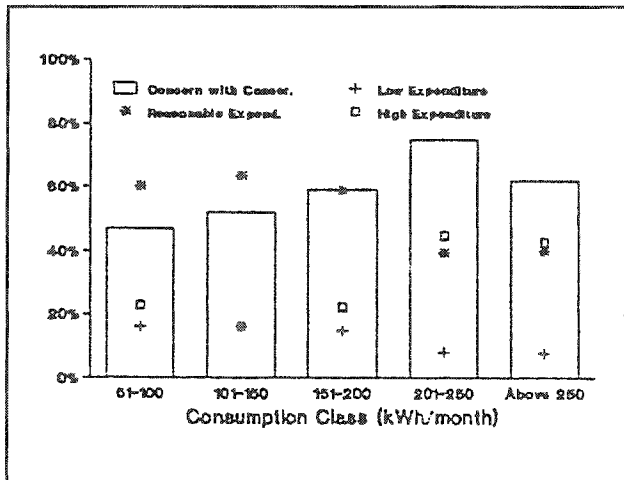


Figure 3. Percentage of Households Concerned with Energy Conservation and Their Electricity Bills Before the Campaign

efficient equipment reach the homes of the majority of the population. It was found that the consumption levels are low for the great majority of households and conservation could not be achieved without sacrifice. Also, many households already knew the correct ways of using their equipment.

Awareness campaigns have attractive costs to utilities, but they have been very seldom submitted to any evaluation in Brazil. The present experiment had a total cost of US \$20,000 including the fees paid to the University for the survey work.

It was found that the penetration of the fluorescent lighting is low, only 16% and it is a clear indication to us that conservation programs have not helped the introduction of more efficient residential equipment in Brazil.

This experiment tried to measure consumer knowledge of "more efficient ways" to operate domestic appliances. It was not the intention to measure if the respondents really behaved that way. A high proportion of households still estimate a large potential for conservation in their homes. This is an indication that they might not act in accordance to their knowledge. Notwithstanding the high rate increases households have suffered since 1987, well above inflation rates, electricity prices are still low and the average consumer pays little attention to energy conservation.

References

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