

A PROGRAM TARGETED AT MORE PERMANENT CONVERSION TO COMPACT FLUORESCENT LAMPS IN THE RESIDENTIAL SECTOR

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Abstract

Since 1988 Stockholm Energi AB and the light-source manufacturers have had joint campaigns to encourage the substitution of incandescent lamps to electricity efficient compact fluorescent lamps (CFLs). Campaigns like these don't guarantee a permanent use of efficient lamps since it is easy to replace the CFL with an incandescent lamp. To attain permanent use of CFLs, luminaires made for CFLs must be included in campaigns.

In 1990 for the first time in Sweden - in Stockholm, Göteborg and Huddinge - Stockholm Energi together with the light-source manufacturers and their branch organization the National Light Association conducted a campaign that included both CFL lamps and luminaires.

The campaign was executed during October 1990. Direct mail folders enclosing information and rebate coupons, were sent to adults in all households in Stockholm (450.000) by Stockholm Energi. The rebates were financed by the suppliers. During the campaign period Stockholm Energi advertised the rebate program in daily newspapers, on busses and in subway stations. The suppliers and retailers advertised their special offers.

About 22.00 coupons of 450.000 were cashed and this corresponds to approximately 4.9 % participation rate. Luminaires correspond to 8.5 % of the cashed coupons.

INTRODUCTION

Stockholm Energi AB is the third largest power company in Sweden. It is a very integrated energy utility, since it delivers electricity, heating and town gas to its customers.

Stockholm Energi serves 435.000 customers of which 390.000 are residential customers. The remaining are mostly commercial customers but there are some industries too. The residential sector represents approximately 40 % of the total demand of electricity in Stockholm, the commercial sector nearly 50 % and the industrial sector slightly more than 10 %. ¹

Stockholm Energi derives an obvious advantage from its close contact with the entire energy chain, from its close contact with the entire energy chain, from production via distribution to the customers' use of electricity, gas and district heating. ²

For almost a hundred years now Stockholm Energi has been successfully reducing wastage from production and distribution, but it has not concerned itself with the way in which customers use what it delivers. That has now changed and Stockholm Energi is acquiring a holistic view of energy supply. This holistic view will enable Stockholm Energi to take action where the best economic and environmental benefits are to be reaped. Inputs at the customer end can be a good alternative to the expansions of production or distribution facilities. ²

"Energy quantities released" in the long term by more efficient customer behaviour can be sold outside Stockholm Energi's territory. Work is now in progress by various means - energy clubs, customer centres, campaigns, energy briefings, counselling etc. - to create a new energy culture. ²

The electricity price in Sweden is rather low, customers need more than price signals to be observant in the

possibility to take measures in order to get a more efficient use of electric energy. The customers need knowledge in which possibilities they have, they need tools and help to make the measures. Customers also have to become familiar with how their behaviour effects the energy use.

It is not possible for Stockholm Energi, and not its will, to do this all by itself. Therefore Stockholm Energi cooperate with the actors and the experts; manufacturers of appliances, builders, installation contractors, consultants etc.

EFFICIENT USE OF ELECTRICITY FOR LIGHTING

Background

An end use with a great potential for energy efficiency improvements is lighting. This end use represents around 28% of the total electricity demand in Stockholm. 1.5% of the lighting demand is for public lighting. (2)

In 1987 Stockholm Energi started to study how to use financial incentives to improve the efficiency of residential lighting in Stockholm. This study resulted in a lighting program and the first campaign in this program towards the residential customers was realized in 1988.

The main reason why Stockholm Energi started this program was to increase the general consumer's awareness of using electricity more efficiently and also to get a more efficient end use. In this respect the changing to energy efficient lamps is the most simple measure to introduce.

Stockholm Energi had five objectives for the lighting program:

- * To encourage the substitution of existing incandescent lamps to efficient fluorescent lamps since these lamps use 70-80% less electricity than the incandescent lamps they are designed to replace.
- * To lower retail prices by increasing the demand for efficient lamps.
- * To make the first concrete step towards being an energy service company and to save energy and peak power.
- * To increase general consumer's awareness of benefits of buying efficient electric products.
- * To address growing environmental problems stemming from power generation.

Campaign Designs

The first two campaigns were very simply in design. During February and March 1988 respectively 1989 coupons redeemable for 6.8 ECU (50 SEK) rebate were sent to each of Stockholms 390.000 residential electricity customers. The coupons could be used over a five week period to purchase any CFL designed to replace incandescent lamps and/or an adapter for CFLs. Only one rebate was given per household. At the time a wide range of CFLs and adapters were available in the Swedish marketplace.^{3,*}

A substantial effort was made in advertising the rebate campaign in the daily newspapers. Placards were placed on busses and in the Stockholm subway stations, public exhibitions with examples of products and fixtures were made, announcements were enclosed with the coupons which were mailed to the customers. Posters and brochures were also placed at the retailers.³

The third campaign, during two weeks in October 1989, Stockholm Energi only advertised of the benefits of the efficient lamps, while the suppliers and retailers advertised their special offers for CFLs.

Supplier and Retailer Cooperation

A very important element of the program is the cooperation with the lighting suppliers and retailers. During the campaign periods the suppliers lowered their wholesale prices, the discounts were around 30%. The suppliers also advertised their products in newspapers, busses, subway and at the retailers. They also gave the retailers a lot of information of the campaign, the campaign design, the cooperation with Stockholm Energi and how to deal with the coupons. While designing the program and the campaigns Stockholm Energi cooperated, and still is, with the National Lighting Association, Ljuskultur. The cooperation with the suppliers and Ljuskultur has

* 1 ECU = 7.4 SEK

been and still is a very important element of success in the lighting program.

Participation and consumer acceptance

Follow-up surveys have been conducted in 1988 and 1989. Some of the salient findings are described below. In the surveys 900 households (1988) and 600 households (1989) answered questions on why they participated (or didn't participate) in the program, types of lamps purchased, benefits or problems associated with the lamps, how they used the new lamps compared with the old ones, how they judged the quality of the lamps, their intentions about use of efficient lamps in the future, how they became aware of the program etc. ^{3,4}

More than 90% of the households in Stockholm has noticed the campaigns.

Interestingly, lower energy costs were cited as the primary reason for participating in the campaign in only about half of the cases during the two first campaigns. Trying a new technology and using the rebate coupon were the most frequently cited alternative reasons. Participants also valued the longer lifetime of the efficient lamps. ³

CAMPAIGN NUMBER FOUR: TO ACHIEVE A MORE PERMANENT CONVERSION TO COMPACT FLUORESCENT LAMPS

Campaigns like these described above don't guarantee a permanent use of efficient lamps since it is easy to replace the CFL with an incandescent lamp. To attain a permanent use of CFLs, luminaires made for CFLs must be included in the campaigns.

In 1990 for the first time in Sweden - in Stockholm, Göteborg and Huddinge - Stockholm Energi together with the light-source manufacturers and their branch organization, the National Light Association, conducted a campaign that included both CFL lamps and luminaires.

Campaign Design

The fourth campaign was executed during October 1990. The design was much like the two campaigns in 1988 and 1989. Direct mail folders enclosing information and rebate coupons, were sent to all households in Stockholm by Stockholm Energi. This time however, the rebates were financed by the suppliers. There were 14 coupons in all for a total value of 82 ECU (605 SEK). Nine coupons rebated lamps or adapters and five coupons rebated luminaires.

During the campaign period, Stockholm Energi advertised the rebate campaign and gave information on the benefits in the daily newspapers, on busses and in the subway stations and coaches. The suppliers and retailers advertised their special offers. A pamphlet giving more detailed information and explanations, was produced by Stockholm Energi. The National Lighting Association, Ljuskultur, published a special edition of their magazine. This dealt with lighting, lamps and luminaires for households. It also contained a comprehensive market survey of luminaires made for CFLs. The magazine and the pamphlet were distributed to the retailers for their customers. The suppliers also supported the retailers with display materials.

Products

The lamps included in the campaign were manufactured by Luma, Osram, Philips and Tungsram. All of these companies had products that could directly replace incandescent lamps, either with built-in control gear or for use together with adapters. The product range also indicated a trend towards electronic control gear instead of conventional gear, offering smaller and lighter lamps.

The luminaires involved in the campaign were manufactured by Ateljé Lyktan, Philips and Thorn-Järnkunst. All luminaires can be described as "consumer luminaires" and are all meant for domestic applications with many annual burning hours to obtain maximum energy saving. This is also applications where lighting quality and comfort can be improved by use of CFLs instead of incandescent lamps since sufficient amount of light can be generated with a minimum of heat.

Consumer prices further down are all included VAT of 25% since private persons can't purchase them without paying VAT.

- Hockey from Ateljé Lyktan
A free standing decorative luminaire with a 2D 16-lamp for general lighting.
Consumerprice 243 ECU (1 800 SEK) incl VAT
Rebate 27 ECU (200 SEK)
- Thorn Twinfront
A luminaire with integrated double socket and timer. For mounting under cupboards for workplace-lighting.
Lamp is 2D 16.
Consumerprice 101 ECU (750 SEK) incl VAT
Rebate 4 ECU (30 SEK)
- Thorn 2D 3055
A luminaire for wall- or ceiling-mounting with a 2D 16-lamp. For general lighting.
Consumerprice 71 ECU (525 SEK) incl VAT
Rebate 4 ECU (30 SEK)
- FDK 201 from Philips
A luminaire with a PL-C 10 W lamp specially designed for plant irradiation.
Consumerprice 54 ECU (400 SEK) incl VAT
Rebate 7 ECU (50 SEK)
- FWC 110 from Philips
A luminaire specially designed for security lighting of residential areas. With integrated photocell for automatic dusk to dawn switching. Lamp is PL-S 9 W.
Consumerprice 67 ECU (500 SEK) incl VAT
Rebate 7 ECU (50 SEK)

Result and evaluation

The follow-up survey shows that about 22.000 coupons out of 450.000 were cashed during the campaign period, which corresponds to approximately 4.9 % participation rate. Of cashed coupons roughly 8.5 % were for luminaires, corresponding to about 1.800 pcs. ⁵

The number of cashed coupons give the direct effects of the campaign, but there are indirect effects as well. Market research shows that roughly another 5.000 lamps could be attributed to the campaign. Most probably this phenomenon is valid even for the luminaires. ⁵

Interestingly there is a change among the participaters 1990 comparing to 1988 and 1989, where the results are quite similar. 1990 the participaters are young urban professionals, tenant-owners, living in City. The reasons why they participated are: decrease electricity cost, try something new, make use of the coupons and avoid changing lamps so often. ⁵

Those who didn't participate 1990 are families with children and pensioners, living in rented apartments. The reasons why they didn't participate are: not interested, price is to high, just didn't occur, product is too large and ungainly, have already CFLs. ⁵

The outcome of campaign number four could have been even better if some problems had been solved during, or rather before, the campaign. One problem was the manufacturers production capacity. Accordingly to this, demand for light-sources was greater than supply. Another problem was, and still is, that luminaires are more unique than light-sources and it wasn't possible to purchase "all products in all shops". This will probably be a permanent problem; all manufacturers products aren't available at all retailers, depending on the retailers specialization. There is nothing queer about this, it's how the market works.

When the program started 1988 there were approximately 30.000 households having CFLs. After the first campaign the amount increased to around 55.000, and in 1989 the amount was around 70.000 households. After the campaign 1990 there are approximately 85.000 households having 230.000 CFLs in Stockholm. According to National Lighting Association the annual market growth is greater than 30%. ⁵

ENERGY AND ECONOMIC IMPACT

Since the program started 1988 approximately 230.000 lamps have been purchased by the households living in Stockholm. According to calculations by Stockholm Energi this has saved about 10-15 GWh per year. Most savings are made in the wintertime during the dark period. How much capacity that has been saved is difficult to

specify but the calculations states about 5 MW. (Calculation conditions: 13W CFL compared to a 60W incandescent lamp, average lighting time 6 hours per day November-March)

Stockholm Energi's total cost of the program is approximately 2.3 MECU (17 MSEK) including the follow-up surveys. This does not include the loss of income related to the energy not sold since Stockholm Energi are able to sell this quantity today in the system for power exchange.

CONCLUSION

- The lighting program is a success for Stockholm Energi. Since 1988 approximately 90.000 residential customers have participated in the lighting program. More than 70% of 390.000 households have noticed the campaigns in one way or another. The general consumer in Stockholm is now aware of the importance to use energy more efficient.
- Luminaires for CFLs are the guarantee for a permanent conversion to low-energy lighting products. The latest campaign showed that luminaires respond to activities and shall be included in future campaigns.
- To guarantee full success the trade (e.o electrical retailers and department stores) has to play a more active role and become "experts" in low-energy lighting products and carry a more complete campaign-range.
- The demand for the efficient lamps has increased even during times when no campaigns are running.
- Stockholm Energi AB will continue with the lighting program in cooperation with the branch organizations, as have been done so far.

REFERENCES

- [1] *Long-range forecast, electricity 1990-2010*, Stockholm Energi 1990.
- [2] *Annual report of Stockholm Energi for 1990*.
- [3] *Lönsam upplysning*, USK 1989.
- [4] *Rabatten på watten*, USK 1988.
- [5] *Ett steg längre*, USK 1990.