Why Are the Energy Efficient Customers Only 13% of the Market?

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Efficiency programs are often expected to be fully accepted in customer groups where a certain technology is applicable. At least if the economic incentive is large enough. Evaluation of implementation of energy efficient technology and extensive customer surveys showed Vattenfall that this was not what happened in reality. Lots of customers turned down good offers and customers who got a poor payback sometimes invested in efficiency improvements anyway. What was happening?

Within the framework of a large price- and marketing experiment customers were studied from lots of different angels. Values (including life-styles), action range and frame of reference turned out to be some of the answers. Product features, timing and marketing methods were other explanations. It also turned out that quite a few customers were directly opposed to the idea of efficient use of electricity.

Introduction

A 1990 study conducted by Vattenfall revealed new understanding about the market for electricity conservation. Before that customer surveys, end-use metering, demonstration projects and marketing of products and services had been carried out based on a variety of sampling- and market segmentation methods. The results in terms of reaching the customer with a product in a cost-efficient way were however not impressive. Several results from the residential sector indicated that customer values played an important role to marketing efficiency but we had not been able to link end-use behavior, demographic variables or choice of technical solutions to those values.

One example was a survey[1] showing that customers with environment oriented "green" values actually used more electricity than neighbors in identical homes. This could not be explained by such differences as family size, time spent at home or access to energy efficient equipment on the local market.

Simultaneously material on how commercial and industrial customers made decisions and reacted to price increases showed that values probably played a large but hidden role in companies too. The difficulties to link this to end-use behavior was even larger here as the human systems are much more complex in organizations than in families.

Research Approach

The approach we finally choose was to start not from end-uses or energy behavior but from values in general and how they developed in society over time. Then we tried to find a way to link this broader development to energy in general and electricity efficiency especially. In order to be able to do this Vattenfall cooperated with a private research institute (SIFO) in Sweden that regularly makes opinion polls on values and consumption.

The study was composed of three parts:

1. General description of values in the Swedish society - now and in a historic perspective.

2. Segmentation of the population in twelve equally large groups based on similarities in values.

3. Market segmentation of the population by attitudes to electricity conservation.

The Sample

A statistical sample of the Swedish population with ages between 16 and 74 years old was polled. Interviews were conducted with 2,009 persons during a period of two months in the fall of 1990.

Map of Values

A "map" of values composed by more than forty trends was used for the general description. Behind each trend - identified with a key word - is a large number of questions. The map shows how close different values are to each other and the general area of values that they belong to.

The dimension south to north describes which values are declining and growing in society in terms of the number of people who are attracted to them. Traditional values may be held by a lot of people but they are not growing any more. Modern values are those values that more and more people are attracted to. The northern values are also more flexible than the southern ones and change as they grow. To the north we have people who are striving for change, personal development and expressing themselves.

The dimension west to east shows how people react and make decisions. Key words close to each other on the map represent values that are likely to be found with the same individual. The further apart two key worlds are from each other on the map the less likely it is that the same person expresses both values.

In the middle of the map are key words for values that are common to many people. They are also found in many groups that differ from each other in other aspects. Further out to the edges are values that are typical to special groups.

Changes Over Time

Safety and survival were dominating values in Sweden when the 50-ies began. During the 50-ies and 60-ies values connected to the creation of the "welfare state" grew. These were the traditional values of the industrial society; trust in the market forces, authorities and technology in combination with a high value on increased standard of living and economic growth. Private consumption and status were closely linked. Those years

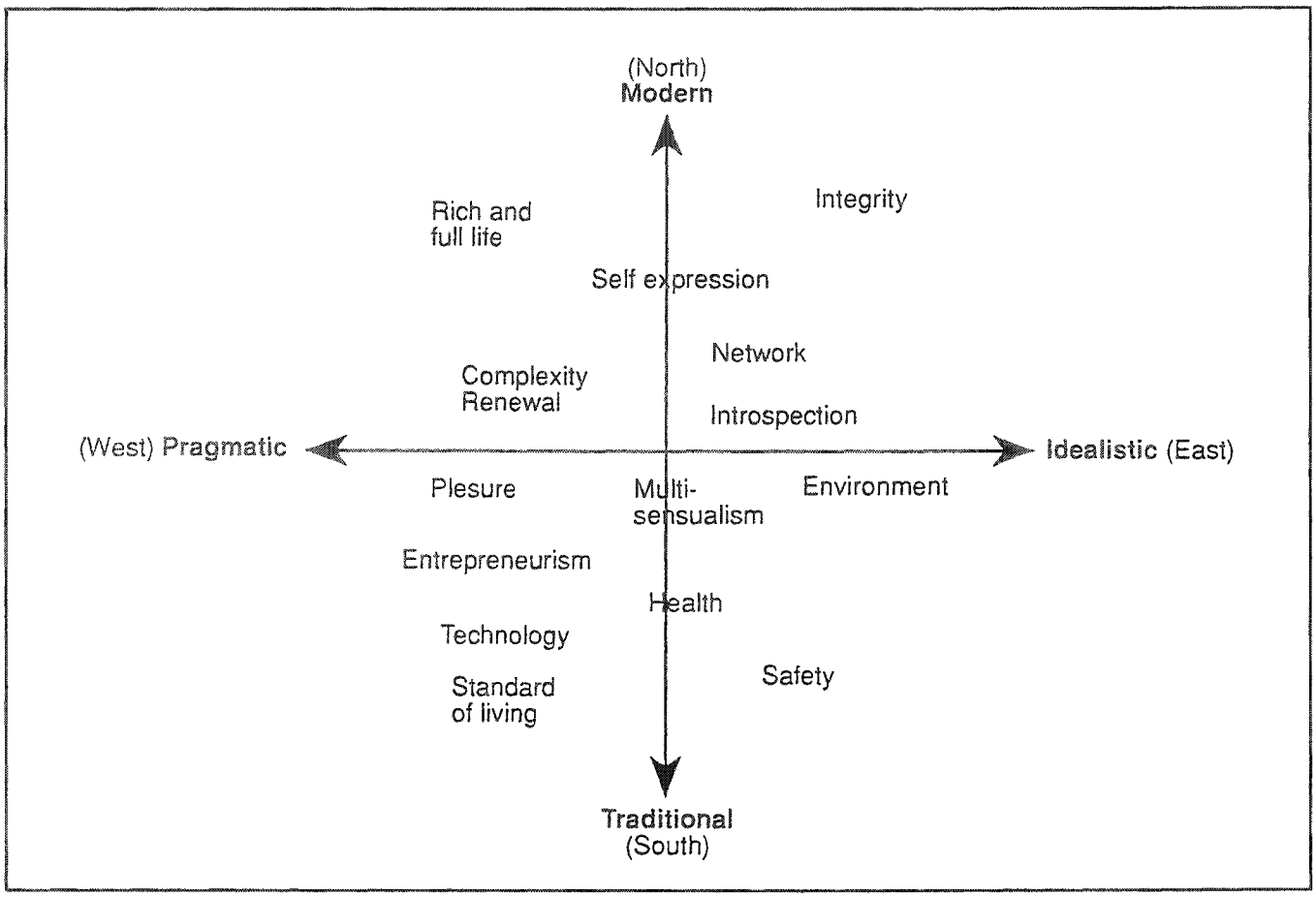

Figure 1. Shows the Dimensions on the Map, a Sample of Key Words and Their Relationship to Each Other

the energy industry grew a lot in Sweden and energy production was considered a main contribution to what was desirable for a majority of the population.

In the late 60-ies and the 70-ies came a reaction to mass-consumption and streamlined products. Opinions against commercial values grew strong. Important values were now introspection, self development, resource consciousness, quality, conservation and social concern. Power production was connected with use of natural resources and questioned in terms of the long term effects on society and environment.

The 80-ies integrated some of the self oriented values from the 70-ies with a come-back of trust in market forces. The typical opinion leader now greeted self-confidence, flexibility and risk-taking with enthusiasm. Many had values in sharp contrast to people who still carried the environmental, equality and social consciousness values from the 70-ies.

What we see in the 90-ies is an increasing union between environmental concerns and trust in the market forces. The gap between pragmatism and idealism is narrowing. At the same time differences between modern values such as pro-European attitudes, global interests and networking and traditional ones connected to materialism, safety and ethnocentricity are large. There is an increasing belief in technology as a means to solve global energy problems in a way that is profitable to the parties involved. At the same time there is simultaneously strong support and strong opposition to internationalization of energy markets and businesses.

Twelve Population Groups

The population was segmented in equal groups each representing 8.33 % of the population or 0,5 million Swedes. Each segment has its own profile based on how strongly they support or oppose the values behind the forty key words on the map. Methodologically the segmentation was based on the personal value profile of each interview person. With the help of factor analysis each individual is placed on the value map and marked with a spot. When all individuals are spotted on the map patterns develop. To make it easier to see the pattern, groups of individuals are structured in squares of equal sizes.

As some groups have not only two dimensions but three in their profile the segmentation is structured as shown in Figure 3.

Group A is a segment with people who have modern, pragmatic *and* idealistic values. Groups E and F have pragmatic values, that are both modern *and* traditional. The other nine segments are grouped according to their position in the dimensions modern - traditional respectively pragmatic - idealistic. Group H are the typical "Smiths and Joneses" of Sweden with values that are very average.

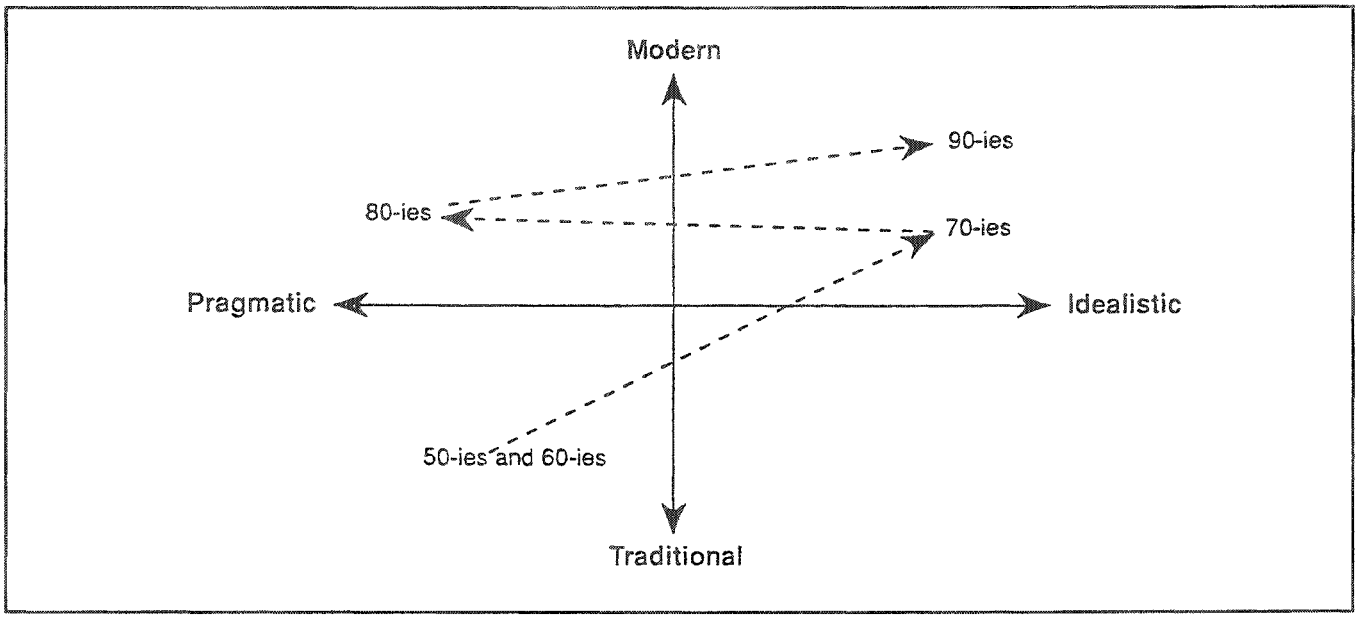

Figure 2. Shows How the Values on the Map has Shifted Over Time

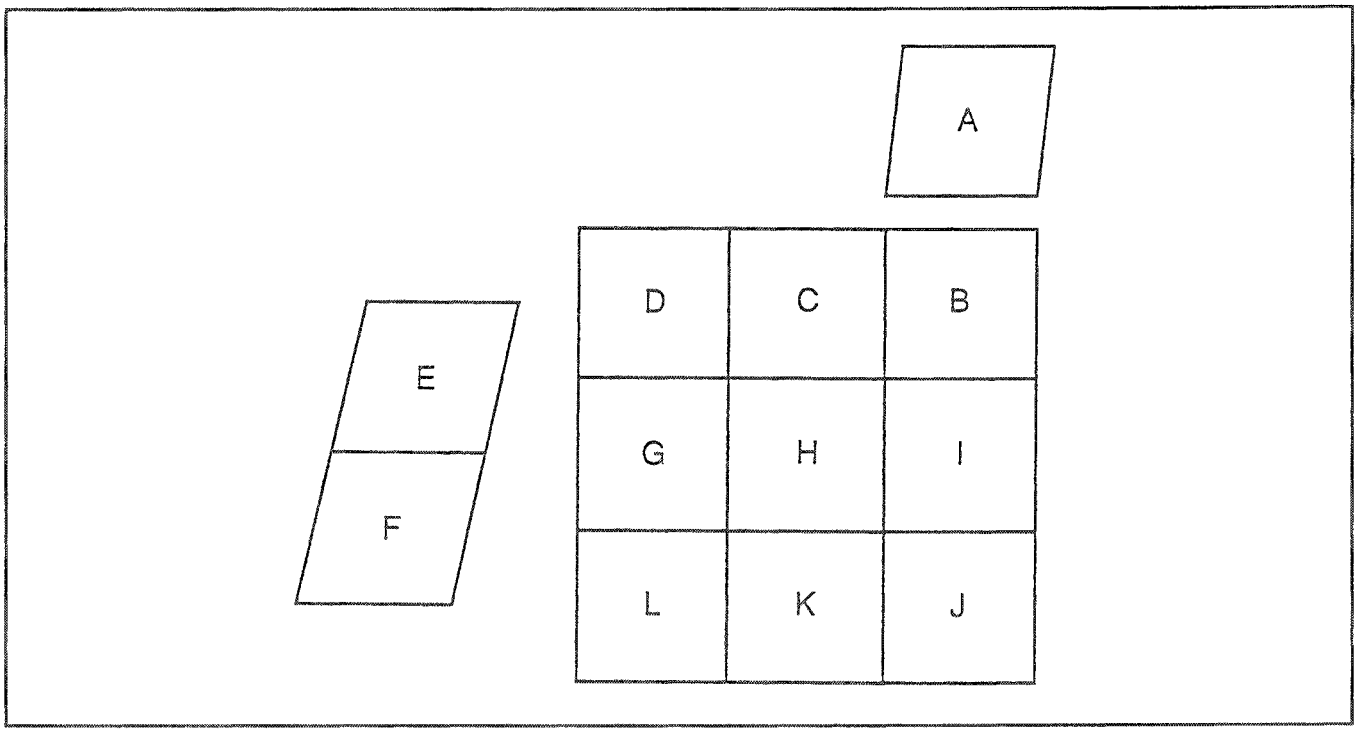

Figure 3. The Twelve Population Groups

Each of the twelve groups can be described in terms of

- value-profile
- demographics (age, sex, social class, family composition, profession, political opinion, housing, geographic area)
- use of media.

An index is used to describe the penetration of demographic factors. If the penetration equals the average of the total population in one segment, this segment gets the index number 100. If the penetration is higher then average the index gets a higher number (double penetration = 200). A lower penetration than average give numbers below 100 (half the penetration = 50). The example on the next page shows how this works in a specific age group. If we had exactly the same amount of people in ages 16-29 years in all segments, all squares would get an index of 100. As you can see in the figure this is not the case.

As an example of how the segmentation works we can look at segment B. We here have people with strong identities who shift between inner and outward aspects of life depending on their mood. They unite concern for environment and equality with ambition, renewal, complexity and health. Harmony between body and soul, individuals and society is considered important in this group. B also wants the Swedes to be open to other countries and ethnic groups and regard themselves more as citizens of the world then as Europeans.

However environmental concern and technology can not be combined in their opinion. As consumers they are critical, knowledgeable and active. In terms of organizing they prefer networks and have strong sympathies towards Amnesty International and Greenpeace. The incentive to participate comes from wanting to do what is best for society rather than from the prospect of personal gain.

Demographic factors that have higher than average penetration in this group are:

- women
- university education
- employees in civil service organizations, health care, schools and research
- membership in one specific union (the Central Organization of Salaried Employees)
- political sympathies with the environmental party and the leftwing socialists.

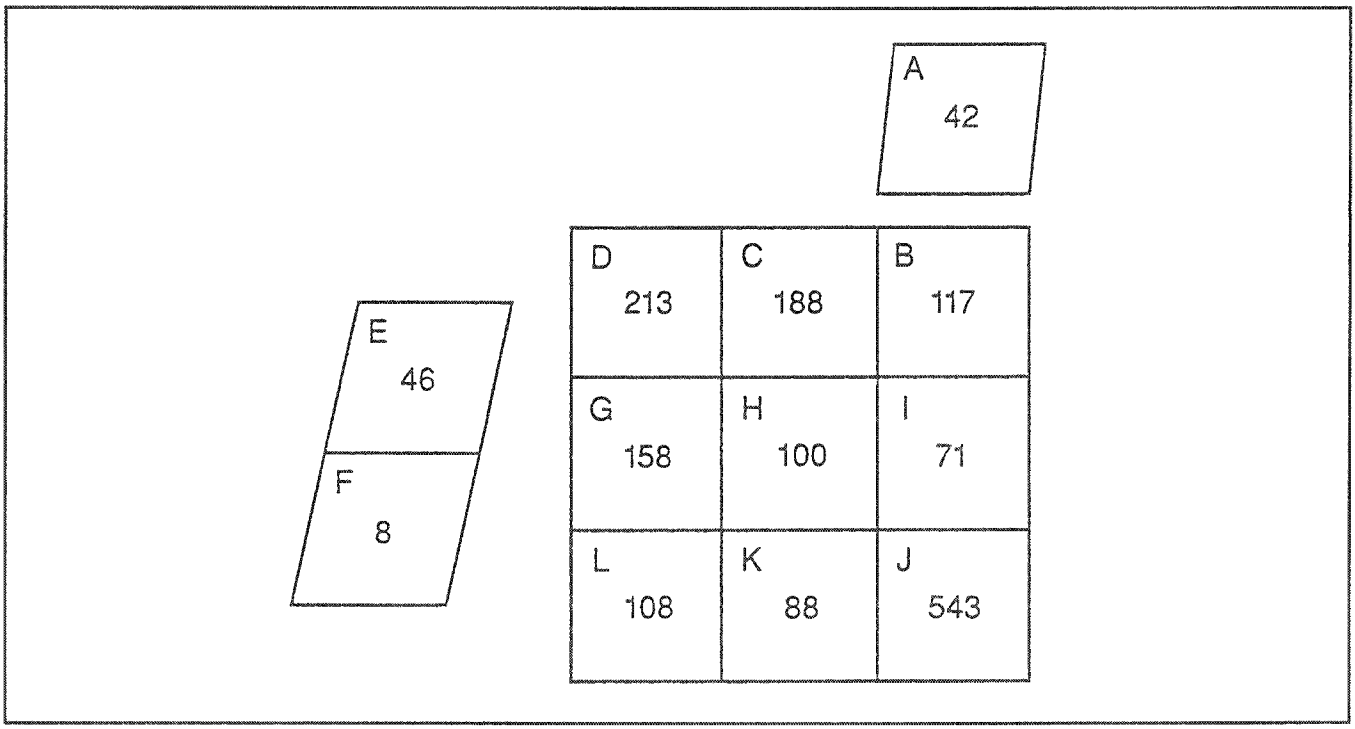

Figure 4. Penetration of Ages 16-29 Years in the Population Groups[2]

Average age in group B is 39 years. They earn more than the average of the population and 24 % in this group think that they have more money than they need.

15 newspapers and magazines have a higher than average penetration in this group. Several of them are exclusive ladies magazines and papers from consumers organizations. Group B also prefer public TV-channels to commercial.

In terms of communicating with group B Vattenfall will have to consider messages that appeal to women with "green" values and use media that they - not we - prefer. It´s important to use whatever common denominators there are and avoid the "supermale and technological style". An example of what can be done is a project called "Women and Energy" that Vattenfall started a few years back in order to get more efficient communication with women in opinion leading positions. The idea is that female employees on the expert or management level participate in networks and arrange information activities exclusively for women. The initiative has been received very well.

Conservation

From extensive previous customer research Vattenfall had information on customer attitude and behavior, price awareness, end-use technologies correlated to the level of energy used etc. Forty questions were selected from this material and put into the overall study of general values which in total had several hundred questions. By using the Vattenfall questions that specifically dealt with values on energy conservation the population was segmented in what was called "Energy types". Each "Energy type" is connected to the population map by the kind of index described earlier. The different segments are shown in Figure 5.

The study showed a clear correlation between the values of individuals and their view on electricity conservation. Other factors as building type, heating system, cost of electricity, age of building etc., only showed weak correlations. Many consumers were found to have poor specific knowledge about their electricity consumption. On an average level the interest in conservation was very

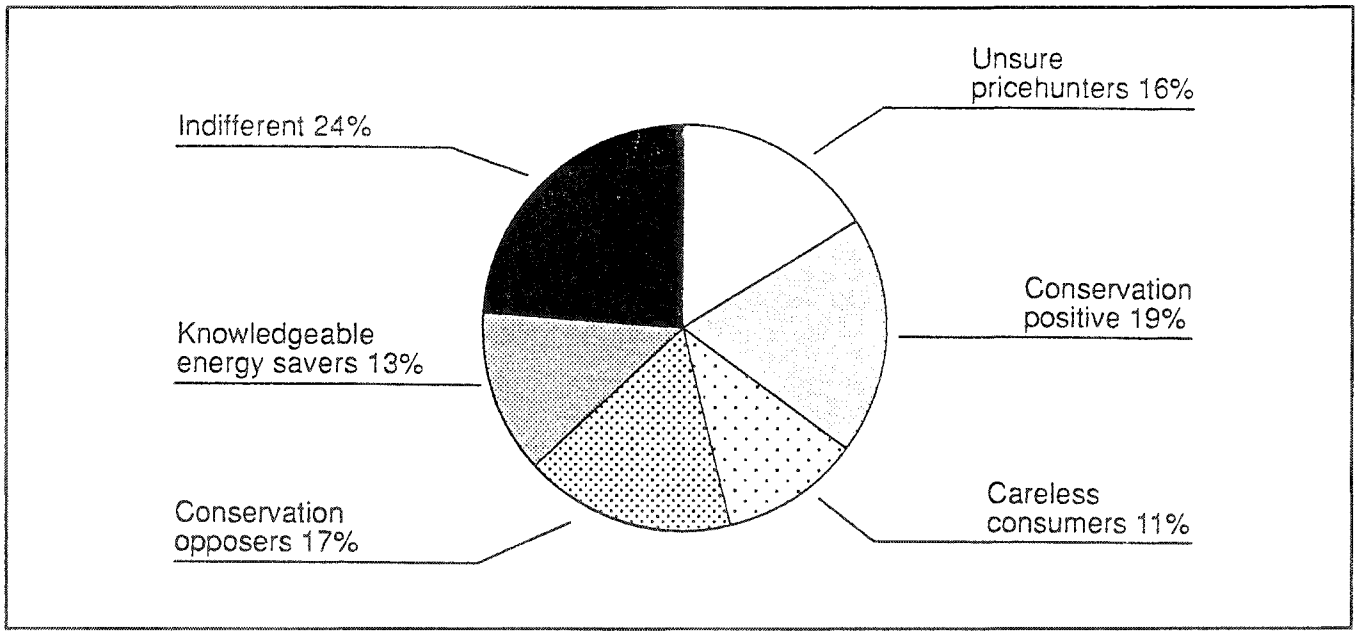

Figure 5. Segmentation by Values on Energy Efficiency

modest. Only 13% of the customers could be considered as energy efficient. Those were called "Knowledgeable energy savers".

Attitudes

The attitudes to conservation depended mainly on two factors;

1) How the concept "energy conservation" was interpreted

2) Motives for conservation.

There were large differences between the twelve population groups in those aspects. People who belonged to groups A and E considered conservation to be "rational and efficient" while groups G, L and K connected it with negative values like "lower standard of living" and "our society is retarding".

In consequence "Knowledgeable energy savers" had high penetration in groups A (index 162) and E (index 177) and were very scarce in the other three groups. (Index 38 in group L as the lowest penetration).

All groups on the eastern side of the map (B, I and J) as well as group A were willing to conserve electricity if society could benefit from it. Incentives were:

- "To use less energy in Sweden"
- "Do society and environment a favor"
- "Phase out nuclear power"

In those groups people also were open to legislation as a mean to decrease the use of electricity if consumers proved reluctant to contribute. That view was not an option for D, G and L.

Groups on the west side of the map in general regard residential conservation activities as useless. They think that the conservation potential lies in the industrial and commercial sectors and in transports. To groups I and K the main motive for conservation is to lower the electricity bill.

Another difference between the groups on the west respectively east side of the map is their opinion of what causes environmental problems. Groups on the east side regard to a much larger extent nuclear power as an important part of environmental problems. Among the "Energy types" this opinion is mainly expressed by "Unsure price-hunters". Swedes in general however consider the effects on environment from nuclear power to be small compared to industrial emissions, traffic pollution, use of chemicals and rainforest destruction.

In this way different opinions on conservation can be linked to the twelve segments and the map of general values in one question after the other. For example: "What did your electricity cost in 1989?" Almost half the population could not tell their total cost of electricity.

The frequency of this answer in the different segments is shown in Figure 6.

The result is specially interesting as we had quite large price increases to private consumers in March 1989 as a result of new energy taxes. This was debated a lot in newspapers and TV for a period of several months prior to the increases. A follow up question asked "if you save more electricity since 1st of March 1989". 33% said they tried to do that. Those customers were most frequent in group E and least frequent in groups D and L.

Energy Conscious

From the idea that "conservation is desirable" to efficient conservation actions is a large step. Previous research at Vattenfall[4] has shown that all of the factors below have to be present in order to make efficient conservation actions possible.

- Positive attitude
- Access to information
- Incentive
- Specific knowledge
- Technology available
- Sufficient action range

Of all the "Energy types" only one segment showed all those characteristics. As indicated before this was the "Knowledgeable energy savers". They were truly energy conscious - from attitudes to actions.

The second most likely groups to take action is the "Conservation positive". They have most of the above characteristics but low specific knowledge and no private incentive (even if they have a societal one).

"Unsure price-hunters" have personal incentives and a few other characteristics but lack access to information and mistrust their own possibilities to use their action range.

In this way you can describe each "Energy type" until you finally come to a group where the attitude to conservation is negative and the incentives are negative as well. Those are the "Conservation opposers" who see conservation as a threat to their personal standard of living. As something connected to environmentalism, globalism and public interests - all values that are negative to them.

Here I will only describe the *"Knowledgeable energy savers"* more in detail.

They consider themselves to use electricity efficiently to a larger extent than all the other segments. If you compare this opinion to the conservation actions taken in each

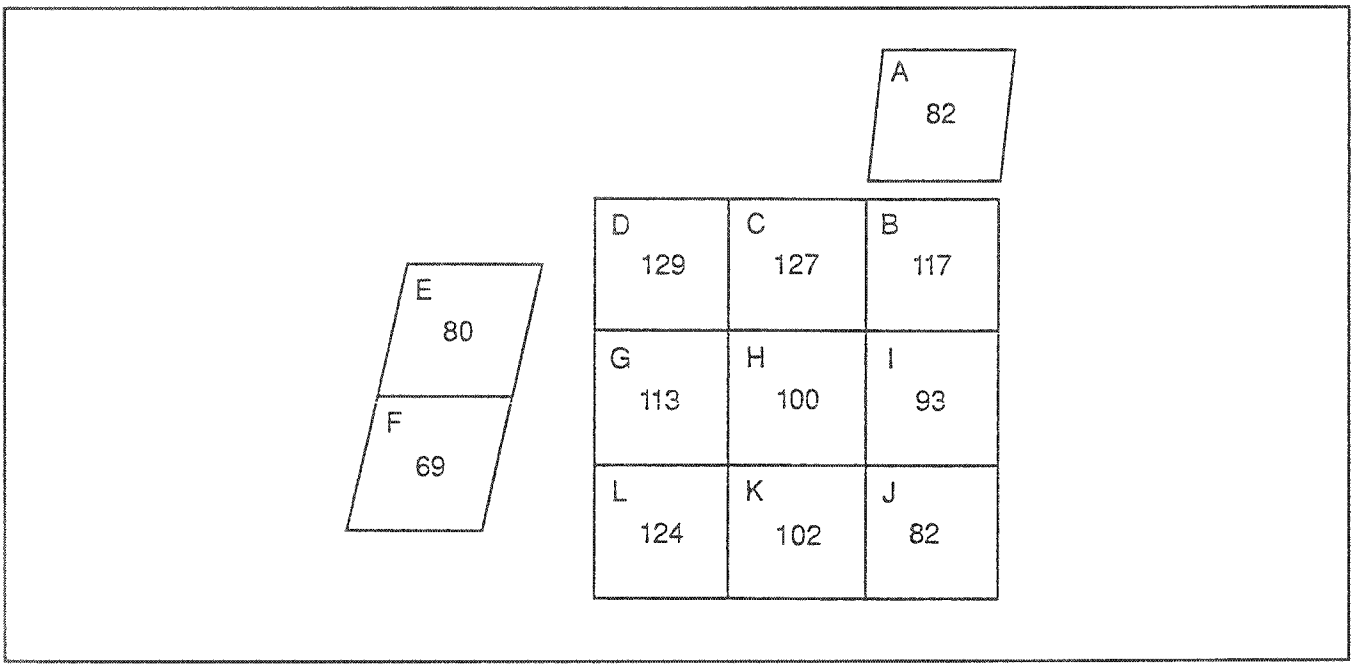

Figure 6. No Opinion of Electricity Cost in 1989[3]

segment it proves to be correct. They know a lot about energy and electricity both in general and specifically. General knowledge is the kind of knowledge you can have about energy systems, taxes and energy policies on an overall level. For instance people in this segment often know that electricity prices in total have decreased in real terms during the past ten years in spite of the 1989 price increase. Most people don´t.

The second kind of knowledge is what it takes to actually know *how* you do something in the right way (i.e. knowledge of tax structure for your area, technological options in your own system, places to go shopping for more efficient equipment etc.). Specific knowledge is also needed to get feed-back on the results of your conservation actions. To be able to read the meter and the bill and be able to interpret the information correctly.

"Knowledgeable energy savers" have often made investments in conservation and behave in energy efficient ways. They have insulated their houses, bought remote control systems, heat pumps and efficient lighting to a much larger extent than the other groups. They also use equipment and water efficiently and adjust the indoor temperature more frequently then others. However house sizes, heating systems, electric equipment and everyday habits, like for instance time spent at home, do not differ from people in average.

The "Knowledgeable energy savers" consider conservation to be rational and efficient. It also is important to them that resources are used efficiently. Their incentive to conserve is however to lower their own bill. They are price sensitive in so far that they react to price increases, know the price per Kwh and how it changes, have a correct opinion about the total cost and make a pay-off calculation on their investments in conservation.

As they already know a lot they have no demand for information from energy companies or authorities. In case they want further information they have it within easy reach in personal networks and specialized publications they subscribe to. In spite of this they have a positive attitude towards general information to groups with less knowledge than they have themselves.

The future energy system in Sweden should in their opinion be self-sufficient in terms of energy production. A mix of different kinds of energy sources is preferred. The only energy source they oppose is coal. Today the Swedish energy system works to their satisfaction. They do not think that nuclear power could be phased out only by electricity conservation measures.

The price of electricity is considered reasonable and is compared to other heating costs. Price increases should not be made in order to promote conservation or because of environmental reasons.

Their value profile is found mainly north-west on the map. Groups A, E, F have the highest penetration in this segment as shown in Figure 7.

Here we have many individuals who see no conflict between environment and technology. Those of them with modern values (groups A and E) are the present opinion leaders together with group B. (Group B has high penetration among the "Conservation positive"). As groups A and B are growing and have demographic traits showing that they have a substantial influence on decision making in different parts of society, pro-conservation values are expected to grow during the coming years.

Whether this actually will lead to more conservation remains an open question. It takes a lot to be an energy conscious customer. Not many customers have a positive attitude to conservation, a personal incentive to conserve energy, knowledge of prices and technical solutions, sufficient action range to do something when they want to and know how to do it. And all of those features at the same time, not only one of them. That´s why the energy efficient customers are only 13% of the market.

Endnotes

1. Uppdrag 2000-report: Hushållens energikonsumtion, Vattenfall 1987-09-02
2. 24% of the total population is in this age group
3. This answer was given by 45% of the total population.
4. Uppdrag 2000-report: Från mätare till människa. Vattenfall 1991-10-23
5. The knowledgeable energy savers are 13% of the total population.

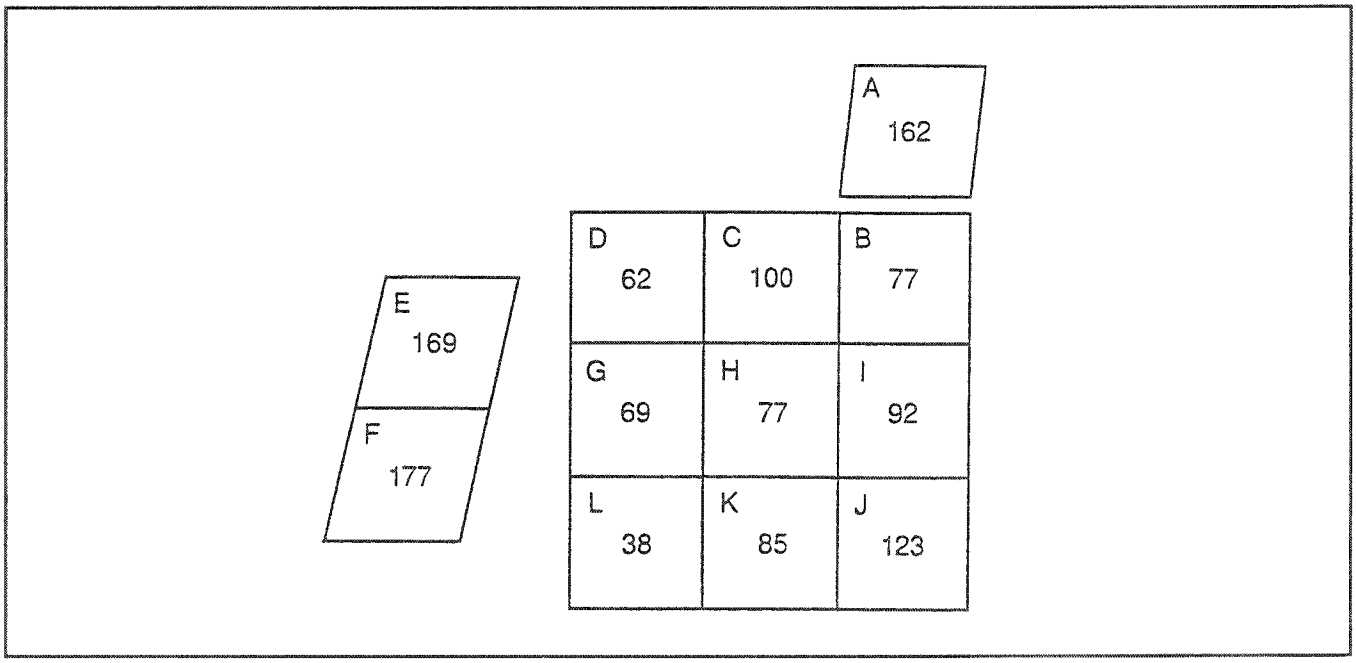

Figure 7. Penetration of "Knowledgeable Energy Savers" in Different Population Groups[5]

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