Del. 2.2: Discussion paper on trends, drivers and influencing factors for purchase and use of products

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1 Trends and Drivers

1.1 Ecodesign and Labelling directives/regulations

1.1.1 Overview on framework of legislation

The Ecodesign and Labelling framework based on the two EC directives 125/2009/EC and 30/2010/EC provides a strong driver supporting the market and technology development for more energy efficient products. The Ecodesign directive (resp. Energy related Products (ErP) directive for energy related products provides the basis for eco-design minimum requirements which are individually defined for product groups in specific regulations. Products not compliant with these requirements may no longer be placed on the EU-market. The eco-design regulations furthermore define standardized information requirements for various efficiency and performance parameters of products. This standardised product information strongly improves market transparency and provides an efficient basis for consumer information besides the label.

Energy labelling for products as defined by the labelling directive and the product specific regulations in addition drives market development from the demand side. Buyers are provided with information on efficiency and energy consumption of products directly at the point of sale.

Overall the major driving force of the regulations is provided by

- the phase-out of non-complying products
- the continuous revision of minimum requirements over longer time periods
- the stimulation of demand for very efficient products by the label scheme

Thus the eco-design and labelling framework addresses the market both from the supply and the demand side.

Most major product technologies used in households are already covered by the scheme except for office equipment and some types of consumer electronics (see table Table 1.1: Current state of implemented and planned ecodesign and labelling regulations.). For office equipment the US/EU Energy Star-Programme is still used for product labelling and consumer information. Thus this product group is currently excluded from the EU labelling scheme. The EU database for Energy Star which includes all Energy Star labelled products is currently in a process of complete revision.

1.1.2 Success of labelling concept

Since the implementation of the EU label in 1992 the concept has been a widely acknowledged success story. As indicated above it has been an important driver for consumers to demand energy efficient products and for manufacturers to provide more efficient technology. Efficiency of some product groups (e.g. refrigerators) has been improved to such an extent that the original A to G class scale had to be extended to additional efficiency classes (A+/A+++). For several product groups products below class “B” are no longer available on the market. Thus “A” class is already the minimum standard in these cases.
However despite the general success of the labelling concept the developments have also led to new challenges respectively the need for a more comprehensive revision of the labelling scheme (see section below).

1.1.3 Status and outlook (working plan)

Table 1.1 shows the major product technologies relevant for households which already have been covered by ErP. Among others this includes white goods, lighting, room heating, water heating, office equipment as well as TVs, set-top boxes and vacuum cleaners. Further regulations to be expected soon will cover local space heaters, cooking appliances, ventilation, windows and solid fuel boilers.

Table 1.1: Current state of implemented and planned ecodesign and labelling regulations.

<table>
<thead>
<tr>
<th>Product Group</th>
<th>Label</th>
<th>Ecodesign</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulations already implemented</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing machines</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Dryers</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Dish washers</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Refrigerators&amp;Freezers</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Lighting</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>TVs</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Standby Energy Consumption</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>PCs</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Monitors</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Settop-Boxes</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Circulator Pumps</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Room Airconditioners</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Water heaters</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Power supplies</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Vacuum Cleaners</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Boilers</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>New regulations still to be implemented</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local space heaters</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Cooking appliances</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Ventilatoren</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Fenster</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Biomassekessel</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

The standardised product information provided by manufacturers on the basis of the ecodesign and labelling regulations provides the central source for customized consumer information services and consequently for the tools provided by the “Efficiency 2.1” project.
1.1.4 Challenges related to revised labelling layout

Although the product data and label offered by the ecodesign and labelling framework provide an essential precondition for consumer information, these information sources are currently not sufficient to ensure effective consumer guidance.

Due to the more complex labelling concept implemented a few years ago and a strongly growing number of labelled products which are labelled in different ways, it has become partly difficult for consumers to use the label effectively. Obvious limitations of the current approach have been realised by the EC and the EU-Member States and a revision process for the concept has been started recently. In this process among others the following problems need to be addressed:

- **the label should be uniform across the different products groups, aiming for visual simplicity.** Today the label is not completely consistent for the different product groups. Some differences are partly necessary due to different product parameters to be addressed; however the design of the labels should be as uniform as possible to facilitate consumer orientation.

- **All labels should include information about both energy efficiency and energy consumption and emphasize the energy consumption aspect.** In the past not all labels included information on energy consumption, or this information was not adequately emphasized. A focus on efficiency only may be misleading, as larger products may be quite efficient despite higher energy consumption.

- **The label scale needs to be consistent and easy to interpret.** The introduction of the hybrid A-G and A+/A+++ scale has led to of confusion among consumers. For example it was unclear for many buyers how the different A+ levels are to be rated in comparison to the A-G levels. Thus a homogeneous, transparent and easy to update labelling scale should be used in the future.

- **The relative “performance” of a labelled product in comparison to the most efficient products available on the market should be easy visible.** In the past the A+ labelling was partly confusing for consumers because the top label class was different for different product categories (e.g. A+ or A++ or A+++). Thus it was not transparent which is the best class currently reached by products available on the market. The current top level efficiency should be clearly indicated on the label.

- **The different label classes should reflect similar differences in energy efficiency.** The difference in energy efficiency between different label classes should be similar so that consumers can expect that switching between the different classes provides similar gains in efficiency.

It is expected that the revision of the label concept requires at least one or two more years and will not be finalized before some time in 2015.

In absence of a revised consolidated labelling concept it is particularly important to support consumers with additional effective information tools. In this respect the tools provided by the Efficiency 2.1 project are particularly important as a means to improve the effectiveness of consumer information.
Related Studies:

- Bio Intelligence, 2012, Study on different options for communicating environmental information for products - Final report.
- Meissner M., Heinzle S., Decker R., 2012, Not worth the extra cost? Diluting the differentiation ability of highly rated products by altering the meaning of rating scale levels.

1.2 Roll out of smart metering

1.2.1 Target, state of play

Smart metering has been highlighted in recent years as a major approach to support energy efficiency in households.

Smart metering in general may serve several central targets which among others are:

- correct billing based on actual metered data,
- better information for customers
- more efficient data exchange and market processes (e.g. supplier switching) in the liberalised electricity market
- more cost effective metering and billing
- overall an increase of energy efficiency

Thus as an indirect effect smart metering may also lead to increased consciousness regarding energy efficiency of household products.

In accordance with Directive 2009/72/EC of the European Parliament and of the Council concerning common rules for the internal market in electricity, Member States are required to ensure the implementation of smart metering systems that assist the active participation of consumers in the electricity supply and gas supply markets.

The current situation regarding the implementation of smart metering in the EU differs strongly from country to country. Figure 1.1 shows the status of implementation and devel-
opment of the legal framework in the different EU-member states from an assessment in the Smart Regions project.

Figure 1.1: Status of implementation a legal framework of smart metering in the EU (Smart Regions 2013).

The roll-out plan for Austria for example includes the goal of a 90% implementation by end of 2019.

1.2.2 Savings related to smart meters

The energy saving potential that can be accessed by smart metering in households due to direct feedback is currently estimated to 5-15%. This is the approximate potential estimated across the EU.

1.2.3 Related aspects (visualisation, privacy protection, requirements for user feedback)

One of the key tasks and preconditions for using smart metering systems is to find appropriate technical and legal solutions which safeguard protection of personal data as a fundamental right. Member States and stakeholders should ensure in the initial phase of the roll-out of smart meters, those smart metering system applications are monitored and that fundamental rights and freedoms of individuals are respected.

In order to guarantee protection of personal data throughout the Union, Member States should adopt and apply the data protection impact assessment developed by the Commission.

Member States are provided with guidance on a set of common minimum functional requirements for smart metering of electricity that would enable them to identify common
means of achieving cost-efficiencies in their roll-out plans. This could in turn serve Member States, metering suppliers and network operators as a common basis for their own cost-benefit analyses and investments to facilitate the procurement associated with roll-out and provide regulators with European reference definitions.

Important additional requirements for the practical implementation among others are the following. Smart meters

- need a bi-directional communication-connection.
- must provide the possibility of metering and saving meter counts, average power values or energy consumption in 15-minutes-periods. They also have to provide the possibility of saving the daily energy consumption.
- must save all metered data for at least 60 days within the meter. It has to be ensured that in case of network failures and disconnection from the grid all data is saved in the meter to ensure a reconstruction of all relevant data.
- must provide the possibility of exporting all data via communication ports at least once a day. All the data for one day has to be transferred at the latest by 12:00 (noon) of the following day.
- need communication ports which allow at least 4 external meters (e.g. gas, water etc.) to be able to use the communication line of the smart meter in both directions, and which support data transfer from these devices.
- have to provide a communication port with an interface that allows unidirectional data transfer to external devices connected to the customer’s installation.
- and all communication have to be encrypted and protected to avoid unauthorised access to the data.
- have to enable the remote disconnection of the customers system, the remote release for reconnection by the customer and a limitation of the maximum load.
- have to be equipped with an internal clock. A calendar function must be provided by the smart metering system. There must be the possibility of remote synchronisation of the clock.
- The possibility to receive and process remote software updates has to be provided in compliance with the national weights and measures regulation.

Related Studies:

- Empowering consumers through smart metering BEUC Frederic Klopert & Gregoire Wallenborn 2011; http://docshare.beuc.org/docs/1/CKBICFGAKCEHAJPFNKPBNCCSSEPCLWY9DB6EG9DW3571KM/BEUC/docs/DLS/2012-00369-01-E.pdf
1.3 EU Directive on energy efficiency

1.3.1 Overview on objectives

The energy efficiency directive 2012/27/EU established a common framework of measures for the promotion of energy efficiency within the EU in order to ensure the achievement of the EU 2020 20% target and to support further energy efficiency improvements beyond that date. The directive defines rules to remove barriers in the energy market and overcome market failures that impede efficiency in the supply and use of energy. Member States shall set indicative national energy efficiency targets, based on either primary or final energy consumption, primary or final energy savings, or energy intensity. The targets are to be notified to the EC.

Priority measures indicated in the directive among others include:

- Building renovation
- Energy audits and energy management systems
- Metering
- Billing information
- Consumer information

Thus the directive includes a larger number of measures addressing the end-user respectively the consumer and act as drivers to support information and motivation of consumers. The most important aspects are briefly highlighted in the following section.

According to the directive Member States shall promote the availability of cost-effective high quality energy audits to all customers. Measures shall be developed to raise awareness among households about the benefits of such audits. Training programmes for the qualification of energy auditors shall be encouraged in order to facilitate availability of experts.

Member States furthermore shall also ensure that (provided it is technically possible, financially reasonable and proportionate in relation to the potential energy savings) final customers for electricity, natural gas, district heating, district cooling and domestic hot water are provided with competitively priced individual meters that accurately reflect the actual energy consumption and time of energy use. Where heating and cooling or hot water are supplied to a building from a district heating network or from a central source servicing multiple buildings, a heat or hot water meter shall be installed at the heating exchanger or point of delivery.

Where final customers do not have smart meters as referred to in Directives 2009/72/EC and 2009/73/EC, Member States shall ensure by end of 2014, that billing information is accurate and based on actual consumption, in accordance with the Directive. This should cover energy distributors, distribution system operators and retail energy sales companies, where this is technically possible and economically justified.

The obligation may be fulfilled by a system of regular self-reading by the final customers whereby they communicate readings from their meter to the energy supplier. Only when the final customer has not provided a meter reading for a given billing interval billing shall be based on estimated consumption or a flat rate.
Member States furthermore shall take appropriate measures to promote and facilitate an efficient use of energy by small energy customers, including domestic customers. These measures may be part of a national strategy. The following potential measures shall be considered:

- fiscal incentives;
- access to finance, grants or subsidies;
- information provision;
- exemplary projects;
- workplace activities;
- ways and means to engage consumers and consumer organisations during the possible roll-out of smart meters through communication of:
  - cost-effective and easy-to-achieve changes in energy use;
  - information on energy efficiency measures

Overall this shows that also directive 2012/27/EU provides an additional important framework or driver to support energy efficiency in households.
2 Influencing factors for purchase and use of products

2.1 Overview on related study results

Energy use and its impacts are dominant themes in the political and economic discourse of most countries. The use of energy in the residential sector is affected by the energy efficiency of appliances and electronic equipment. Efforts to improve household energy consumption have gained popularity in the last decades, with a focus on environmental labelling and more recently on targeted behavioural campaigns (e.g. smart meters, carbon calculators). The shift in focus to household consumption is due to its crucial role in achieving carbon reduction and energy conservation targets in developed economies (Panzone, 2013). It should be kept in mind that, within the larger macroeconomic and geopolitical frame, domestic energy savings cannot be considered an exclusive responsibility of households but involve a broader set of stakeholders. Achieving the best results in terms of saving energy will require that consumers, services (including retail sales staff) and government work together (Gaspar & Antunes, 2011; Promotion3e).

Current consumer research (Reisch, 2011) shows that in the case of consumer goods, 80% of all consumer decisions are not rationally controlled. In these cases, the decision to buy is not cognitively developed, but taken on the basis of emotions and experiences. Behaviour is like a routine in many areas, embedded in complex contexts and determined by customs. In other words, consumers decide rational, but on an individual level.

Paramount is that consumers interact at different levels. They behave according to the context as:

- individuals
- groups (couples, families, peer groups, such as neighbourhoods) and
- collective actors (institutions, organizations, networks, cooperatives, associations, clubs, associations, etc.)

Each market participant behaves primarily as a citizen, but also as a collective actor in a given group, in which case other functions and standards have validity. Investment decisions are in principle in a group different than if they had been made individually. This applies especially to households who choose differently than individuals. However, “households” are often addressed as a target group. Consumer research has so far mainly focused on the consumer as an individual set apart - both in regard to policy work as well as the behavioural consumer research (Bogner et al, 2012).

A key point is that household decisions are mostly collective decisions that are shaped by social contexts. Basically, people living in a household have individual preferences. However, the bargaining power of the individual is determined by various negotiation positions, such as long existing gender roles and specific gender roles (e.g. children, and mothers), origin and amount of family income. Behavioural economic research shows that couples are choosing different than when decisions are taken individually. For example, couples tend to be more risk-averse compared to if they would make a decision on their own (Munro, 2009).
Surveys regarding household behaviour usually keep this aspect open to interpretation or very unspecific. Respondents do not receive any specifications or restrictions, if they should make an assessment in regard to their personal perspective or as a representative of the entire household.

However, an important aspect is that household decisions are often not based on a detailed discussion with partners or other persons living in the household. Often they are decentralized decisions of individuals. In these cases, a possible analysis of the entire household preference would not be useful, since this would obscure the real situation: the question of who decides what in the household and what resources are available for this person, can affect the political intervention to stabilize the household energy demand (Lundberg et al. 1997 in Bogner et al, 2012). Finally, one must emphasize again, that behaviour in the household is often not based on conscious decisions but on behavioural routines that are executed daily and which are embedded in a complex decision making process (Mack and Hackmann, 2008 in Bogner et al, 2012).

Young (2008) argues that people consider characteristics associated with long-term aspects and not only those associated with the purchase itself. For example, although people value the cost of an appliance; they also value the long-term savings that can be achieved due to the lower energy consumption of certain types of equipment. Moreover, some people may perform a cost-benefit analysis and consider aspects such as future energy price rates (Young, 2008 in Gaspar & Antunes, 2011). However, purchase decisions do not always involve a cost-benefit analysis and there are likely to be barriers/constraints to undertaking such an analysis, resulting in the choice being determined in a routine and non-deliberated way, based on product characteristics that are more typically taken into account by the consumer (Gaspar & Antunes, 2011). Accordingly there is evidence that cost-benefit analysis and deliberation is complex given that people generally have a limited awareness of the energy efficiency of appliances, of the price they pay for energy use and of the general prices of services (Yamamoto et al., 2008 in Gaspar & Antunes, 2011).

Another important consideration is that although many surveys show that people claim to be willing to pay more for appliances with higher energy efficiency, only some actually do so in practice, placing more value on other aspects such as the cost of the appliance, quality and brand (Banerjee and Solomon, 2003 in Gaspar & Antunes, 2011).

2.1.1 **Heuristics in consumer psychology: cognitive mechanisms applied (heuristics & biases) in information processing and risk analysis (based on Reisch 2011 in Bogner et al, 2012)**

As the complexity of making a choice increases, people simplify their decision-making processes and are more likely to rely on heuristics and biases. The following examples do not focus solely on energy consumption, but are relevant for it and thus are described briefly.

- **Endowment effect / status quo bias (related to loss aversion)**

The value of a good to an individual appears to be higher when the good is viewed as something that could be lost or given up than when the same good is evaluated as a potential gain, i.e., potential losses are evaluated as being stronger than potential gains **loss aver-**
sion). Contained within this is a preference for the particular status quo situation, which can in turn lead to the fact that the coming about of beneficial transactions becomes hindered.

The effect of information framing (related to loss aversion)

A. Buying this energy efficiency microwave will save your household, on average, €40 per year in energy bills
B. Buying a less energy efficient microwave will mean that, on average, you spend an extra €40 per year in energy bills

Even though the statements convey the same information about energy saving, statement B will be more effective than statement A. The reason for this is that individuals are naturally loss averse.

- **Preference for the immediate (present-biased preferences = hyperbolic discounting)**

Economic actors do not rationally weigh up present against future benefits and costs. Rather they put too much weight on the immediate (“Discounting” of the future. “People care about NOW”.)

**Examples:**

- low retirement savings in the absence of compulsion
- When buying home office equipment, consumers may not take into account follow-up costs of cartridges
- Consumers fail to fully consider the future savings from a more efficient motor vehicle – legislation
- Low motivation for sustainable consumption
- Addiction, procrastination, impulse buying

**Consumer Policy Implication:**

- Incentives to overcome „short-termism“ / myopia / the „tyranny of small decisions“:
- Saving clubs; consumer education on spending budgets; financial incentives & consumer campaigns to save for retirement
- Legislation to force consumers into more efficient cars (USA) or Energy Using Products (EU – EuP Directive); Japan: “Toprunner”

- **Conformity bias:**

Consumers have a tendency to behave similar to others in a respective group, even if their own assessment diverges from the one of the group.

- **Overconfidence bias:**

People (as consumers) tend to overestimate their own capabilities. Psychology research distinguishes three types of overconfidence:
• Assessment of current performance
• Assessment of performance relative to the performance of other people
• Assessment of their own knowledge (precision / accuracy, timeliness, etc.)

Instead of an objective assessment of all available information, consumers tend to believe that the possibility of becoming a victim of negative events is less likely than the possibility of becoming a beneficiary of positive events. Thus, people overestimate their own abilities and their own luck.

• **Altruism and sense of fairness**

People have a sense for “fair deals”. In sustainable consumption: “Low cost”, but also “high justice” is needed to change behaviours. Chance for “sustainable products” – call on people’s sense of fairness, willingness to pay will rise.

• **Overestimation of salient events / risk aversion for small risks**:

Some risks are significantly overestimated, even if objectively the occurrence of the feared incident is highly unlikely. Consumers overact to highly salient, rare events; at the same time, they are surprisingly risk adverse for small gambles that pose the chance of a loss.

### 2.2 Real world consumer behaviour: literature review

#### 2.2.1 Designing policy to influence consumers: Consumer behaviour relating to the purchasing of environmentally preferable goods (Policy Studies Institute, 2009)

This study argues that contrary to the belief of many economists, consumers very rarely weigh-up the full costs and benefits of their purchasing decisions. Instead, they are strongly influenced by emotional factors, the behaviour of other people, by habits, and by the use of mental short-cuts, which all help to speed up decision-making. Rather than being consistent, consumer preferences have also been shown to be inconsistent, changing over time and according to the situation and the way in which information is presented (Policy Studies Institute, 2009).

**Key findings: what do we know about consumer behaviour?**

**Consumers rarely weigh up all the costs and benefits of choices.** Instead, purchasing decisions may be made automatically, habitually, or be heavily influenced by an individual’s emotions or the behaviour of others. This also means that consumers tend not to use all of the information available to them when shopping. Instead, people are more likely to read information when they perceive a benefit from doing so.

**Consumers use mental short-cuts to help speed up decision-making.** These short-cuts can distort consumers’ decisions. Short-cuts can include relying on labels or brand names that are recognised, and being influenced by the way in which information is presented and the context in which a decision is made.
Consumers respond more to losses than gains. This means people are more reluctant to give something up or suffer loss than they are motivated by benefits of equal value. Thus, the way in which consumers interpret information is affected by the way in which the information is framed.

Consumers value products much more once they own them. In addition, the value placed on a product is inconsistent. It can vary over time, and can be affected by the previous cost of the product and the emotional attachment someone places on a product. This makes people reluctant to trade in old products, even when it would be cost-effective to replace them.

Consumers place a greater value on the immediate future and heavily discount future savings. This have impacts on the way in which consumers value the efficiency and lifetime costs of appliances.

Too much choice can be overwhelming to consumers, making decision-making difficult. As choice increases, consumers may consider fewer choices, process less overall information and evaluate information differently.

Consumers are heavily influenced by other people. This might take the form of an indirect influence, for example from seeing neighbours or friends buying a product, or a more direct, explicit influence, for example when a salesperson persuades someone to buy a certain product.

Consumers use products to make a statement about themselves. Products meet far more than just a functional need; they make a statement about a person’s identity and about the type of person they are and would like to be.

In the light of these findings, the McGeevor Study identified a number of opportunities and implications for the design of more effective product policy. Some of these have direct implications for the development of our APP, and thus are further discussed.

Reconsider the impact of price. The impact that price has on consumer behaviour can be influenced by in-store marketing, such as special offers, by the prices of similar products and by consumer perceptions of changes in price.

Help consumers consider long-term costs. Consumers have a tendency to overvalue the short-term and undervalue the future so tend not to consider the long-term running costs associated with products. It is important that the long-term costs of products, rather than just the purchasing price, are highlighted to consumers.

Recognise the importance of recognition. Consumer choice is often driven by recognition of products, brands or labels. Labels need to be consistent and easily recognisable, something which the current colour-coding system used within the European energy label will aid.

Reconsider information provision. The way in which messages are framed plays an enormous part in the way in which consumers interpret that information.
**Make it easier to make choices.** This may mean making it easier for consumers to research their purchases, for example by improving Internet-based price comparison sites.

**Ensure that standard models are environmentally-preferable.** If a consumer feels overwhelmed by choice or perhaps is just in a rush when shopping, they are often likely to accept the standard product model, or ‘default’.  
**Remember that all consumers are different.** Gender and income levels impact on product choice, as do attitudes, values and beliefs. While some people may carry out extensive information searches before shopping, others may be content to decide in-store or to listen to the advice of a sales person.

(Policy Studies Institute, 2009: 4-7)

### 2.2.2 IEE Project Promotion3E

The project Promotion3E aimed to assess which appliance characteristics and other aspects are considered when customers purchase appliances choice in Europe, the differences between consumer profiles in these and the determinants of energy efficiency class consideration. Promotion3E “The Promotion of Energy-Efficient Appliances in Europe” was an Intelligent Energy for Europe (IEE) funded project.

**Influencing characteristics relevance for choice**

According to the findings of the Promotion3e project, when considering characteristics for choice, it can be seen below (Figure 2.1) that cost and quality were at the top, while energy consumption came in fourth place.

![Figure 2.1: Most frequently considered appliances characteristics (Gaspar & Antunes, 2011)](image_url)
Influencing factors for purchase and use of products

Considering each type of appliance separately, cost is seen as the most relevant when choosing large (42%) and small appliances (49%), while quality (44%) is the most valued characteristic when choosing technology appliances (Promotion3e).

Generally, results show that the creation of consumer profiles is relevant. Accordingly, to be successful, interventions aimed at persuading customers to initiate new behaviours/choices and change existing ones, should be adapted to the specificities of each consumer group characteristics (e.g. couples vs. men or women buying alone). Consequently, sales staff training could be used to increase employee competence in adapting different types of persuasive messages to different types of consumer groups and their characteristics. It was shown that cost and quality were the most important characteristics considered for choice but at the same time were not correlated or only weakly correlated, with energy consumption and energy efficiency class. This indicates that interventions should be made in order to strengthen the association between these energy use characteristics and economic and quality aspects. It was concluded, that one of the ways to achieve this would be through sales staff training (Gaspar & Antunes, 2011; Promotion3e, 2011).

Labels

The content and format of the information included in labels is the subject of on-going discussions between policy makers and stakeholders. The result of the project suggests that label content might be more affective if it includes information associated with characteristics such as energy consumption, water consumption, customer support and warranty for example. This could increase the probability of considering energy efficiency class in choice and, consequently, increase the frequency of energy efficient purchases (Gaspar & Antunes, 2011; Promotion3e, 2011).

2.2.3 Transpose - TRANSfer von POlitikinstrumenten zur StromEinsparung

The project TRANSPOSE examined the potential savings for electricity in private households. Starting point for the interdisciplinary research project was the question why energy saving measures are not properly utilized in private households. A number of working papers were published, and below you find a summary of the main relevant findings.

1. Hamenstädt, U. (2009), Electricity saving through price ajustments? An Experiment (Stromsparen über den Preis? Ein Experiment )

Electricity consumption has increased continuously in German households over the past years. Are more efficient household appliances too expensive or is electricity too cheap, thus providing no incentive to save? Hamenstädt presents an experiment seeking to answer this question. Findings seem to suggest that an increase in the price of electricity would have little success in motivating buyers to realize their saving potential. On the other hand, results show political instruments to be in a very promising position when getting involved in the process of buying electricity saving household appliances. Consumers were much more prepared to invest in an electricity saving refrigerator than in an electricity saving television. In addition to defining the price sensitivity of consumers in relation to electricity and energy saving household appliances, this experiment also developed a model on the impact of price increases on the electricity market. Hereby one can deduct factors
related to the impact and workings of political instruments. This is central to the promoting of sustainable consumption, if one is to use political instruments to support a more efficient approach to electricity consumption in private households.


This paper, first, examines the complexity of household behaviour along with the challenges and limits of modelling this behaviour. Second, the empirical findings are presented and discussed against this background.


This study comprehensively analyses psycho-social as well as socio-demographic factors influencing five selected behavioural patterns of electricity consumption. By means of a German wide telephone survey (N=1000) the reasons behind buying energy efficient cold appliances and televisions, regularly switching off power strips and other stand-by appliances, and other everyday-life activities (turning off the lights, cooking with lids, using electric savings programs etc.) were disclosed. Also, households using electric heaters were questioned on their willingness to exchange their electric appliance with a heating alternate (N=126). These questionnaires were carried out on the basis of an integrated behavioural model (OSA model).

The results show that every behavioural pattern is caused, in detail, by different influence factors, which must be accordingly considered when drawing up interventions for reducing consumption. For a general electricity saving behaviour, which 65% of the participants claim to have, the influencing factors of the OSA-model are particularly significant. These are: the self-concept concerning parsimony, ecology and orientations towards possession as well as the morally normative aspects (personal norm). Also, the impression that electricity saving is too expensive and complicated through this behaviour plays an important role, just as the social environment with its reinforcing function. The use of power strips, which 74% of the participants say to use, is mainly held back by various habits as well as the use of power strips being seen as disturbing and inconvenient. Merely the confidence of being able to handle these difficulties individually (self-efficacy) has a positive impact on this general behaviour and impression.

For cold appliances, an electricity consumption rate of under 400 kWh/a may be assumed. From the ecological point of view, this is a very desirable rate. At the moment however, this consumption rate only applies to approximately 30% of the respondents' households. The actual electricity consumption of refrigerators is not influenced by climate-based or further reaching cost-benefit calculations. Rather, it is affected by the excess demand caused by the lack of space in the existing appliances and by other socio-demographic factors: Tenants use less electricity for refrigerators in comparison to house owners. Only a minority of 14%
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has the concrete intention to purchase an energy efficient refrigerator. This intention is influenced by the self-image of being innovative, the concept that the electricity consumption of cold appliances is controllable (control of behaviour), as well as a currently high electricity consumption of cold appliances. For the next purchase, however, the vast majority (94%) plans to invest in an energy efficient appliance. This intent is fuelled by the belief to support climate protection with the purchase as well as the positive attitude of the remaining household members. House owners are less ready of considering the energy properties of the future cold appliances.

When turning to televisions, the main challenge in saving electricity will be the choice of the most energy efficient appliance when replacing the old set. A soon replacement as with the cooling appliances is not necessary, since the majority of the respondents still uses relatively small CRT tube televisions and new LCD televisions only reduce consumption noticeably, if the screen is not larger that of the previous appliance. The actual electricity consumption of televisions increases with higher income and a possession-oriented self-image (higher amount of appliances). Only a minority of 8% intends to purchase a new television in the very near future. The intention of considering the electricity consumption when purchasing the next television (82%) is influenced by the self-image of being ecological, feeling a moral obligation to save electricity (personal norm) and some particular beliefs. Barriers for this intention are the perception that energy efficient appliances are not available on the market and a higher income.

For electric heaters, only a small minority of the respondents (6%) actually intends a replacement in the near future. This decision is influenced by the view that the replacement would not pay off and that it is the next generation’s responsibility to take care of this matter. Also, the age and the feeling of a moral obligation for saving electricity have an effect. A direct comparison of the people with the replacement intention to people without this intention shows that those intending to replace the electric heater (smaller group) are younger and have a higher income. Further, they see heating by means of alternative energy sources as cheaper, in the long run, and feel guiltier towards environmental problems than the other group of respondents. Furthermore, a number of hampering attitudes are not as dominant, such as feeling not able to afford the replacement, the investment would not pay off or that the next generation will have to handle these matters.

The aggregate electricity consumption of a household is considerably determined by the time the household members spend at home. It is higher in one-family houses and lower in multi-family houses. Further, a strong moral obligation for saving electricity and the impression of being able to control the consumption are of some importance.

2.3 Lessons learned from behavioural science and psychology

- The "how-when-where" information is as important as the "what" (framing, defaults, information overload). Transparency and comparability are crucial. (Example: New York has determined that the font size of calories on restaurant menus has to be the same size as the price).
Consumers are often undisciplined, emotional, and make mistakes. One should not start from the premises of the "rational" consumer, but from empiricism.

There are "naive" and "sophisticated" consumers (not always the same). This is very different, depending on the consumer sector, and it is important for the target group-specific communication. They can be trusting, vulnerable, responsible consumers—all depending on the situation and consumer sector (we can be all of the above).

Activation of supportive social norms is key to success of interventions. People want to be accepted. Policies against social norms go wrong.

Citizens want to be asked (civic participation). Self-imposed risks are seen less critical than imposed ones. Ownership of a solution determines the will to implement it immensely.

Attractive visions help to soften the present tendencies (How would an extremely fascinating Energy future look like?)

Feedback: Feedback on one’s behaviour, a robust result of the energy consumer behavioural research.
3 References


Promotion3e: [http://www.promotion3e.ips.pt/promotion3e/](http://www.promotion3e.ips.pt/promotion3e/) (accessed 03.09.2013)

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