ENERGY RESEARCH
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COOPERATION

WP 4: Stakeholder interviews
National report the Netherlands
TNO/RuG

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Content

1. Introduction

In total we have carried out twelve interviews with Dutch stakeholders; three of them were conducted by RuG and nine of them by TNO.

Most of the interviews were carried out in the area of Domestic Energy Use, within this domain we concentrated on five topics:

- Installation of photovoltaic panels (1 interviews)
- Energy efficient Refurbishment (1 interviews)
- Construction of low Energy Houses (2 interviews)
- Energy efficient Heating Behavior (1 interview)
- Buying green Power (1 interview)

In the area of Household Appliances we focused on one topic:

- Purchase of Energy efficient Appliances (3 interviews)

In the area of Mobility we focused on three topics:

- Public Transport use, Park and Ride facilities (1 interview)
- Short Distance Mobility (1 interview)
- Hybrids (1 interview)

We are satisfied with the balanced sharing of the interviews over the several topics, regarding the area of Domestic Energy Use as our focus. However, it took us a lot of time and patience to organize the appointments since some organizations apply strict procedures for giving interviews, which was time consuming. Beside that, we as well faced some regular problems, like identifying relevant stakeholders and interviewees on an appropriate level, trying to contacted them and find time for an interview.

All twelve interviews were carried out in a face-to-face setting, in most of the interviews TNO or RuG used to be presented by one researcher and in all cases we only interviewed one person at a time. However, some interviewees were able to answer questions on two topics like for example ‘Energy efficient Heating Behavior’ and ‘Purchase of Energy efficient Appliances’, we count this as two interviews. The interviews were all digitally taped. None of the interviews were fully transcribed, but for all interviews we made short summaries.

The interviews structured by the provided templates worked quite well to our opinion, with exception to one stakeholder group, which was banking. We as a project group had decided that it was relevant to include a bank as an interview stakeholder, but later on we found out that it was hard to match a right template to conduct the interview.

The interviews have provides us with a large amount of information of The Netherlands on nine of the in total twelve BARENERGY topics.

2. Area of Domestic Energy Use

2.1. Installation of photovoltaic panels (Purchase)

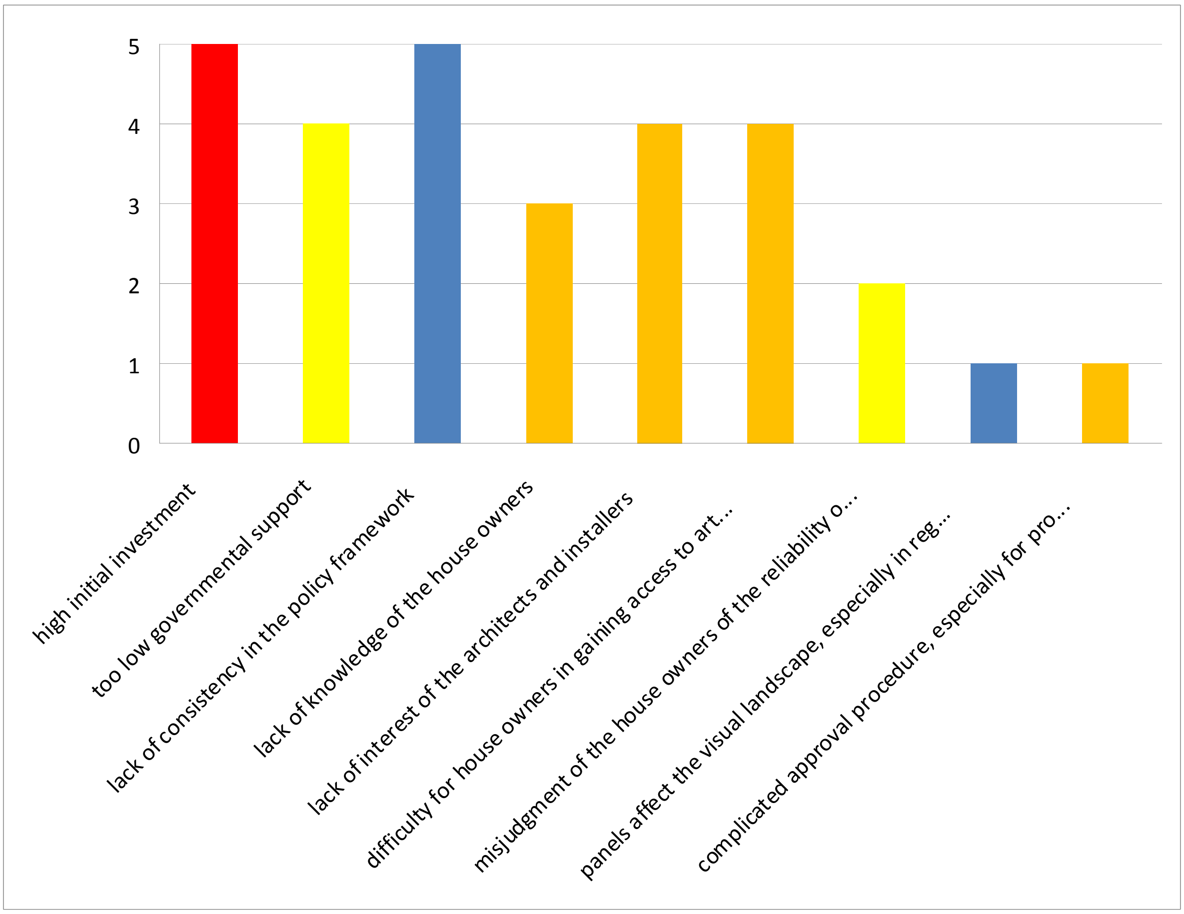
Introduction

We have interviewed one stakeholder in this field: a Director Business Development & Export at a European enterprise with the highest sales and is also a leading international supplier in the field of solar system integration. The group pursues a global growth strategy: it produces, installs and plans solar systems and wind power stations for its customers in more than 20 countries.

2.1.1. Barriers

i. Graphical ranking of barriers

The stakeholder was presented with a list of 9 barriers related to change of behavior and was asked to rate them on a scale from 5 (very important) to 1 (non-important).



ii. Overview of each barrier:

One of the main important barrier is identified as a **Policy barrier**, ‘Lack of consistency in the policy framework’. This is considered as a very important barrier, because as a result of the unreliability of the governmental subsidies; the demand for photovoltaic panels will not develop in a consistent way. For example: The Renewable Energy Production Incentive (SDE) in 2008 was attracted more applications than there was budget. One can conclude that this was a success, but to illustrate the lack in the consistency of the policy framework; ‘In 2009 it will be *very likely* that a new funding round for solar panels will be arranged’…but ‘very likely’ is a weak promise to built on.

Another very important barrier in the current Dutch situation is the high initial investment, a so-called **Economic Barrier.** For example: the people who received funding of the Renewable Energy Production Incentive (SDE) in 2008, will only receive funding for the electricity produced by their photovoltaic panels, but not on the initial purchase and installation costs. If installing photovoltaic panels would be more profitable in the Netherlands, the demand will increase.

There is also a group of barriers valued with 4: important barriers. In this group **Cultural-normative or social barriers** play an important role, ‘Lack of interest of the architects and installer’ and ‘Difficulty for homeowners to gain access to artisans and solar companies’. Beside these cultural-normative or social barriers there is also another **Policy barrier,** ‘insufficient governmental support’ which is linked to previous named barriers on the inconsistency of the policy framework.

Supplementary to the barriers above, the stakeholder came up with three extra barriers:

- **Lack in demand (Political barrier):** Because of the changes governmental subsidies the demand for solar panels fluctuates.
- **Underdeveloped supply (physical and structural barriers):** because of the lack in demand, the supply side does not develop, and even discourages installation of solar panels as it is considered to much of a hassle. When an installer trains its employees and the subsidy is cancelled the market collapses
- **Low interest product (individual-psychological barriers):** solar energy is not something people see as an added value.

a. stakeholders

From the point of view of the stakeholder, government, installers, energy grid companies and the European government play an important role.

2.1.2. Past attempts to overcome the Barriers

Subsidy on purchase of solar boilers The government announced that it would stimulate the purchase of solar boilers ánd that it would setup a subsidy. After this announcement it took the government 1,5 years to set up the subsidy, during which no solar boilers were sold. People postponed their investment until they could profit from the subsidy. This is a classic example of how governmental stimulation can hinder the development of a market.

Energy Performance Coefficient (EPC) This was received very positively. It was introduced in 1996 when the maximum EPC for new buildings could be 1,4. At the same time it was announced that it would be decreased to 1,2 by 1998 and to 1,0 by 2000. Thereby, the long-term vision of the government was made clear and commercial organisations could plan to meet these standarts. This resulted in more energy-efficient buildings to be build before the rate was officially set. However, after 2000 the rate was kept level for 7 years. During this years developers kept innovative ideas on the shelf, waiting until the necxt adjustment. This came in 2007, yet no further reductions have been planned. This rule only applies for construction.

Subsidy on installation of pv-solar pannels Subsidies on the installation of solar panels has been given a number of times. The problem with these subsidies are caped to a maximum total amount of MW. In all occaisions this amount was reached very soon, after which the subsidy closed and the demand collapsed until the next subsidy. Therefore, these subsidies make the market very unrelaible for installers to invest in.
A positive effect of this subsidy is that consumers tend not to calculate if, with a governmentel subsidy the investment is profitable. Their motive becomes that they receive a subsidy, and not that they will be profitable.

2.1.3. Possibilities for future actions

Future attempts should be long-term, and the government should clearly communicate their intentions.

The European Commission is discussing a new rule, which states that for major renovations, energy efficient measures should be taken. This could be a very effective rule, which helps to profit form the window of opportunity offered by these renovations.

There should be an open end feed-in regulation, which is financed through the energy price. This way the energy-grid provider should be responsible for the transactions. Thereby, it is no longer a issue for the government budget, which makes it easier to achieve a long-term commitment.

Solar boilers are already profitable when applied in projects.

Between 2015 and 2020 it is expected that the price of energy supplied through solar panels will break even with the price of energy from fossil fuels. Only after that time, PV solar panels will become a serious alternative.

2.2 Buying Green Power (Purchase)

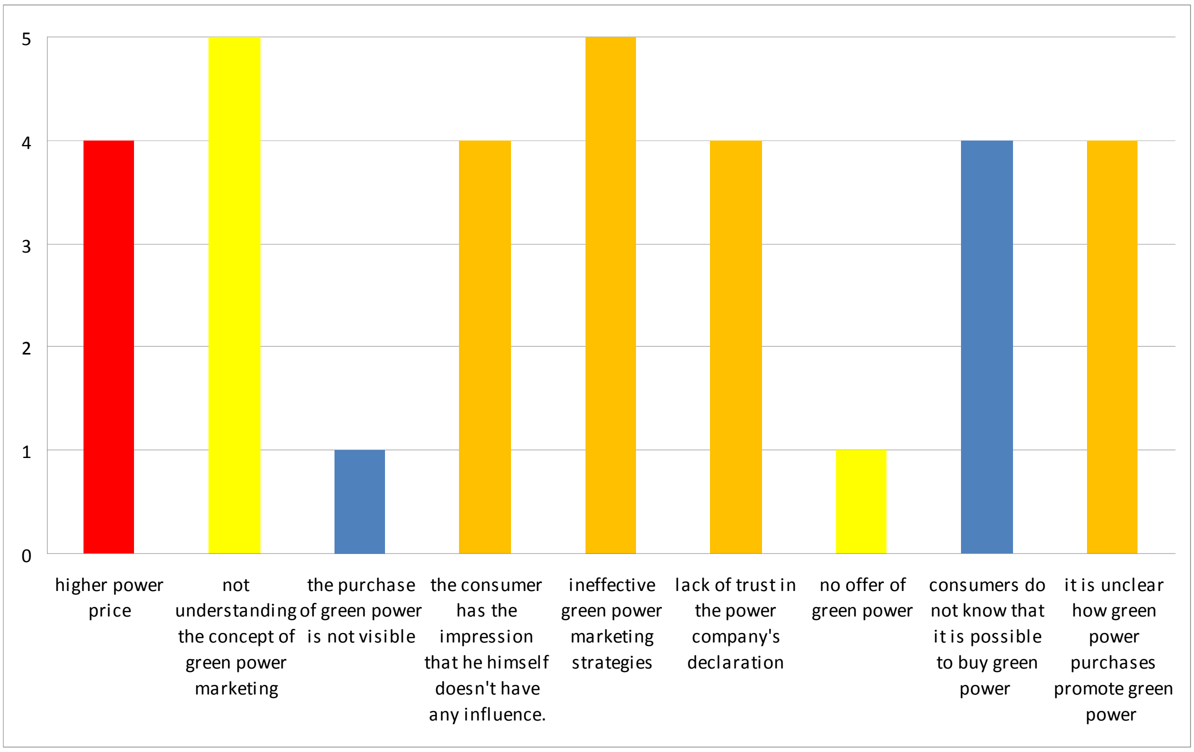
Introduction

We have interviewed one stakeholder in this field: a senior researcher Policy Studies of a large research centre in the Netherlands in the field of energy, which employs at this moment about 900 people. The research centre carries out research in the field of energy. With this work the researchers move between fundamental research at universities and appliance of knowledge and technologies in practice. This work has a huge impact on daily life. For example, solar systems are placed on roofs of houses and modern wind mills are spinning in the field by means of technology developed by this organization.

2.1.1 Barriers

i. Graphical ranking of barriers

The stakeholder was presented with a list of 9 barriers related to change of behavior and was asked to rate them on a scale from 5 (very important) to 1 (non-important).



ii. Overview of each barrier:

The main barriers identified were 'not understanding the concept of green power management' **(knowledge based barrier)** and 'ineffective green power marketing strategies', both received value 5. This last barrier is such important, because making a mistake in the marketing strategy could lead to discourage potential users or harm the image of the product for a rather long time.

Secondly there is a group of barriers valued with 4: important barriers. In this group **individual-psychological barriers** play an important role as, 'impression that single consumer behavior can not have any influence' and 'lack of trust in power companies' declaration'. The so-called 'neighbor effect' is important in the stimulation of green energy: ‘if all my neighbors are changing to green energy, than it would be probably that best choice for me as well’. Besides individual barriers, also **economic barriers** and **knowledge-based barriers** play a role of importance. The higher price of green energy is for most households (90%) an economic barrier.

According to the stakeholder, based on their own research on consumer behavior, there are three types of barriers to change behavior:

1) Internal barriers
Such as psychology, motivation, attitude, socio-economic status, lack of knowledge, lack of information etc. Internal barriers are particularly affected by the so-called routine behavior, that 95% is part of our daily behavior. This behavior is more or less unconscious and therefore difficult to influence and steer. However, the choice for green electricity is not a routine behavior and therefore easier to influence.

2) External barriers
Such as lack of an infrastructure where you can make use of, lack of green electricity supply, lack of service providers, lack of incentives etc.

3) Landscape barriers
These are developments at a higher scale and influences (strengthen or weaken) the two groups mentioned ahead. Examples of landscape barriers include National or European policies, but also so-called ‘Al Gore’ or ‘Obama’ effects or the impact of the financial crisis.

Most of the barriers the stakeholder spontaneous answered were **knowledge-based barriers**. Secondly the stakeholder came up with Individual-psychological and Cultural-normative barriers:

- **Lack of knowledge (knowledge based barrier):** Consumers face a lack of knowledge concerning what green energy is and its difference to fossil energy.
- **Definition green energy (knowledge based barrier):** It is not clear what the required specifications for green energy are.
- **Unclear country of origin (knowledge based barrier):** It is not clear where the green energy is produced.
- **Lack of trust in suppliers (Individual-psychological barriers):** Suppliers are market parties with their own interests, and therefore often not perceived as objective and consequently their often is a lack of trust of consumers in respect to the suppliers.
- **Feeling of ownership lacks (Individual-psychological barriers):** The first 10% might be willing to change because of the benefit to the environment; the remaining 90% have difficulty in feeling able to overcome the global challenges by means of their individual behavioral changes.
- **Insufficient production within the Netherlands (cultural-normative, social barriers):** Because only a small amount of green energy is produced in the Netherlands people are not motivated by this fact, since they cannot “see” a visual shift to green energy. Furthermore, contributing to local production and consequently national security of supply and energy independence is much more stimulating as driver than contributing to energy production elsewhere.
- **Households are no single entity (cultural-normative, social barrier):** Households have multiple identities. They for example act both as consumer, but also as producer (in the case of green energy). Houwehold consists of multiple entitities (different genders, different ages, social class, education level etc.), and in addition, many households are in different moments of the ‘lifecycle’ (yuppies, dinkies, young families, elderly etc.). Therefore, there is no single unit that can be defines as a “household” and targeting households with tailored messages and forms is a major job.

- **Lack of role model Government (Political barrier):** Government should act as role model. At present this is not yet the case; governmental buildings were recently found to be most energy inefficient when measured.
- **Difficult to see the benefits of green energy for end-users (Economic barriers):** There is hardly a financial advantage to green power. Other advantages that so apply to i.e energy efficiency (environmental friendliness, comfort, savings) are much less applicable to green power.

b. stakeholders

From the point of view of the stakeholder, **Intermediary parties** play an important role because of their position as translators between the producing and consuming context, and their often (at least perceived) less subjective identity, would be well positioned to inform consumers about green energy and demand clear definitions and specifications from producers. **Producers** are as well important since they should provide transparent information about the origin of green energy.
Policy makers are an important party because they should provide the boundaries within which producers can act and become competitive. **NGO's in the field of climate change** has been shown that a coalition of different NGO's and commercial companies is a strong ambassador for behavioral change because they are seen as parties with different interests that than have been able to come to an agreement on what information is correct. And last but not least the **consumers**, since they should be willing to prefer green energy above regular energy and therefore change their consuming behavior.

2.1.2 Attempts to overcome the Barriers

i. Attempts to overcome the Barriers

Even though the stakeholder indicates she has no in-depth knowledge on past policy, she came up with attempts to overcome barriers she has heard of:

Program Clean and lean: Consumers receive a refund of several percentages on renewable energy production technologies and energy efficiency technologies.

Mostly Dutch policy has a lacks in continuity and is too complicated.

Marketing campaigns: Dutch energy providers have initiated marketing campaigns around green energy.

Guaranteed price: Dutch energy providers have given consumers of green energy the guarantee that the price for green energy would never be more than that of traditional energy (some still do). This has been very successful, but has also been the cause of a major breach of trust: more people joined than there was green energy available. At least that is the urban legend going around, the rumor than became that to be able to meet the demand the 'quality' of green energy offered reduced (using also nuclear) and became in transparent. This was resulting in a breach of trust.

2.1.3 Possibilities for future actions

Policies should never focus on one mechanism (e.g. financial).

Calculate external costs: The external cost of traditional energy (like additional health care, climate measures, etc.) should be calculated and added to the tariff.

Increase transparency: It should be clear for the consumer where, how and by whom green energy is produced.

More than just moral value: the switch to green energy should be beneficial in more than just environmental aspects.

Barriers to traditional energy: not switching to green energy should be made as difficult as possible. For instance by raising taxes, of prohibiting forms of energy production.

Labeling: Energy labels could be introduced for different types of electricity.

Better marketing: Marketing efforts could be more adjusted to individuals instead of treating customers as one group.

Education: Children have a big influence on the buying behavior of adults. Therefore, children can be educated in a more general program on energy efficient behavior. Indirectly this can enhance the transfer to green power.

Indicate quantity: The number of green energy users should be communicated. As well as a stimulation of the neighbor effect → recommendations made by neighbors, family and friends.

2.2 Construction of low Energy Houses

Introduction

We have interviewed two stakeholders in this field:

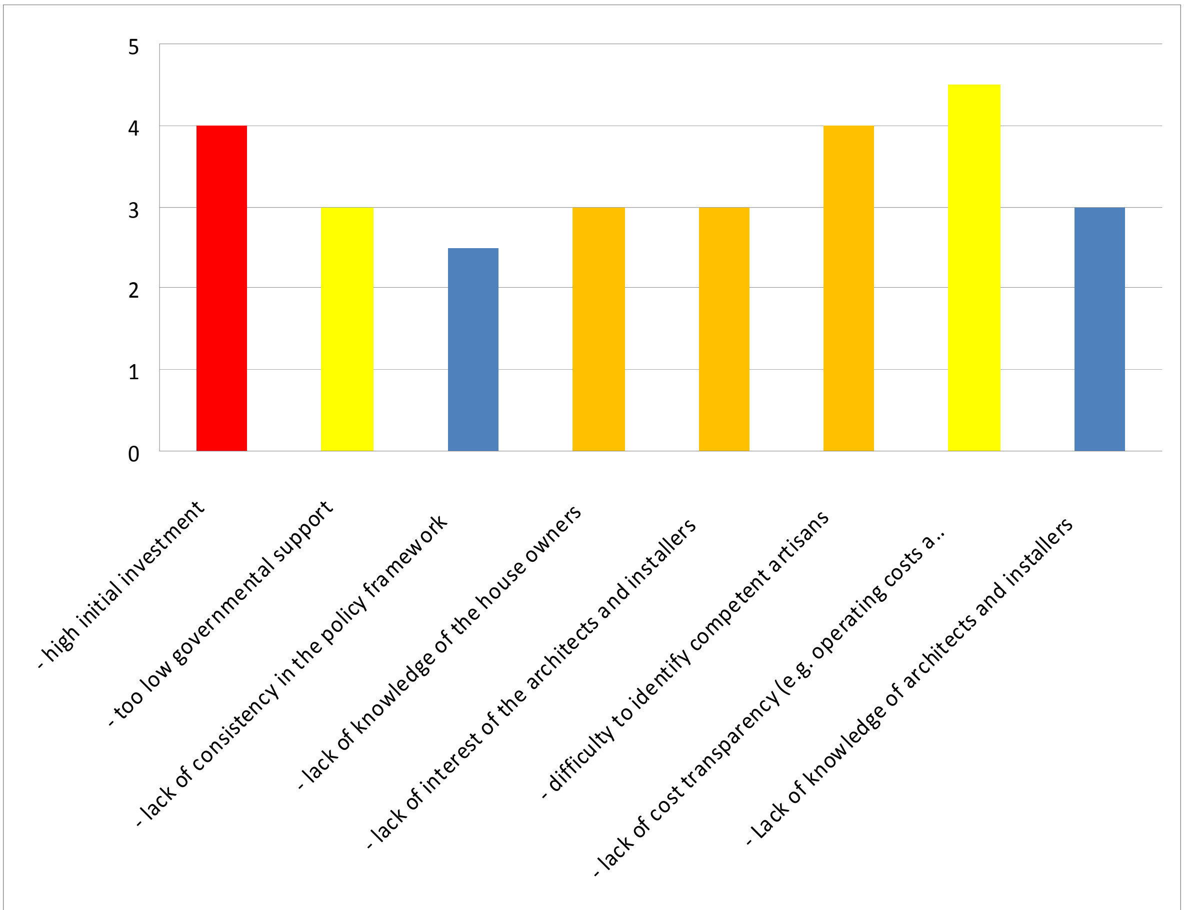
- A project developer, employed at a **project development company**, focusing solely on low-energy housing. This company is continuously searching for solutions and ways to build homes more energy efficient or even energy-neutral (no energy use) and to produce without the detriment of the affordability of the dwelling or comfort.

- A double interview is carried out with an Account manager Sustainable Financial Advice and a Consultant Project development of a Dutch **bank** with a mission to be a bank which has a societal responsibility. After 1995 it has focused more on sustainability, and since 2004 it also includes retail activities with investments, mortgages and payment / savings- accounts. In their relation with commercial customers they provide credit and partnership by providing excellent knowledge of the sector and risks.

2.2.1 Barriers

i. Graphical ranking of barriers

In both interviews the stakeholders were presented with a list of 9 barriers related to change of behavior and were asked to rate them on a scale from 5 (very important) to 1 (non-important). The graphical ranking below shows the integrated result of both interviews.



ii. Overview of each barrier

The main barrier was identified as an **Knowledge barrier**, 'Lack of cost transparency'**.** If the initial price is too high, many people fail to even consider whether or not they will be able to earn their money back while the people, who do consider this, usually choose to invest the extra initial cost in an upgraded kitchen or bathroom instead of energy-saving measures.

Secondly there is a group of barriers valued with 4: important barriers. High initial investment, **Economical barrier** as well, is an important barrier in the construction of low-energy houses. The initial price of a low-energy house is higher due to higher building costs (due to installation of relatively expensive energy-saving measures and more expensive materials). Most buyers are interested in low-energy housing – most buyers want to live in an environmentally friendly house – but as soon as they see that it is more expensive, they turn to 'standard' houses. Purchasers are interested, but once they hear that it costs €10.000 more, they rather buy a standard house with a more luxurious kitchen or bathroom, even if, in the long run, this will cost them money. Another important barrier is 'Difficulty to identify competent artisans', **knowledge based barrier.** Many contractors still make mistakes in the installation of energy-saving measures – or omit them completely. Reliable, competent contractors; are necessary otherwise specified aims and targets may not be reached. Many developers who claim to reach certain targets do not actually reach them, often as a result of building errors.

Other less urgent barriers are:
Lack of knowledge of house-owners/prospective buyers. People are often unaware of the possibilities that exist to make houses more energy-efficient. Awareness is improving, thanks to increased media attention, growing number of subsidies, and rising energy prices that make people aware of the potential for saving money by saving energy.
Lack of interest of architects and installers. Many architects and installers still design and build sub-optimal houses. Some installers are not interested in energy-efficient technology, as it requires them to change their systems.

Lack of knowledge of architects and installers. Some architects are still drawing houses in which there is absolutely no room for energy-efficiency improvements – this can be either due to lack of demand from consumers (if consumers do not want low-energy houses, architects do not draw them) or because of a lack of knowledge. He thinks that most architects who do not consider energy efficiency fail to do so because of lack of demand, but this lack of demand also means the architects do not specialize in it – which means they lack specific knowledge to help consumers who are interested in low-energy houses.

A prominent detail is that 'lack of consistency in the policy framework' is not seen as a major issue in this case. According to one of the stakeholders: 'the government supports the construction of low-energy housing through subsidies, norms, and information and this support is getting stronger every year'.

b. stakeholders

Municipalities: Should control proper use of subsidies and inform people of possibilities for energy-saving measures. Municipalities are more suitable than other authorities because they have direct contact with buyers of new houses and people requesting building permits.
Governments: Should make energy-efficiency norms stricter.

2.2.2 Attempts to overcome the Barriers

- **Government subsidies**: Dutch national government used to subsidize all kinds of energy-saving measures – solar panels, solar-boilers, insulation material, etc.. These subsidies were widely abused by consumers and producers, but they did lead to a rapid increase in sales of energy-saving measures. Subsidies have been cut back now, but the ones that are still in place work well.
- **Municipalities provide information** to people building new houses regarding energy-efficiency options – this information is important, and should be extended further.
- **Norms with regard to minimum energy-efficiency** of each newly-build house are becoming increasingly strict, and will become stricter over the next few years. These norms work, but should become stricter to really make a difference.
- **Energy label Green policy development** (Dutch: groen regeling nieuwbouw): Consumers can invest in a green fund, and they get a tax reduction on the first € 54.226. From this fund, green projects could lend against favorable conditions.
- **Climate mortgage**: consumers receive a reduction on their interest when they take energy efficient measures.
- **Initiative project developers:** A number of project developers offer housing which are in line with the Dutch policy, but include several options for energy efficient measures. When consumers opt for one of these options, they get a reduction of 50% of the cost.
- **The National Mortgage Guarantee fund** (Dutch: Nationale Hypotheek Garantie) gives people the opportunity to lend additional money for sustainable investments in their homes up to € 25.000. Normally for a mortgage banks look at the liquidation value of the building. But for this investment the return on investment on the energy costs is taken into account. Therefore, not your income, but your expenditure is most important.

2.2.3 Possibilities for future actions

- Control on use of subsidies is important: Municipalities are becoming stricter in controlling whether energy-efficiency goals are met by developers and constructors, but these controls should become more widespread – a tightly controlled system increases consumer confidence that energy-efficient houses really are energy-efficient.
- Stricter norms: Minimum norms for energy-efficiency of new houses should become stricter
- More information should be provided to both people who purchase a new house and people who are looking to make energy-saving adaptations to their current house. Many mistakes are made in the choice of energy-efficiency measures people install in their own homes – clearer information should help people to maximize energy-efficiency gains. This information could for example be provided by municipalities when people request a building permit.
- Best way to stimulate the construction of low-energy housing is to make it more profitable. If the difference between energy bills in low-energy houses and ‘regular’ houses increases, people will become more aware of the advantages of energy-efficient housing. Such a low bill can work as a trigger to convince people to purchase a low-energy house; non-financial incentives cannot provide the same trigger.

2.3 Energy efficient Refurbishment

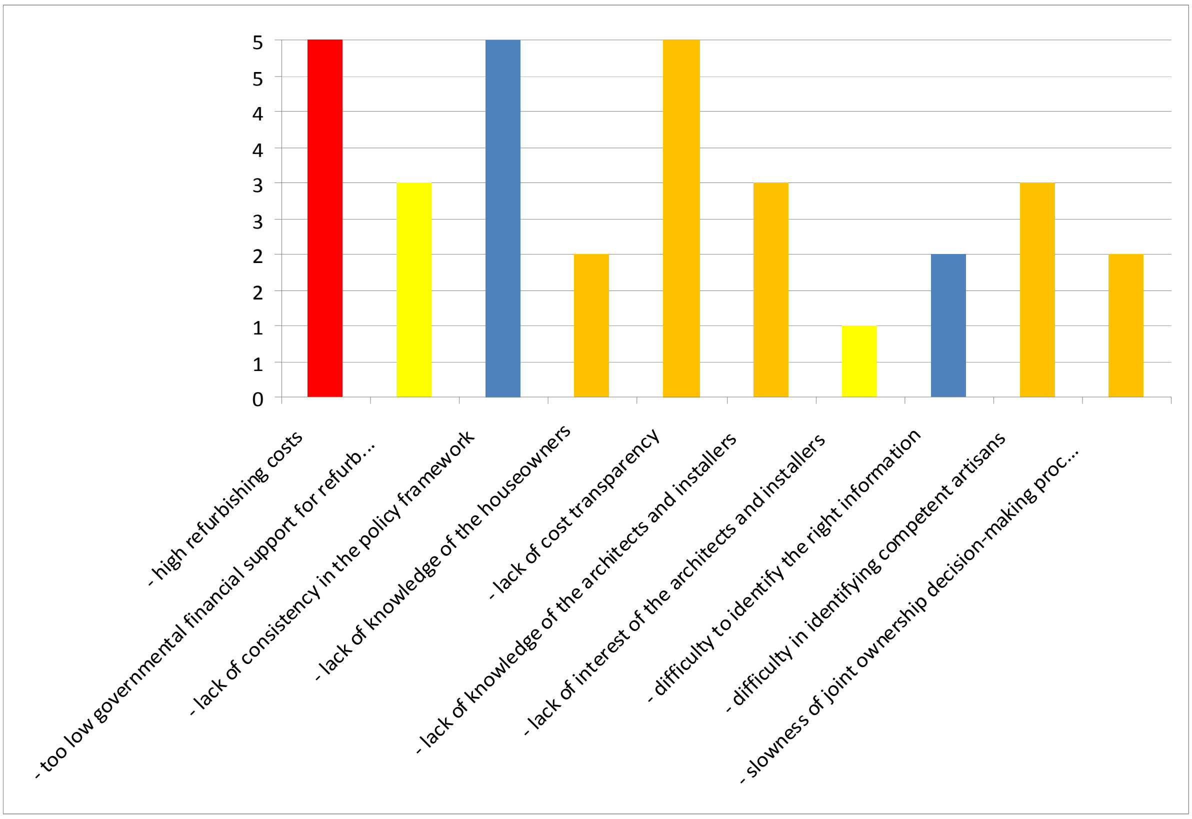
We carried out one dedicated interview on ‘energy efficient refurbishment’ with one stakeholder in this field: a senior adviser of a Dutch organization, with the aim and purpose to take any kind of action which is necessary to guarantee the availability of low-priced good quality houses for tenants, safe neighborhoods that provide a positive social environment and to encourage strong local organizations of tenants.

Besides this interview we also received some input on this topic during the interview on ‘energy efficient heating behavior’.

2.3.1 Barriers

i. Graphical ranking of barriers

The stakeholder was presented with a list of 10 barriers related to change of behavior and was asked to rate them on a scale from 5 (very important) to 1 (non-important).



ii. Overview of each barrier:

There are three main barriers identified; an **Economic barrier**, a **Policy barrier** and a **Knowledge based-barrier**.

The investment needed to improve the energy efficiency for heating of a building is a large barrier. One of the reasons for this is the long-term payback time of initial costs.

The lack of consistency in the policy framework; consumers find the governmental subsidy very unreliable and therefore not attractive. One year you get a subsidy for some adjustments and the next year it is discontinued.
A knowledge-based barrier is the issue of ‘Lack of cost transparency’. There is rarely put any effort last years in evaluating the refurbishment measures on the financial benefits for the tenants. Because of this lack of knowledge, it seems as if the measures only have cost lots of money and that the promised financial savings are never realized. Quite often energy prices increase that much, that after all tenants pay a higher energy invoice than before the measure.

Supplementary to the barriers above, the stakeholder came up with three extra barriers:

- **Large effort (Individual barrier):** For the improvement of the energy efficiency for heating a house a large effort is required. This includes finding a constructor to gather advice and the implementation of the adjustments.
- **Perceived risk (Individual barrier):** Some people are afraid the architectural condition of their house may be damaged, by taking the wrong measures.
- **Competition (Cultural-normative barriers):** Especially regarding the physical adjustments to housing there are bottlenecks concerning competition between advice and realization and the construction- and installation industry. From the governmental program “more with less” (Dutch: Meer met Minder) an attempt is made to dissolve this conflict of interest. This way, competitions should no longer be a barrier in the ambition to renovate houses in such a way that they can be heated and vented efficiently.

b. stakeholders

From the point of view of the stakeholder, **Government** plays an important role by supplying subsidies they effectively lower the initial investment for energetic improvements to homes.
Constructers / installation companies since these should cooperate more closely making the process easier for the customer. **Advisory organizations**, these should provide residents with more information about their house. This way they better know how to efficiently heat or vent their house, of which improvements they can make to their house. **Consumer construction materials shops**, these should give better advice when selling products (producers are less important, because this type of product is not bought because of image).

2.3.2 Attempts to overcome the Barriers

Governmental campaigns: Consumers mostly are quick to notice negative publicity on ventilation systems. Governmental campaigns try to invalidate these presumptions and to provide general knowledge on ventilation.
Governmental subsidies: Governments support home-owners that take energy efficient measures. Consumers find the governmental subsidy very unreliable and therefore not attractive. One year you get a subsidy for some adjustments and the next year it is discontinued. Or, as is the case with solar cells, a discount is provided for a limited amount of cells, while as consumer you cannot tell for how long this amount will be available.

2.3.3 Possible future actions

A window of opportunity arises 5 years after a house is bought. During a move people have lots of other things to consider, therefore energy efficiency is not considered. After five years people tend to be willing to consider adjustments to improve energy efficiency.

To take advantage of this window of opportunity there should be subsidies, green financial services (mortgages) and information and advice individually tailored to the customers' situation. Also feedback on the acquired savings can support willingness to make adjustments.

Policy and policy measures should be reliable, otherwise they will miss target. Furthermore, it is found that consumers demand the government to stipulate the course of action. They expect policy which is of a more enforcing nature.

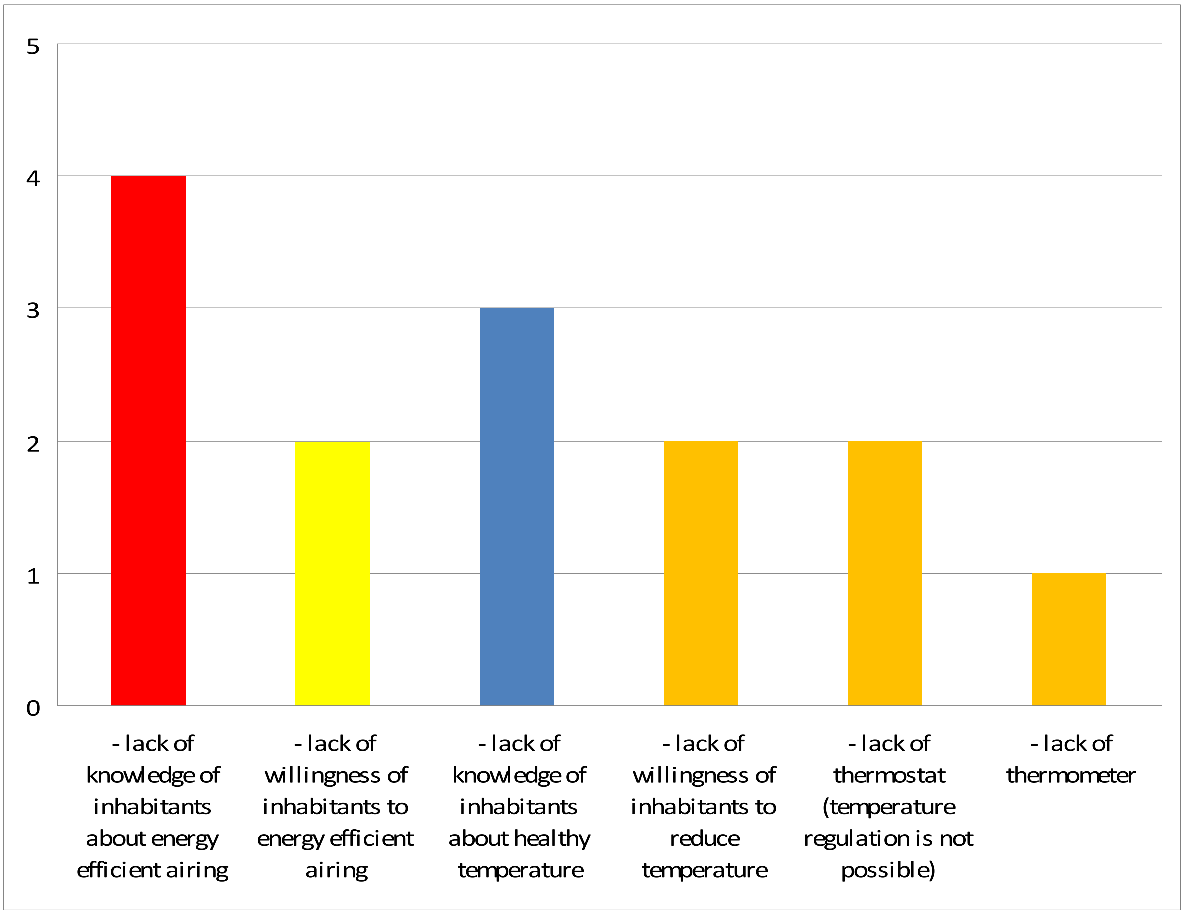
2.4 Energy efficient heating behavior

We have interviewed one stakeholder in this field: a communication advisor of an independent national organization which provides consumers with practical and reliable information in the fields of environment, energy and climate. This information is developed by the knowledge department and translated in source documents that are reviewed by an independent expert panel before it is made public by the communication department. Important actual themes include energy reduction, travel and voyages, nutrition, waste and information on climate- and environmental issues and hallmarks. This organization develops public information material like websites, advisory modules and brochures and forms strategic alliances with actors which are focused on consumers.

2.4.1 Barriers

i. Graphical ranking of barriers

The stakeholder was presented with a list of 6 barriers related to change of behavior and was asked to rate them on a scale from 5 (very important) to 1 (non-important).



ii. Overview of each barrier:

a. basic overview

The main barriers concerning this topic are **knowledge based barriers**. 'Lack of knowledge of inhabitants about energy efficient airing' is identified as a large barrier since it has been established that residents often lack knowledge of the house and how to heat and ventilate it efficiently. Consumers mostly are aware of negative publicity concerning ventilation systems, but lack general knowledge about ventilation. ‘Lack of knowledge of inhabitants about healthy temperature’ is valued as a medium barrier. The choice for a certain temperature in general, is not based upon the fact that it should be around 20 degrees. But is determined by the lifestyle of the inhabitant and the type of housing. For some houses 19C is a comfortable heat, while for others it should be 21C.

The stakeholder valued other presented barrier with a 2 or even 1.

- **Lack of willingness of inhabitants to energy efficient airing:** This is a small barrier, it is not about a lack of willingness, but it is mostly due to a lack of knowledge and therefore, the fair to make mistakes.
- **Lack of willingness of inhabitants to reduce temperature:** In general residents are willing to lower the temperature; it depends on the situation the resident is in (old, young, family, cozy night, etc.).
- **Lack of thermostat:** This is hard to generalize; overall this is not seen as a barrier for efficient heating.
- **Lack of thermometer:** This is a very small barrier; mostly a thermometer is present, most often integrated in the thermostat.

The stakeholder added one more barrier to the list:

- **Required effort (individual-psychological barrier):** An important barrier is the effort which is required to heat your home more efficiently, for instance by calibrating the thermostat.

b. stakeholders

Government by supplying subsidies they effectively lower the initial investment for energetic improvements to homes.

2.4.2 Attempts to overcome the Barriers

Information campaign: The behavior of people can only be changed through information campaigns. These are mostly directed on physical improvements on housing.

2.4.3 Possibilities for future actions

Unfortunately, we could not gather input on the matter from the interview

2.5 Summary of Area of Domestic Energy Use

Barriers on the area of domestic energy use can be divided into two categories:

1) Day-to-day behavior, which has to do with our daily behavior regarding the management of our household. The table bellows give an overview of the barriers assessed as (very) important.

Interview topics	ranking	Type barrier	Explenation
Buying green power	5	knowledge	Companies do not understand the concept of green power management
	5		ineffective green power marketing strategies
	4	knowledge	Unknown that it's possible to buy greenpower
	4		Business model green power unclear for consumers
	4	individual	single consumer behavior can not have any influence
	4		lack of trust in power companies' declaration
	4	economic	Higher power price
Energy efficient heating behavior	4	knowledge	Lack knowledge inhabitants energy efficient airing

2) Behavior regarding the physical condition of the building, which has to do with personal decisions whether to carry out specific actions or not. The table bellows give an overview of the barriers assessed as (very) important.

Interview topics	ranking	Type barrier	Explenation
Installation PV panels	5	Policy	Lack of consistency in the policy framework
	5	Economic	high initial investment
	4	Cultural	Lack of interest of the architects and installer
			Difficulty for homeowners to gain access to artisans and solar companies
	4	Policy	insufficient governmental support
Construction Low Energy Housing	4,5	Knowledge	Lack of cost transparency
	4		Difficult to identify competent artisans
	4	Economic	high initial investment
Energy efficient refurbishment	5	Economic	High refurbishing costs
	5	Policy	Lack of consistency in the policy framework
	5	Knowledge	Lack of cost transparency

As one can see, there is a difference in barriers of importance between these two groups. The barriers in the first group has strongly to do with **lack of knowledge**; as well on the side of the market, i.e. implementing ineffective green power marketing strategies, as on the side of the consumer itself, i.e. unknown that it's possible to buy greenpower. However, it seems that the governemt doesn't play a role importance in this group.

Past attempts to overcome these barriers in the day-to-day behavoir, were totally focussed on governmental (communication) campaigs en other information campaigs. To the opinion of the interviewed stakeholders, it is very hard to find other policy instruments to steer people's behavior regarding the day to day management of their households.

In the second group of behavior regarding the physical condition of the building, **policy barriers** plays an important role, i.e. lack of consistency in the policy framework and insufficient governmental support in the sense of unreliable governmental subsidies. As well **economic barriers** are assessed as important, mainly the high initial investment is named as a blockade to take actions upgrading the physical condition of houses. Lack of knowledge is also indentified as important, but in a other way than in the first group. Lack of knowledge is here meant as a lack of information to feel comfortable to do investments; lack of cost transparency.

Past attempts to overcome these barriers regarding the physical condition of builidings, include: governmental subsidies, introducing more strct minimum norms regarding energy-efficiency (government), but also green banking services from the marked side.

3 Area of Household Appliances

Three interviews have been carried out in this field:

- A communication advisor of an independent national organization which provides consumers with practical and reliable information in the fields of environment, energy and climate.

- Senior staff member of an independent environmental organization committed to securing a healthy natural environment. Their main strength lies in influencing the policy-making process. They mobilize public opinion and put pressure on key policymakers in the field of nature and environment to make sustainability a cornerstone of policy and legislation, at the European, national and local levels. The European issues they cover include energy, road transport, fertilizer policies, pesticides and waste management.

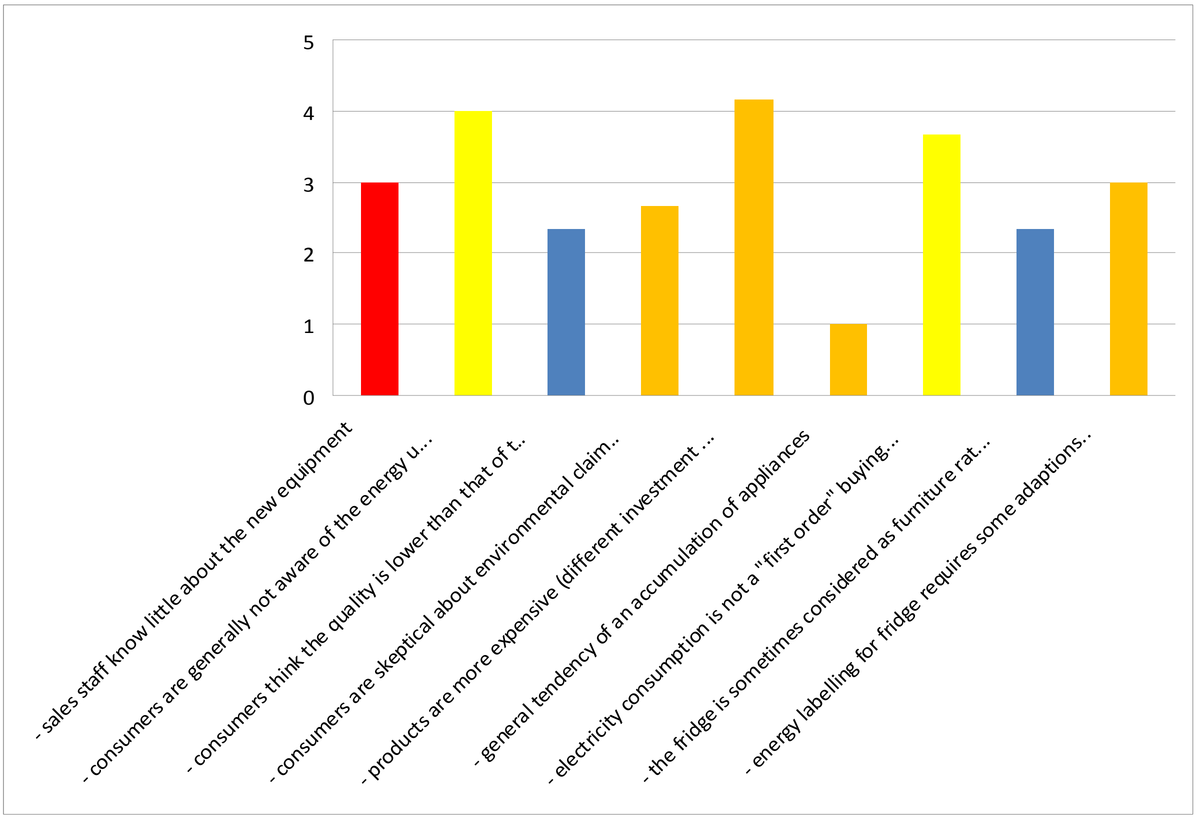
- A manager corporate social responsibility of a large and successful electrical retailer in the Netherlands with 50 so-called Superstores. This company started in 2006 with a serious initiative, trying to sustain the electronics industry by working closely with various parties in the field of sustainability, including the World Wildlife Fund (WWF).

3.1 Energy Efficient Appliances (Purchase)

3.1.1 Barriers

i. Graphical ranking of barriers

In all of the three interviews, the stakeholders were presented with a list of 9 barriers related to change of behavior and were asked to rate them on a scale from 5 (very important) to 1 (non-important). The graphical ranking below shows the integrated result of the interviews.



ii. Overview of each barrier

As we see, none of the statements received value 5 (very important barrier). The most important barrier, valued with 4,5, is an **economic barrier** 'products are more expensive – different investment profile'. One of the stakeholders arguable ''Energy friendly appliances are commonly more expensive than traditional appliances. This is an important barrier for consumers, even though these higher initial costs are often earned back given that energy friendly appliances have more economical operational costs. Yet it should be remarked that 'earn back' period differs per type of appliances. It has been shown that for example washing machines have a relative short return on investment for energy efficiency. Therefore, consumers are more willing to pay a higher initial investment. Tumble dryers, on the other hand, have a much longer return on investment".

Another important barrier, valued with 4, is a **knowledge based barrier**, 'consumers are generally not aware of the energy used by the appliances'. This lack of awareness is an important issue; the actual energy use of appliances remains invisible for consumers. The electricity bill does not provide them with useful information concerning which appliances use how much energy. For example, many people do not know that the dryer consumes approximately 25% of total energy use while the washing-machine only uses 5%. Once this information becomes known, people can start to act. For this reason the energy labeling for domestic appliances is developed. The aim of these labels is that consumers can easily gain insight into the energy use of different appliances. But, the current labeling system does not provide insight in the actual energy consumption and costs measured in Euros per year.

The third important barrier, valued with 3,5, is an **Individual barrier**, 'electricity consumption is not a first-order buying criteria'. The image and appearance of energy efficient appliances can be a barrier for consumers. Of course this depends on the type of appliance and the users. E.g. For a young family which has to do a lot of washing, the energy consumption becomes more often a first order buying criteria. For the reason that they will use the machine a lot, it pays how much they can save by buying an energy efficient washing machine. For the purchase of a computer, computer related electronics, televisions or hifi, other buying criteria seems to be more important like design, performance and features.

There are two barriers qualified as medium important. One is again a **knowledge based barrier**, 'sales staff knows little about new equipment'. Of course this is a barrier that is very dependant on the situation. For the Dutch situation there is an example of a retail chain of which sales employs are very well familiar with the energy-efficiency of appliances. But overall, the three interviews conclude that sales staff knows too little, despite the fact that this barrier is important because advice by sales staff is often decisive in consumers' choice of appliance.

The other medium barrier is a **knowledge based barrier,** 'energy labeling for fridges requires some adoptions'. White appliance labels are outdated, especially for washing machine where 90-95% of all products already are label A. The ability of labels to distinguish efficient and less efficient appliances has decreased over the past few years – for many appliances only 'A-label' alternatives are available. Between these a-label alternatives, differences in energy-efficiency may still be large. In order to remedy this problem, there is an initiative at EU level for 'dynamic labeling' – using the same clear letter structure, but changing the norms that dictate the category a product belongs to every three-five years.

Furthermore there are four barriers indicated as less important:

- Consumers think quality is lower than that of more traditional 'browner' products **(cultural/social barrier)**: parts of the consumers are unaware of the quality aspects of energy efficient appliances, such as functionality and comfort of use. Consumers tend to doubt if energy efficient appliances are as effective and comfortable to use as traditional appliances. Marketing of retail organizations could helps to overcome this barrier.

- The fridge considered as furniture rather than an electric appliances (**cultural/social barrier):** people see refrigerators as a status symbol that should look nice in the kitchen. It has the value of a piece of furniture instead of a utensil like a washing machine. Regularly people own a refrigerator which is larger than necessary for the size of their family; still people are reluctant to replace it for a smaller version. People feel they 'ought to' purchase all kinds of appliances; they fail to consider whether they could do without extra appliances. This has also to do with status; appliances such as televisions and fridges are used to show off wealth, weakening the importance of energy-efficiency in purchase decisions.
- Consumers are skeptical about environmental claims – distrust labels and media **(individual barrier):** Some people belief that environmental problems are overstated, and/or that technology will solve all environmental problems. These beliefs make people unwilling to purchase energy-effiicient appliances, because they do not think saving energy is necessary.
- General tendency of an accumulation of appliances: hardly no input

iii. Stakeholders

From the point of view of the interviewed stakeholders, **producers of household appliances** play an important role. People at the top of companies should give the right example – drive in a smaller car, buy energy-efficient appliances themselves. 'You can only credibly tell your employees to purchase energy-efficient appliances if you show them you purchase these appliances too'. **European Commision**, because they should accept stricter norms and dynamic labels. **Consumer electronics retailers**, given that it is very important that consumers have access to energy-efficiency information the moment they are considering to buy a domestic appliance. The first moment of contact with a sales representative and the information that is supplied is of great importance. To include this information in adds also is of great importance. **Governmental information**, to create public support and clarity around labels and hallmarks, the government is very important, and should initiate a public campaign.
Last but not least, **sales staff** is key. If sales staff is not informed or knowledgeable, consumers will not take the environmental concern serious.

3.1.2 Attempts to overcome the Barriers

These are the main Dutch attempts to overcome the barriers according to the interviewed stakeholders:

- **Government subsidies**: Worked well, more energy-efficient household appliances were sold. This measure could be successful again but have been reduced over the last few years as a result of their success. This attempt was acceptable to consumers and business, but policy makers fear it is too expensive.
- **Fiscal incentives for producers**: Producers of household appliances profit from tax reductions if they produce energy-efficient appliances. This was successful and should be continued, since it was also acceptable for consumers, producers and for the government.
- **Creating clear norms with regard to minimum energy-efficiency (labeling)** each household appliance must provide. This works well – works to prevent poor appliances from entering the market and it improves consumer confidence in labeling systems. If norms are re-evaluated (meaning not all appliances get label A) labels are an easy, cheap, and effective measure to promote purchase of energy-efficient appliances. This measure was acceptable for all three groups.

3.1.3 Possibilities for future actions

- **Changing the investment profile of energy-efficient appliances**: Consumers have to be told that they will save money by buying an energy-efficient appliance, even if the initial cost is higher, and they must be able to trust that they will indeed save money. To do so consumers must either be informed more about savings that result from lower energy use, or initial costs should drop to make the difference in the investment profiles of energy-efficient appliances and ‘regular’ appliances smaller.

- **Dynamic labeling**: Dynamic labels, with norms that are evaluated every three to five years, should help consumers to differentiate between energy-efficient and less energy-efficient appliances.
- **The minimum demand regarding energy efficiency of household appliances should become stricter** – this will stop people from buying the very worst household appliances.
- **The financial energy labels should be introduced on a European level**. Another measure concerns VAT (Value added tax) reduction for energy efficient appliances to make them more prices competitive with regular appliances.

3.2 Summary of Area of Household Appliances

On the topic of purchasing energy efficient appliances we carried out three interviews and integrated the input in one overview. The table bellows give an overview of the barriers assessed as (very) important.

Interview topics	**ranking**	**Type barrier**	**Explenation**
Purchase Efficient Appliances	4,5	Economic	Products are more expensive
	4	Knowledge	Consumers are not aware energy use appliances
	3,5	Indiviudual	Electiricity consumption is not firts-order buying criteria

The barriers identified as (very) important are all on the individual level. As one can see form the table above, is that **economic**, **knowledge** and **individual** barriers play an important role whether to buy energy efficient household appliances or just to choose for the ‘brown stuff’.

So it seems logical that most of the past attempts to overcome these barriers were focusing on personal level, like governmental subsidies on buying energy efficient appliances, introducing consumer labels etc.
But prominent is that measures on market-side were as important as well, i.e. fiscal incentives for producers and clear setting norms regarding minimum energy-efficiency to prevent poor appliances from entering the market.

4 Area of Mobility

4.1 Public Transport (Use), Park and Ride facilities

A double interview had been carried out representing two stakeholders in this field:

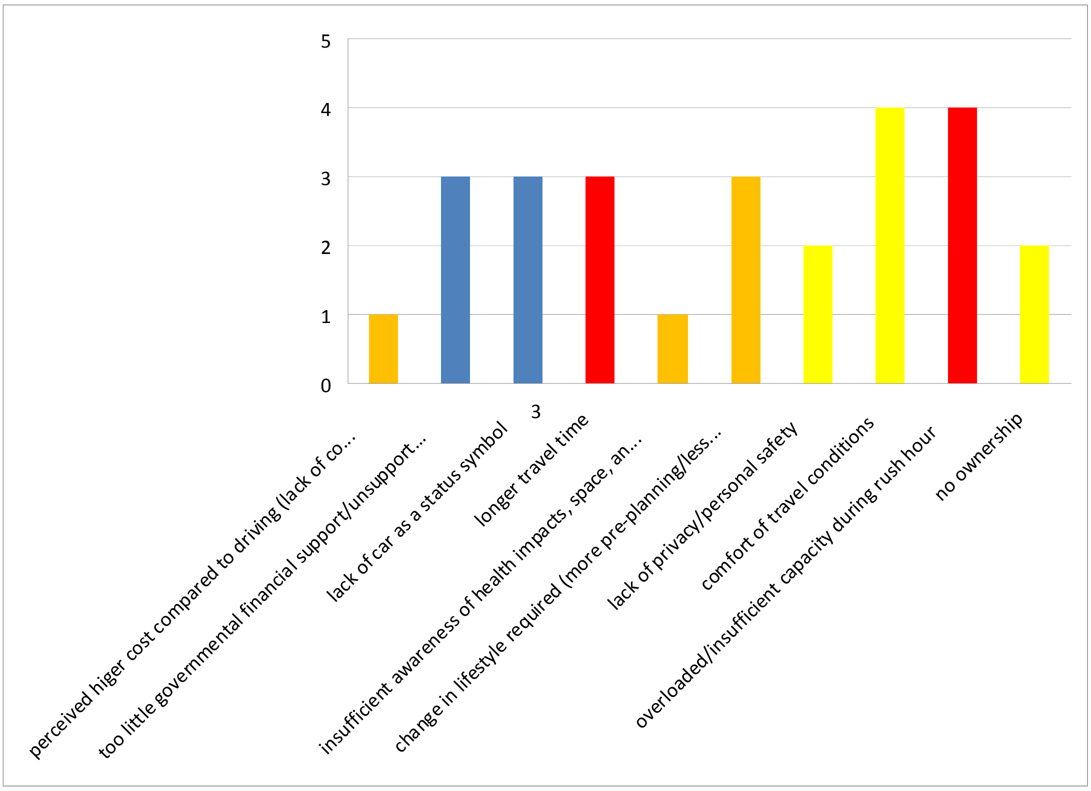
- A senior policy developer at the department of transport at the municipality of Groningen. Groningen is the major city of the Northern Netherlands and, with a population of 185,000, the eighth largest city in the Netherlands.

- Coordinator of the development team at Public Transport Agency Groningen-Drenthe. The public transport agency Groningen-Drenthe develops organizes and manages the public transport buses in Groningen and Drenthe and is a collaboration of the provinces of Groningen and Drenthe and the municipality of Groningen.

4.1.1 Barriers

i. Graphical ranking of barriers

In both interviews the stakeholders were presented with a list of 10 barriers related to change of behavior and were asked to rate them on a scale from 5 (very important) to 1 (non-important). The graphical ranking below shows the integrated result of both interviews.



Groningen is a compact city with limited space. Consequently its centre neither offers the space nor the capacity to meet the demand for parking facilities, which are becoming increasingly scarce. To solve this problem, various forms of parking accommodation have been developed, each with its own target group and rates. As an auxiliary facility, Groningen has developed a well-functioning Park and Ride (P&R) system. Basically, the City bus concept is simple. There are several P&R areas, with a total capacity of over 2,000 free parking places. From there, the City buses take a direct route into the city centre and back.

ii. Overview of each barrier

As can be noted, none of the statements received value 5 (very important barrier). Two barriers are assessed as important, valued with 4. An **Individual barrier**, ‘Comfort of travel conditions’ - the travel conditions of P & R systems should ideally be as comfortable as someone’s own car. This is not feasible, but it is important to try and make the gap as small as possible. The more comfortable the system, the more attractive it will become to new groups. People should be able to park their car, take a bus, and go into the city, and when they return, they should be able to take a bus easily and get taken back to their car quickly. Currently, the return journey is somewhat problematic – the buses stop right in the center of the old city, where there is no possibility to create formal lines (by using gates for example) meaning that during peak hours, it can be difficult to get onto a bus, as people push and jump line.
Another important barrier is a **Physical** one, ‘Overloaded/insufficient capacity during rush hours’. The insufficient capacity of P & R systems is a growing problem – as system becomes more successful, capacity becomes an increasingly large problem. Problem is difficult to model, because there are no models of park-and-ride use over time. Policy is aimed at increasing capacity.

Four barriers are ranked as medium, valued with 3. Let’s start with a **Political barrier** ‘Lack of government support’ - Both local and national governments are enthusiastic – however, they should ‘put the money where the mouth is’. Good intentions abound, but these are often not or belatedly turned into action. Missing ‘Car as a status symbol’ is also a medium **Cultural/social barrier**; in specific societal groups, cars are still seen as status symbol – these people are highly unlikely to ever use the park-and-ride system. However, this group appears to be becoming smaller. The ‘Longer travel-time’ is a **Physiological Barrier**, because in reality people often save time by traveling by park-and-ride bus. However, the perception is that it takes a lot of time – this has to do with ‘transfer-avoidance’: the unwillingness to move from one vehicle to another. The last medium barrier is an **Individual one** ‘Required change in lifestyle’. However this becomes less important as the quality of the service improves. In order to remove this barrier, the image of park-and-ride systems should improve: ‘People should be willing to tell others at a party they use park-and-ride. Right now, people are not’.

Furthermore there are four barriers identified as less important, valued 2 or 1:

- Perceived higher cost compared to driving **(Individual barrier)**: Not an issue; people complain that parking lots in the city center are expensive, while the park-and-ride system is cheap in comparison.
- Insufficient awareness of health impacts, space and energy use benefits of public transport **(Knowledge based)**: Awareness definitely is lacking, but one cannot expect citizens to be aware of these factors. This is not a selling point for the park-and-ride system. The interviewees refuse to accept this as a barrier ‘this is not the kind of information you should use to convince people to use park-and-ride systems’.
- Lack of privacy/personal safety **(Individual barrier)**: Safety is important at park-and-ride parkings. In buses, however, it is not such an issue. The target audience for park-and-ride buses is different than the target audience for normal city buses – while on normal city buses, people report feeling unsafe, it hardly ever happens on park-and-ride buses.
- No ownership **(Individual barrier)**: Linked to privacy and status – not really a problem for most users, but does stop certain groups from using the system.

Supplementary to the barriers above, the stakeholders came up with two extra barriers:

- **Lack of knowledge** about the use of park-and-ride facilities. Many people know that park-and-ride facilities exist, but many do not know how to use them. Uncertainty regarding the use of park-and-ride systems is in part caused by failed experiments with park-and-ride systems in other cities in the Netherlands. These failures received quite a lot of media-attention, making it difficult to convince people to try the system near Groningen. The Public Transport Agency has send leaflets door-to-door everywhere in Groningen and Drenthe [An area with approx. 700.000 inhabitans] to inform people of the park-and-ride system. The Public Transport Agency will continue to search for ways to make the system known to the public.

- **Past investments in parking lots in and around the city center:** Municipalities want two things at the same time: They want people to use the park-and-ride system, because it means less cars entering the city, which leads to less congestion and better quality-of-life in the city center, while they also want the parking lots that were build to be used, as these parking lots earn the municipality money – money that was invested in these parking lots in previous decades. The municipality therefore tries to stimulate the use of the park-and-ride system, but it does not go as far as to stop people from driving their car in the city center. The municipality of Groningen is generally pleased with this policy, and that it will be continued.

Stakeholders

4.1.2 Attempts to overcome the Barriers

The stakeholders emphasize that the actions that have been taken to stimulate the park-and-ride system form one complete package – they therefore refuse to comment on the effectiveness of individual actions and measures. They state that, overall, the use of the park-and-ride system has increased over the past five years and that measures of consumer satisfaction show that satisfaction with the system has increased.

Measures and actions that have been taken:

- **Frequency of service has been increased**: The Public Transport Agency has increased the number of buses that shuttle between the park-and-ride parkings and the city center.
- **Information has been provided**: New inhabitants of the provinces of Groningen and Drenthe receive information about the park-and-ride system.
- **Quality of facilities at park-and-ride parkings has improved**: Better bus shelters have been build, and more detailed information about departure times of buses is provided.
- **Municipality of Groningen**: Park-and-ride is central in parking policies – money is put into exploitation of parkings.
- **Dutch government**: Grants subsidies for the creation of free buslanes and builds additional buslanes where necessary.

4.1.3 Possibilities for future actions

Suggested attempts for the future:
- Hire staff to patrol park-and-ride parkings to increase feeling of personal safety.
- Improve lighting of park-and-ride parkings to increase feeling of personal safety after dark.
- Extend services beyond park-and-ride: A park-and-bike service will be introduced next year to stimulate more people to leave their car outside the city center.
- Improve the information that is provided to users – all parkings should get information signs that show people how long they have to wait before the next bus arrives.

Possible Windows of opportunity:
- New job in Groningen: Employer should inform new employees of the possibility of using the park-and-ride system as a way to go to work.
- Moving house in the region surrounding the city of Groningen: People who move to a municipality near Groningen receive information about the park-and-ride system. Informing these

people is more important than informing people who move into the city itself, as they are unlikely to use the park-and-ride system.

Recommendation for efficient policies and measures:

- The use of the park-and-ride system around Groningen increases by 10 to 15 percent each year – policies should focus on making sure that the factors essential to the park-and-ride system (high frequency, sufficient parking capacity, and free buslanes) can still be fulfilled even if the number of users increases by creating new park-and-ride parking where possible and increasing the frequency of buses shuttling between the parkings and the city center. Furthermore, the introduction of security guards and improved lighting should improve peoples' sense of safety on park-and-ride parkings, which should increase peoples' willingness to use the parkings. Finally, shops and employers should emphasize the possibility of using the park-and-ride system more to increase the number of users and improve the image of the park-and-ride system.

4.2 Short Distance Mobility

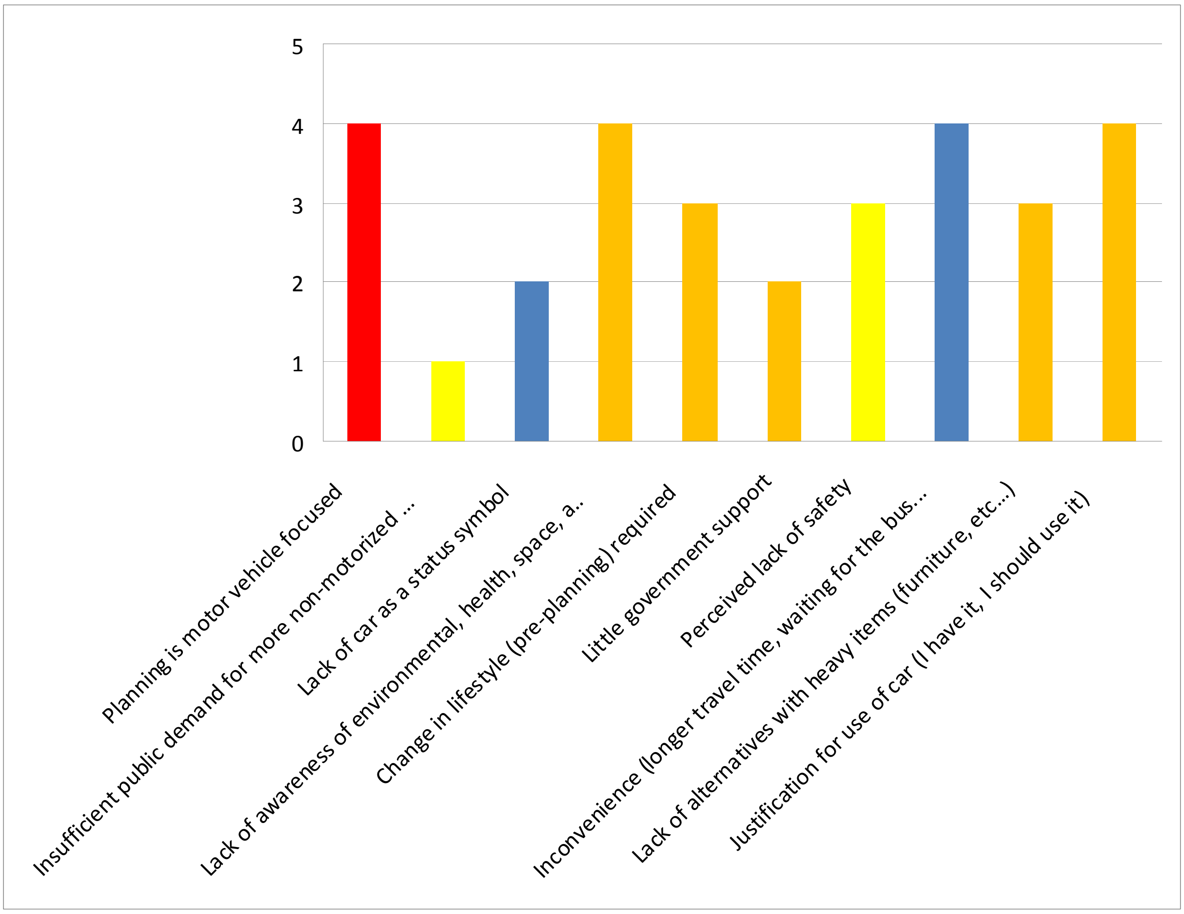
We have interviewed one stakeholder in this field: a senior Advisor Traffic and Infrastructure, employed at a Dutch Institute which is developing, integrating and applying knowledge on the longer-term problems and challenges of technological, economic and societal innovation.

Point of view peers – The stakeholder feels that the point of view by peers is mostly the same. The opinion is that the decrease in the use of cars for short distances is not really an issue in the Netherlands. This is due to the fact that cycling is already firmly embedded in the Dutch culture. Furthermore in the Netherlands above average attention is given to congestion and air pollution issues.

4.2.1 Barriers

i. Graphical ranking of barriers

The stakeholder was presented with a list of 10 barriers related to change of behavior and was asked to rate them on a scale from 5 (very important) to 1 (non-important).



Short distance trips

More than two third (69%) of all trips in the Netherlands are shorter than 7.5 kilometers. One third of these trips are by car, one third by bicycle and one third others. When travelling by public transport, cycling is frequently used as pre- and post-transportation. Even through, this is not included in Table 1.1; there could be obtained a lot benefit by increasing the use of bicycles in these short distance trips (source, Hilbers, 2008).

ii. Overview of each barrier:

As can be noted, none of the statements received value 5 (very important barrier). Four barriers are nevertheless assessed as important, valued with 4. An **Individual-psychological Barrier** in this line is ‘Planning is motor vehicle focused’ – since the car is the logical choice for people, other options are not considered as alternative to travel. Than the stakeholder identified a **Knowledge based barrier** ‘, he consider there is a lack of awareness of environmental, health, space, and financial benefits of walking or biking short distances. Another **Individual-psychological Barrier** is ‘Inconvenience’. Comfort is an important barrier to leave the care because using the car is more comfortable, especially in bad weather. People also feel that alternatives take more effort, e.g. switching modalities for reaching their destination. The third important **Individual-psychological Barrier** is the justification of people for the use of their.

Three medium barriers have been identified; two of them are again **Individual-psychological Barriers**, ‘Change in lifestyle (pre-planning) required’ and ‘perceived lack of safety’. This last one is a medium barrier because Holland is a bicycle-minded country, which implies that the urban mobility system is adapted to cyclers and for that reason people do not see safety as a very important issue. The other barrier ‘Lack of alternatives with heavy items (furniture, etc…)’ is a more or less **Physical barrier** - transportation of heavy items is only a small fraction of short-distance transport. But if items should be transported this can be an important reason.

Furthermore there are three less important barriers:

- Lack of car as a status symbol **(Individual-psychological Barriers)**:For status is important to have a car, not to use it for short distances
- Little government support **(Political Barrier)**: There is sufficient support. People do not change their ways because of government support
- Insufficient public demand for more non-motorized paths (**Physical barrier**):There is a bicycle culture in the Netherlands, there are sufficient bicycle paths available

iii. Stakeholders

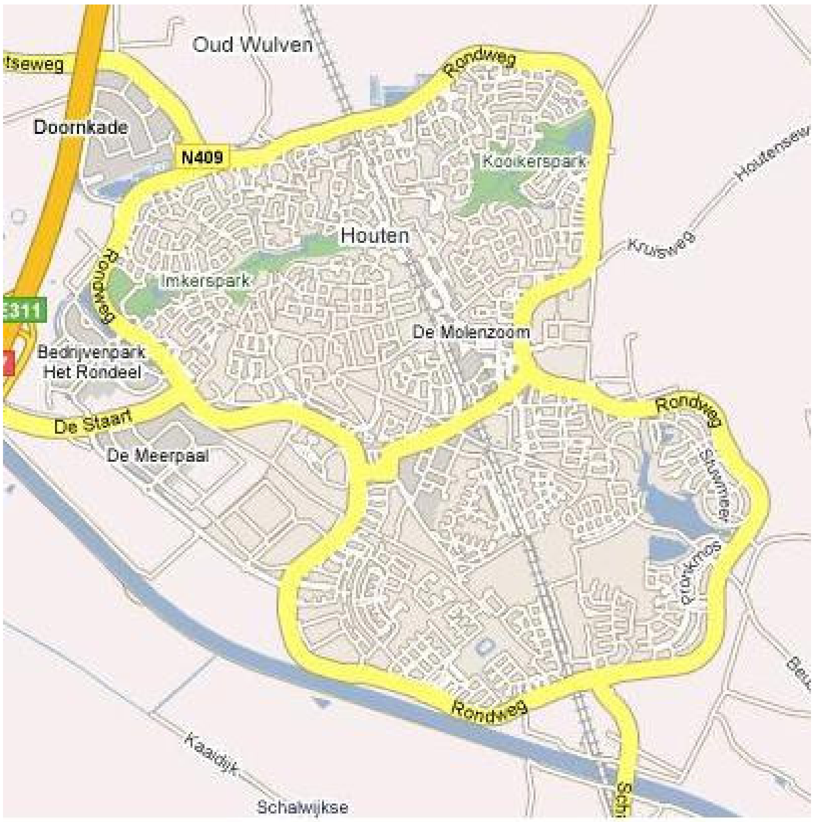
- **Bovag;** The trade organization for bicycle shops is will profit from this development as a decline in the use of cars for short-distance trips will most likely result in an increase in bicycle sales as people will make more frequent use of bicycles.
- **Energy companies;**
- **Public transport organizations;** These will benefit as they are a likely alternative for using the car.

4.2.2 Attempts to overcome the Barriers

- **Town planning:** A Dutch town called Houten was developed in such a way that you can move around the town much quicker by bike than by car (see illustration):

Illustration example of Houten, The Netherlands:
Due to the fast growing population of Utrecht, Houten has been appointed a Vinex location. Thirty years ago, Houten was a small village, but since then, it has been selected twice for further development. Therefore, the population of 8,500 inhabitants in 1979 is expected to grow to 50,000 in 2010. In 1979, Houten was selected for further development for the first time. Both old and new areas of Houten were integrated into one village. This was realised by surrounding Houten with a ring road. Nowadays, this road circles the north of Houten. The development of a new, southern part was started in 1997. Today, both parts of Houten are surrounded by a ring road (see figure 2.1). On the inside of this ring road an excellent bicycle path system has been developed, which connects the different parts with each other. To travel from one place to another by car in Houten, people have to take this ring

road, which takes extra time. Cyclists do not have to travel around on such a ring road, and, therefore, cycling is faster than travelling by car (Municipality Houten). In the southern part of Houten (Houten Zuid) the bicycle paths were made safer and more recognisable by making them red. To add to
the safety, there are no trees next to the paths, only grass and low hedges Spatial planning has created a situation in which slow traffic is leading (cyclists and pedestrians), and motorised traffic – although allowed - is not dominant (source: Municipality Houten).



Municipality of Houten source: maps.google.nl

- **ABC formula:** Co-locating shops to attract more customers because they only have to visit one shopping mall, thus decreasing the number of short-distance trips between shops.
- **Bicycle plan:** A stimulation policy for employees to purchase a bicycle for commuting
- **Bicycle-only streets:** Streets that can only be used by bicycles to increase traffic safety
- **Overall:** Most policy that stimulates the use of transport alternative to cars for short distances is originally designed for other reasons. For example the policy around parking in cities is mostly based on distributing the available space. Yet it can be used to discourage short-distance use of a car. Other aspects on which policy is formulated which have an impact on short-distance mobility are congestion and air pollution.

4.2.3 Possibilities for future actions

Suggested attempts for the future:

- Parking policy: The policy around parking in cities is mostly based on distributing the available space. Yet it can be used to discourage short-distance use of a car
- Governmental campaign
- In the proposed tax per driven kilometer (Dutch: Kilometertax) the first kilometers could be made significantly more expensive to discourage the use of a car for short distances
- Make short distance traffic more difficult for cars by using roadblocks

- Make alternative forms of transport more comfortable: nice bicycle paths, enough places to store your bike, electric bikes

Recommendation for efficient policies and measures:

- The government should not patronize its citizens. Publicity campaigns are the best method. Including obstacles in the infrastructure will bring unwanted side effects. The infrastructure should be as efficient as possible.

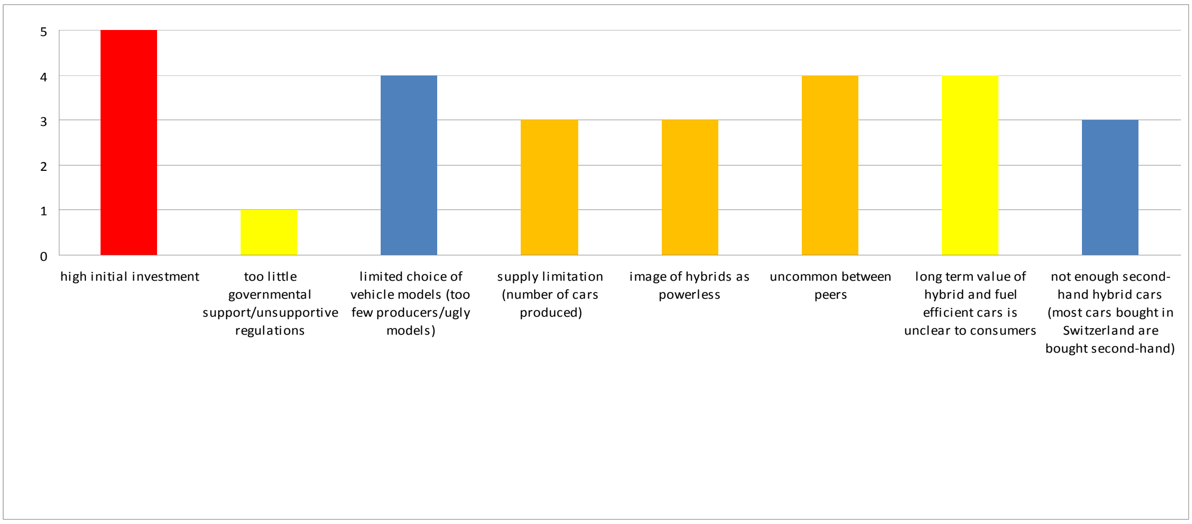
4.3 Hybrids (Purchase)

We have interviewed one stakeholder in this field: a so-called Transition Manager for Sustainable Transport at a ministerial level. The organization he works for is one of the thirteen ministries which make up the national government. The ministry consists of the policy departments and executive departments, as well as the Directorate-General for Public Works and Water Management (Rijkswaterstaat), the Transport, Public Works and Water Management Inspectorate (Inspectie Verkeer en Waterstaat) and the Royal Netherlands Meteorological Institute (KNMI).

4.3.1 Barriers

i. Graphical ranking of barriers

The stakeholder was presented with a list of 8 barriers related to change of behavior and was asked to rate them on a scale from 5 (very important) to 1 (non-important).



ii. Overview of each barrier:

a. basic overview

The main important barrier was identified as an **Economical barrier**, ‘Higher investment costs’. A higher price for consumers is a ‘show-stopper’ and forms an important barrier for buying alternative vehicles. A higher price of the vehicle most of the times does not compensate for the savings because of more efficient use of fuel.

An important barrier valued with 4 is the ‘Limited selection in models’ a so-called **Physical Barrier**. Few car models exist nowadays in terms of hybrid and electric vehicles. Whereas conventional vehicles have hundreds of models, these new types of vehicles only have 2 or 3 models. Consumers have nothing to choose from. ‘Unusual car for colleagues with the same status’ **(Cultural social Barrier)** is as well mentioned as a important barrier. Hybrid and Electric vehicles have an image of an environmental, green car. Some people find it cool, this new technology, but for most it is a bit dull. Instead, the image should be more focused on what it has to offer in addition to normal car. The new Toyota Prius for example is already going this way, and therefore is more successful. An important **Economical barrier** is the fact that the Long-term value of hybrid and energy-efficient cars is not clear for the consumer. The time it takes to get back the costs from the higher investment (due to the higher price of the vehicle), is usually some 7 years, which is much longer than the average time a car is held, which is 3 years. The extra investments thus do not return to the consumer.

A medium sized assessed barrier is the ‘Demand on surpasses supply’, this is an **Economical** but as well a **cultural barrier.** Car sellers make less profit on these new types of cars. Combined with the fact that the image of these new green cars is bad (‘hybrids are for softies’), they have no incentive to persuade consumers to buy a hybrid or electric vehicle. Producers like Toyota & Honda do not yet make a lot of profit out of these new hybrids; instead it is their bid on the future. The new guidelines for vehicle efficiency demand that car manufacturers build new, expensive production lines, which costs them a lot of money. Regulation thus is an important driver for them. Producers of the technology they should focus on developing serial hybrids (instead of parallel hybrids now), to reduce reliance on the conventional combustion engine. They should also focus on new battery technologies. Another medium barrier is the Image of hybrid cars (low power), which one can see as a **Physical Barrier**. These cars do not have enough power and torque for towing caravans; therefore it is not the right car for holidays which is an important aspect in the decision to buy a car for consumers. As last barriers, one feels that there are too few second-hand hybrids available.

Furthermore there is one barrier considered as less important, ‘Lack of government support / measures that counteract buying decisions’ **(Political barrier)**. The Government has an important role for regulating the market. The development of the hybrid car stems from an environmental point of view, not from a consumer point of view in terms of comfort or quality. Therefore the government should push producers into this direction. Fiscal measures are important for this.

b. stakeholders

Consumers: they still lack the belief that these new types of cars are the future, with the exception of the early adopters.

Car sellers: they make less profit on these new types of cars. Combined with the fact that the image of these new green cars is bad (‘hybrids are for softies’), they have no incentive to persuade consumers to buy a hybrid or electric vehicle.

Producers: Toyota & Honda do not yet make a lot of profit out of these new hybrids, instead it is their bid on the future. The new guidelines for vehicle efficiency demand that car manufacturers build new, expensive production lines, which costs them a lot of money. Regulation thus is an important driver for them. Producers of the technology they should focus on developing serial hybrids (instead of parallel hybrids now), to reduce reliance on the conventional combustion engine. They should also focus on new battery technologies.

Government: has an important role for regulating the market. The development of the hybrid car stems from an environmental point of view, not from a consumer point of view in terms of comfort or quality. Therefore the government should push producers into this direction. Fiscal measures are important for this.

Automobile industry lobby: combined with the press (newspapers, journalists, car tests) etc. are very concerned about the imago their cars have.

Employers: the image of cars is very important to them.

Environmental lobby: NGO’s etc. have to tell consumers to look at the advantages of clean cars.

4.3.2 Attempts to overcome the Barriers

Taxes: The decision by De Jager (secretary of the ministry) to financially stimulate hybrid and electric vehicles through reduce taxes by 15% (Dutch: bijtelling) and to lower initial taxes (BPM), provided an enormous boost. This was done to stimulate the new technology, since these are (especially the batteries) much more expensive still and to give them a chance in the market the reduced taxation provided them with a level-playing field. Initially this was focused on electric vehicles; later the hybrid took off since they were stimulated too. The car-lobby reacted furiously to this, since Diesel engines were just as efficient and this was not technology-neutral policy. But it's about cleanliness, not efficiency. This policy was received well by employers and customers, yet the impact was small, as still only a small percentage of cars sold is a hybrid car. Suppliers of competitive cars, which were as fuel efficient but were not hybrid (mostly diesel) objected because they saw the tax-reduction as unfair competition. Yet, when you take the emmited dusk-particles into account there is a clear difference between the two technologies.

Image campaigns: The new driving, with trend-setting example setting with celebrities. This seems to hardly work out.

4.3.3 Possibilities for future actions

Buying and selling are the most important windows of opportunity. The questions is how this will develop in the future: what will be the value of a second-hand hybrid? This is still uncertain now. It will be crucial for the pay-back time for the value of the car to be retained, so that the higher investment will more easily pay back.

The government should introduce a gradation in the taxation: not only stimulate all cars under a specific level of emissions (now: under 103 grams of CO_2 per km), but create different classifications and stimulate each class differently based on their cleanliness. This way, the more efficient the car is, the more it is stimulated.

Solution lies partly with the consumer (beliefs & conscience), partly with suppliers (how many models, how is their marketing) and partly with the government (taxes and subsidies to reduce costs). Furthermore there should be more steps in the tax reduction, so less polutant cars can be stimulated over more polutant cars. Now the division is to great, and the distinction between medium, bad and worse is lost.

Rolemodels should embrace fuel efficient cars, to change the image.

4.4 Summary of Area of Mobility

We have carried out interviews on three topics regarding the area of mobility. The table bellows give an overview of the barriers assessed as (very) important.

Interview topics	**ranking**	**Type barrier**	**Explenation**
Public Transport Park and ride facilities	4	Individual	Comfort of travel conditions
	4	Physical	Insufficient capacity during rush hour
Short Distanse Mobility	4	Individual	Planning is motor vehicle focussed
		Individual	Inconvenience using other forms of mobility

		Individual	Justification for use of car
		Knowledge	Lack of awareness of impacts
Hybrids	5	Economic	High initial investment
	4	Physical	Limited choice vehicle models
	4	Social/Cultural	Uncommon between peers
	4	Economic	Longtermvalue unclear

The interview outcomes of these three topics can be divided in two groups.

First group: the main barriers concerning the use of P&R facilities and short distance mobility are focused on **individual barriers**. It is quite the same as for the two groups divided under the heather of domestic energy use, since this type of behavior has to do with daily routines. Secondly we see that the barriers identified for Hybrid cars are more focused on **economic**, **physical** en **social/cultural** aspects. Like the 'behavior regarding the physical condition of buildings', a large financial investment is also involved in the purchase of a hybrid car.

II. Stakeholder Dialogue

We are actually not able to answer the entire proposed questions about the stakeholder dialogue. Thus, we will concentrate the concluding parts of this report on two issues. We will first reflect on the stakeholder dialogue and the different opinions among stakeholders. Secondly we will conclude on the main barriers for change

Varying stakeholders' point of view

We have selected stakeholders from businesses, political authorities and NGOs in three different areas: housing, household appliances and mobility. Within these areas we have developed different interview templates in order to cover a wide range of questions. Since this is our point of departure, it is not a surprise that we found significant different opinions among our interviewees. Contrary, to a certain degree we found a strong overlap in the interview results of all interviews.

All interviews can be roughly divided in two groups:

- daily routine behavior managing the household
- behavior regarding (large) investments in physical matters

Independent of the areas Energy Use, Mobility and Appliances, almost the same barriers were identified in these groups above.

The major barriers to change daily routing behavior managing the household are:

- green buying's are of often more expensive than brown products
- lack of knowledge green products and impact of brown products
- Energy consumption not first order buying criteria
- Too less information or effect of negative exposure green product, behavior or service
- impression that single consumer behavior can not have any influence
- need for high level of comfort, perchieved related to traditional products or services

The major barriers to change behavior regarding investments in physical matters are:

- high initial investment
- dependence of (unreliable) governmental subsidies
- lack consistency policy framework regarding energy saving
- low interest investing in green energy saving solutions
- underdevelopment supply because of low interest consumers
- lack transparentcy in costs energy saving solutions

Beside the more or less overlapping barriers in the two groups, the interviewd stakeholders also came up with the same attempts to overcome these barriers:

Attempts related to change daily routine behavior are:

- Information provided by government
- Communication campaigns retail compagnies
- (Advanced) energy labelling on appliances
- Using internet for custom-made advice

Attempts related to change behavior regarding investments in physical matters are:

- (reliable longterm) governmental subsidies
- Governmental or EU steering by introducing more strickt rules and regulations
- Creating transparentcy in costs
- Mortgage Guarantee for large groups of population
- (reliable) fiscale incentives

What strikes is that the interviewed stakeholders do expact a lot of Governmental steering, but do not articulate that loud the expactions towards responsibility of individual consumers. It seems that the whole system around them should be introduced to the make the change for them as easy and as unpercieved as can be.

Main barriers for change

In the BARENERGY project we have identified six barriers for energy changes among households and individuals:

- Physical and structural barriers
- Political barriers
- Cultural-normative or social barriers
- Economic barriers
- Knowledge based barriers.
- Individual-psychological barriers

Based upon our interviews with stakeholders we may conclude that the **knowledge** based barrier and **economic** barrier seems to be the most important barrier for change. We are aware that they not always had individuals in mind when they answered their question, but their own perspective. It is their perception of barriers for individuals and households.

A lack of **knowledge** is a barrier identified in all of the areas: energy use, appliances and mobility. Lacking knowledge is as well on the side of the market a barrier, i.e. implementing ineffective green power marketing strategies, as on the side of the consumer itself, i.e. unknown that it's possible to buy green power'. Furthermore it strikes that `lack of cost transparency' plays a very important role regarding behaviour towards the physical conditions of the building'

The **economic** barrier is also represented in all of the domains. But this is mostly an important issue when it comes to large financial investments, i.e. the purchase and installation of PV panels or the purchase of a Hybrid car. This barrier is also related to the discussion about the lack of consistency in the policy framework regarding governmental subsidies. Nevertheless, consumers also feel a barrier when green products are more expensive than the brown ones, even though it has nothing to do with a large investment.

Second important for change are the **individual-psychological** barriers. We all have our own limits to what we would do to achieve a goal like saving energy, we may conclude that believes as `single consumer behaviour can not have any influence' and ` Electricity consumption is not first-order buying criteria' do play an important role for change. It seems also very hard to overcome these individual-psychological barriers, since there are no clear policy instruments beside information campaigns. But how information is understood or misunderstood can also be a part of this barrier.

In the third place the **political** barriers are import for change. People seem to have high steering expectations of the government. The lack in consistency in the policy framework is especially an important barrier for the installation of PV panels and energy efficient refurbishment. Because of the high initial investment cost, people feel that they are dependant on subsidies of the government. But allocation of subsidies makes part of the annual budget and for that reason unreliable over a long period.

The barriers assessed as least important for change are **cultural-normative or social** and **physical-structural** barriers. Not all ways of saving energy may comply with the culture you live in. Willingness to accept new energy technology, available infrastructure and supply of products, may also differ across cultures and energy-efficient appliances may not increase one's social position. But based upon the results they do no play such an important role for change, compared to the other barriers above.

ANNEXE

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