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WARM WATER CONSUMPTION BEHAVIOUR IN GERMANY

-A study on how German families perceive feedback from smart energy meters-

Author: Nadine Schindler
Thesis Counsellor: Anders Due – Department of Marketing
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EXECUTIVE SUMMARY

The fact that natural resources are diminishing and that climate change as well as environmental pollution have a negative effect on the current and upcoming generations makes environmental protection an exceedingly relevant field of study. The smart energy meter WaterGuide was identified as a highly interesting and innovative new product in the area of environmental protection because it has the potential to change consumer's behaviour and habits. It provides real-time feedback about ones energy consumption while showering and is targeted at families with children. As the company wants to expand to the German market it was decided to research how German families with children perceive the device. More specifically, it is investigated how German families with children think about reducing their warm water consumption, whether the WaterGuide has a market potential in that target group, and how it should be marketed best.

The chosen research approach includes quantitative and qualitative primary research. The quantitative research is carried out in the form of an online survey. Its objective is to assess the warm water consumption behaviour of German families with children and what motivates them to reduce it. The qualitative research consists of five semi-structured interviews with German families that tested the WaterGuide. The objective of the interviews is to identify how the WaterGuide is perceived and how it should be marketed in Germany.

The findings from the online survey show that German families with children have a predominantly positive attitude towards warm water conservation and regard it as important. However, their intention to actually reduce consumption is only averagely strong. Also, their confidence in being able to do so is somewhat weak. Furthermore, the main motivation to actually reduce ones consumption is of financial nature only then followed by environmental concern.

The findings from the interview show that the WaterGuide is perceived as a helpful device to raise awareness about ones consumption. It is found to be especially advantageous for families because the visualisation can also be understood by children. The device had positive effects on the motivation to reduce consumption and, in some cases, even lead to adjusted behaviour and a change in previous showering habits.

The main conclusion drawn is that German families with children are a potentially profitable market for the WaterGuide. It is recommended that the visualisation of consumption and the awareness it therewith raises is communicated as the unique benefit the product provides.

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INTRODUCTION

It was mainly due to the UN conference in Stockholm in 1972 that environmental consciousness became a global topic. (Christer 2002) Today, scientists agree that climate change is happening and that natural resources are diminishing. As a consequence, governments started developing regulations and legislation as well as specific goals in order to minimize climate change. NGO's such as WWF and Greenpeace are actively fighting against the different ecological problems and are trying to raise awareness in society. In addition, numerous corporations began to take action as well. They started rethinking their production processes and began selling environmentally friendly products.

As worldwide energy consumption has reached enormous dimensions it becomes evident that governmental and NGO actions alone will not be enough to face this key problem; consumers need to act as well. A study by Bonini et al. (2008) showed that about 90% of consumers think that corporations should take actions regarding environmental issues. But the question arises what consumers themselves can do to protect the environment they live in? There are lots of ways consumers can act: taking public transportation, using energy saving electrical equipment, recycling, eating less meat and more organic food or using green energy, just to name a few. The Greendex study by National Geographic (2010) identified that 56% of consumers are concerned about environmental problems but only 29% feel guilty about their own impact. Nevertheless, 57% are convinced that society has to decrease their consumption in order to improve the environment for upcoming generations.

Today the 'green consumer' is, in general, a well-known and widely used expression. He[1] can be defined as an environmentally concerned person who behaves in consistence with his concern for the environmental consequences of his possession, usage and disposal of products and services. Furthermore, he keeps the public consequences of his consumption in mind. Hence, the green consumer has to make a lot of difficult

[1] 'He' will be used for male and female consumers respectively throughout this study.

choices. However, there are huge differences amongst consumers as to what they regard as environmentally friendly behaviour and how they act accordingly. (Moisander 2007)

1.1 Problem Identification

It becomes evident that it is highly interesting to study what consumers can do to be green, what they are willing to do and for which reasons. Hence, it is relevant to examine private household's environmental behaviour and how they can improve it. As this is an extremely broad topic it was decided to first narrow it down geographically. As the author's nationality is German and therefore has background knowledge it was decided to research the German market.

Between 1990 and 2010 the yearly energy costs of German households rose, more or less continuously, from €826 to €1.561. Hence, the energy costs almost doubled within 20 years. However, this did not lead to a decrease in consumption which was rather stable throughout the years. (Bundesministerium für Wirtschaft und Technologie 2011) This clearly shows that the constantly high energy usage is a major problem for the environment and an increasing problem for a household's wallet. Therefore, it is highly relevant to find ways to reduce German households' energy consumption. Hence, the focus of this paper will be on energy consumption of German households.

In recent years smart energy meters were introduced to the market and tested in various researches. A smart energy meter provides the user with real-time consumption feedback. For example, it could measure the total household electricity consumption or the electricity used for separate appliances. The idea is that the provided feedback will raise awareness and therewith change the consumer's behaviour, which will lead to a reduced energy usage. (Hargreaves, Nye & Burgess 2010, Darby 2010, Kappel, Grechenig 2009, van Dam, Bakker & van Hal 2010)

A highly interesting new type of energy meter was developed in Denmark: the WaterGuide (WG). The WaterGuide is a smart energy meter attached to the shower tap. It measures and displays time, water temperature and amount of water used during a shower. Thus, its purpose is to raise awareness about ones consumption and therewith enable the household to reduce their warm water energy usage. The WaterGuide is found to be a highly interesting and innovative device. It is the only energy meter aimed at reducing the energy used for warm water in private households – more specifically, its target group are families

with children. Thus, it is a unique product which is why it was decided to be used as a case in the present research.

Statistics show that 12%[2] of the energy consumed in a German household is used for warm water. That is the second highest after energy used for heating. (BDEW 2010) In total, the highest amount of water with 36% (45 litres) a day is used for showering and bathing. (BDEW 2012) Overall, these numbers show that the energy used for warm water and especially in the shower/bathtub is a relevant source of a household's energy consumption in Germany and therefore worthwhile to be investigated in more detail.

1.2 Research Question

As identified above it is highly interesting to investigate the warm water energy consumption of German households. The WaterGuide presents an especially interesting way to reduce energy used in the shower. It was therefore chosen as the focus of this thesis. With its target groups being families with children, this leads to the following research question.

How do German families with children perceive awareness raising smart energy meters for the shower?

In order to answer the stated research question it is important to first understand the warm water energy consumption behaviour of German families with children. Also it needs to be identified what motivates them to reduce their consumption. Then, it can be assessed how the smart energy meter – in this case the WaterGuide – is perceived. This will lead to indications whether there is a market for such a product and how it should be marketed. Thus, the following sub-questions arise.

- How is the warm water consumption behaviour of German families with children?
- What motivates them to reduce their consumption?
- Do German families with children present a profitable market for the smart energy meter Water-Guide?
- How should the WaterGuide be marketed?

[2] In 2008, not taking into account energy consumption for vehicles.

In the remainder of this project, appropriate theory will be identified based on which primary research will be carried out, in order to answer the presented research question and its sub-questions. The structure of the thesis is shown in section 1.4.

1.3 Research Objectives

The problem identification and the research question with its sub-questions implicate the following research objectives for the study.

- Assess critically relevant theories and frameworks.
- Investigate the warm water consumption behaviour of German families with children.
- Investigate what drives them to reduce their warm water consumption.
- Investigate how German families with children perceive the WaterGuide.
- Identify if there is a market potential for the WaterGuide.
- Develop recommendations on how to position, distribute and market the WaterGuide.

These specific objectives will guide the design of the primary research.

1.4 Thesis Structure

To illustrate the structure of this research the content of the different chapters will be briefly summarized in the following.

Chapter 1 introduced the topic of this thesis. It highlighted the relevance of the chosen problem and developed the project's research question as well as sub-questions.

Chapter 2 introduces the theoretical framework on which the primary research and the analysis will be based. First, it provides an overview of relevant current work done within the field of environmentally friendly consumer behaviour. It then presents relevant consumer behaviour constructs followed by a thorough presentation of the main theory, the Theory of Planned Behaviour.

Chapter 3 provides the reader with information about the case company Smile Energy and their product the WaterGuide.

Chapter 4 outlines the methodological choices made in this research. At first, the underlying research philosophy is described. Then, the research approach and strategy will be introduced followed by a detailed description of how the quantitative and qualitative research are conducted and analysed.

Chapter 5 and 6 contain the findings as well as the in depth analysis of the quantitative and qualitative data sets.

Chapter 7 develops the managerial implications that can be drawn from the primary data analysis. First, it is assessed whether there is a market for the WaterGuide in Germany. This is followed by marketing recommendations for the brand.

Chapter 8 concludes with answering the research question and its sub-questions based on the analysis from chapter 5 and 6 as well as the managerial implications from chapter 7.

2

THEORETICAL FRAMEWORK

The aim of this chapter is to provide a deeper understanding of the topic at hand and to introduce theories and concepts based on which the empirical analysis will be constructed. First, current literature in the field of ecological consumer behaviour will be reviewed and relevant findings presented. Then, consumer behaviour constructs underlying this work will be briefly introduced. Finally, the main theory used for the empirical analysis will be assessed in detail, the Theory of Planned Behaviour (TPB). This will be followed by a discussion of how the author understands the concept of attitudes, which is contrary to the view in the TPB. Based on that discussion the TPB will be slightly adjusted into how it will be used in the remainder of this thesis.

2.1 Contextual Background

In order to gain a preliminary understanding of the problem at hand it is important to sight already existing literature. Therefore, a literature review on the current findings in regards to ecological consumer behaviour will be conducted. Relevant literature on attitudes towards energy and water saving as well as studies on energy meters will be assessed.

2.1.1 Ecological Behaviour

In general, scholars research various drivers of environmentally friendly behaviour. Main topics identified and researched in this context are values, altruistic motivation, beliefs, monetary motivation, intrinsic satisfaction, moral obligation, social responsibility, community influence, personal identity and attitudes. (Stern 2000, Minton, Rose 1997, De Young 2000, Kaiser, Wölfing & Fuhrer 1999, Gadenne et al. 2011, Gilg, Barr 2006) Consequently, it can be said that the field of ecological consumer behaviour is extremely broad. Therefore, only the findings relevant to the underlying research are presented in this chapter.

In general, ecological behaviour is found to be prone to various influences. For example, outside temperature influences the household energy consumption and the costs of using warm water influence a person's motivation to conserve water. Personal capabilities also influence environmentally friendly behaviour. These are factors such as knowledge, resources, skills and time. (Stern 2000, Kaiser, Wölfing & Fuhrer 1999)

Gatersleben et al. (2002) found that consumers only change their behaviour if it does not require too much change in comfort or too much effort. Moreover, they note that people may not always be aware of their consumption and the impact it has. Especially energy consumption is not visible and therefore often not paid attention to. For example, it was found that moral obligation is likely to lead to environmentally conscious behaviour; however, only when awareness of the consequences of behaviour is high. The fact that people are not aware of the consequences of their consumption may also be explained by habits. Habits were found to play a major role in the field of environmental friendly behaviour. Such behaviours as recycling, switching off lights, taking the car to work or taking a shower are performed on a regular basis in nearly the same manner and without thinking about them; hence, they are performed habitually. (Hargreaves, Nye & Burgess 2010, Stern 2000, Minton, Rose 1997, Thøgersen, Ölander 2003, Maréchal 2010) Habits usually represent short-term benefits. However, long-term rewards for changing the behaviour are often not considered. (Maréchal 2010) For example, taking a long shower provides relaxation while reducing ones shower time can lead to monetary savings and environmental protection in the long run.

Finally, Jorgensen et al. (2009) state that people often countervail their behaviour. For example, someone who installs a water saving showerhead is likely to increase their shower time; hence, no saving occurs. This is also called the rebound effect. (van Dam, Bakker & van Hal 2010)

2.1.2 Environmental Attitudes

In the reviewed literature it became evident that attitudes are a main concept in ecological consumer behaviour and that there is a difference between two types of attitudes in this area: attitude towards the environment and attitudes toward ecological behaviour itself. (Kaiser, Wölfing & Fuhrer 1999)

Attitude towards the environment refers to environmental concern. (Kaiser, Wölfing & Fuhrer 1999) Regarding the direct connection between attitudes towards the environment and environmental behaviour, numerous studies found that there is only a weak direct influence. Even though many consumers indicate to be concerned about the environment their behaviour is inconsistent with these attitudes. (Vantomme et

al. 2004, Bamberg 2003) Nevertheless, other scholars found attitude towards environmental issues to be directly connected to environmental behaviour, such as recycling and buying environmentally safe products. (Bamberg 2003, Willis et al. 2011) Another opinion is that attitude towards behaviour itself is the only direct influence on specific behaviour, in this case specific ecological behaviour. (Bamberg 2003, Fishbein, Ajzen 1980)

Costarelli and Colloca (2004) found that people with ambivalent attitudes towards the environment, i.e. holding a mix of positive and negative attitudes at the same time, tend to have low intentions to behave environmentally friendly. Additionally, it is assumed that people only convert their attitude into action when this involves minor monetary, time or comfort costs. (Bamberg 2003)

2.1.3 Real-time Feedback Meters

In general, real-time feedback meters can be described as technical appliance that provides the consumer with just-in-time information of their consumption and therewith helps them understand and interpret their consumption. These meters can measure different types of household consumption, such as overall household energy consumption, consumption of separate appliances or water flow. (van Dam, Bakker & van Hal 2010, Kuznetsov, Paulos 2010)

Until now different studies with different types of real-time feedback displays have been conducted. Studies explored how smart energy monitors as well as water flow displays are perceived by households. The general assumption is that consumption feedback will increase an individual's awareness and thereby encourage them to reduce their consumption. (Hargreaves, Nye & Burgess 2010)

Studies testing energy monitors show several important results. It is highly important for the meter to be placed in a central place in the household and to look good in a way that it fits into the household. More generally, it must fit into daily life in order to have an impact. The display must be user friendly; hence, information provided on the display must be understandable and clear. (Hargreaves, Nye & Burgess 2010, van Dam, Bakker & van Hal 2010) Furthermore, depending on family dynamics the installation of an energy monitor can lead either to co-operation or to conflicts between the household members. Identifying whose energy usage should be reduced in which ways can lead to disputes. Finally, it was identified that there is a tendency that after a certain time period the usage of the monitor will drop excessively. (Hargreaves, Nye & Burgess 2010) It was found that the monitors do have a potential long-term impact due to changed habits.

Contrary, it was also found that the impact on consumption decreases over a longer time period. (Darby 2010, van Dam, Bakker & van Hal 2010)

There are also studies focusing on feedback displays measuring water flow. Kappel and Grechenig (2009) state, that feedback is only effective if there is a minimum time gap between action and feedback. If this is given, feedback displays provide the user with goals and motives he did not have before. Furthermore, the monitor will be more effective if it displays consumption of one source so that the user can adjust his behaviour in regards to that specific source. Finally, the monitoring appliance must be visually attractive to the user. Kuznetsov and Paulos (2010) identified in their study that a visual display led to higher savings than a numeric display on a water flow meter. This was identified to be due to the fact that users did not know how to interpret the numbers, because they did not know what is high and what is low consumption. The authors conclude that visual displays showing clear negative or positive benchmarks are most likely to have an influence on long-term behaviour.

2.2 Consumer Behaviour

In this section general consumer behaviour constructs relevant for the analysis and the construction of the primary research will be introduced briefly.

In general, consumer behaviour can be identified as the process individuals go through when selecting, purchasing, using and disposing a product/service that satisfies their needs. Hence, it is an ongoing process the marketer needs to understand and incorporate into the marketing plan. (Solomon et al. 2010, Geuens, Van den Bergh & De Pelsmacker 2010)

As McCracken (1986) states “consumer goods have a significance that goes beyond their utilitarian character and commercial value”. In this regard, it is important to introduce the concepts of the self, consumer motivation and values because they provide insights into the bigger significance consumer goods have.

2.2.1 The Self

The self-concept is what a person thinks about his attributes and how he evaluates these. (Solomon et al. 2010) A person can hold various selves which can be positive or negative and vary in time perspective. Moreover, each person holds three selves, the actual self, the ideal self, and the expected self. Thereby the

ideal self is who a person wants to be and the expected self is who a person thinks he might become. The actual self presents the realistic assessment of a person's qualities. (Solomon et al. 2010, Patrick, MacInnis & Folkes 2002)

"*We are what we have and possess*" (Belk 1988) is one of the most meaningful facts in consumer behaviour. Humans chose specific products in order to present their actual self to others or in order to get closer to their ideal self. Often, this is related to managing how others think of us and trying to put ourselves in a positive light. (Solomon et al. 2010) Belk (1988) goes even further with his definition of the extended self: purchased objects that are perceived as meaningful become a part of the self. Four levels of the extended self can be identified: individual level, family level, community level and group level. Overall, possessions generate and maintain a person's self-definition as well as their social identity. (Solomon et al. 2010, Belk 1988)

2.2.2 Consumer Motivation

In order to understand why people behave in certain ways one has to understand their motivation. In general, a motivation is a person's desire to satisfy an occurring need. This need can either be hedonic or utilitarian. Hence, it can be the desire to achieve an emotional experience or functional and tangible benefits respectively. However, a consumer can also be motivated to buy a product that provides both - hedonic and utilitarian - types of benefits. Overall, motives are always goal oriented and vary in strength depending on the level of need arousal. Furthermore, the goal orientation can be either positively or negatively motivated. In the case of negative motivation the consumer tries to avoid a negative outcome whereas when being positively motivated he seeks personal satisfaction. (Solomon et al. 2010) Finally, it can be distinguished between primary and selective motives. A primary motive is a person's reason to engage in a class of behaviour while a selective motive is his choice regarding which specific behaviour in that class to engage to. (Moisander 2007)

In consumer research a number of different approaches to classify consumer needs exist. Needs can for example be classified into need for affiliation, need for power, need for achievement and need for uniqueness. However, one of the most known approaches and therefore worthy of introducing it here is Maslow's hierarchy of needs. (Solomon et al. 2010)

According to Maslow human needs can be put in a hierarchical order. He identified five types of needs, which is shown in Figure 1. The order is fixed, hence, if a basic lower-level need is not satisfied the next higher one will not be activated. However, this approach must be seen critically as one product can potentially satisfy different need levels. Also the order of needs could be perceived differently in-between cultures. Nevertheless, the important key point is that consumers most likely have different priorities in which order to satisfy their needs. (Solomon et al. 2010)

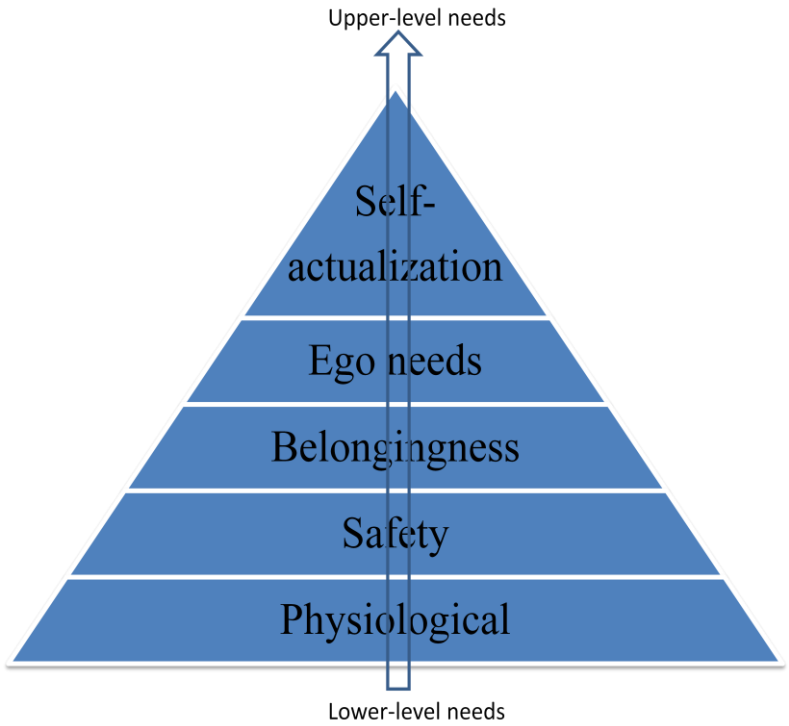

Figure 1 Maslow's Hierarchy of Needs

Source: In accordance to (Solomon et al. 2010)

2.2.3 Values

A value can be defined as a belief about a desirable end-state that guides behaviour. They are general beliefs that apply in various situations. In each culture a set of core values can be found. However, in this project it are the consumption-/ and product-specific values that are of interest. Hence, the values a consumer receives through consumption. These could be such as status, efficiency and ethics. The ongoing development of people going green can be explained by the value they hold, pro-environmental behaviour. (Solomon et al. 2010)

2.3 Theory of Planned Behaviour

In this section the Theory of Planned Behaviour will be discussed. This is followed by the discussion of an attitude concept that differs from the one underlying the TPB. Based on that, an adapted TPB will be introduced.

2.3.1 The Theory of Planned Behaviour

It was decided to use the Theory of Planned Behaviour as the main theoretical framework for the quantitative research. The model has been widely used and it was found to be a good predictor of behaviour and intentions. In addition it is found to be a helpful tool in order to identify how to develop strategies to change behaviour. (Madden, Ellen & Ajzen 1992, Ajzen 1991) Furthermore, scholars found it to be useful in predicting and understanding ecological behaviour. (Kaiser, Wölfing & Fuhrer 1999, Bamberg 2003, Jackson 2005) Hence, it will serve as a basis to set up (chapter 4.4.1) and analyse (chapter 5) the online survey which aims at identifying the warm water consumption behaviour of German families with children and what drives them to reduce it.

The Theory of Planned Behaviour is an extension of the Theory of Reasoned Action (TRA) which is why the TRA will be introduced first. The Theory of Reasoned Action, shown in Figure 2, was first introduced by Icek Ajzen & Martin Fishbein in 1975. The theory aims at predicting and understanding human behaviour. The authors state that in order to change behaviour, one must first fully understand it. (Fishbein, Ajzen 1980) This points out, again, the theory's relevance for the present research as the case company's product strives to change people's showering behaviour.

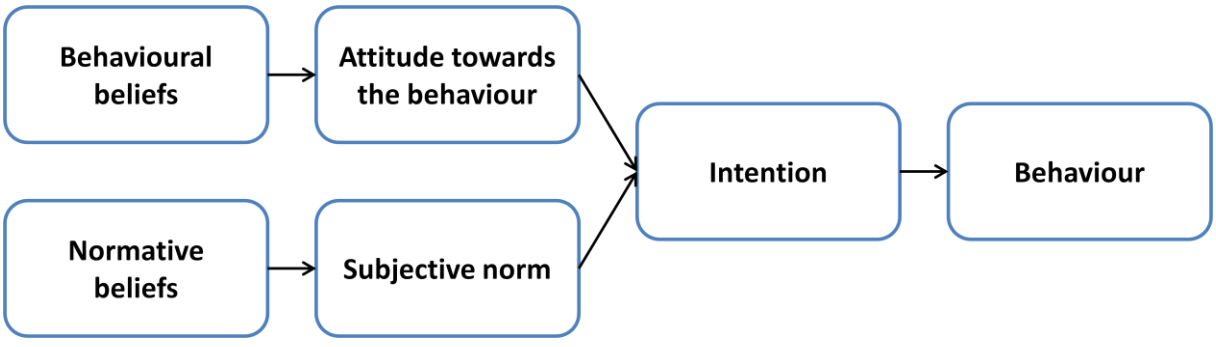

Figure 2 Theory of Reasoned Action

Source: (Ajzen, Fishbein 1975)

In general, the theory states that the likelihood of performing a specific behaviour is determined by the person's intention to do so. A person's intention consists of two constructs: the attitude towards the behaviour in question and the subjective norm. Finally, the attitude towards behaviour is influenced by the person's behavioural beliefs and the subjective norm is influenced by the person's normative beliefs. (Ajzen, Fishbein 1975) All six construct of the theory will be described in the remainder of this section.

Behaviour

The Theory of Reasoned Action departs from the notion that human behaviour is rational. Hence, people consider the consequences of their actions before deciding whether to engage or not to engage in them. Furthermore, it is assumed that people perform behaviour under volitional control. (Fishbein, Ajzen 1980)

According to the theory, it needs to be differentiated between single behaviour and general behavioural categories. Since it is impossible to directly observe behavioural categories, single actions that are part of a category must be observed instead. (Fishbein, Ajzen 1980)

Overall, the authors identified four elements of behaviour which need to be taken into account when observing it. These are action, target, context and time. First of all, behaviour always implies an action. Second, it is important to define the target at which the behaviour is directed. Finally, it needs to be taken into account in which context and within which time frame the behaviour occurs. However, the authors also state that behaviour assessed through self-reports rather than observation can be obtained without specifying target, context and time. (Fishbein, Ajzen 1980)

Intention

As mentioned above, the TRA assumes that people perform behaviour under volitional control. Therefore, the theory argues that a person's intention to perform a specific behaviour is the only direct influence on actual behaviour, whereat intention is defined as the likelihood to perform a specific behaviour. In consequence, one can predict a person's behaviour by simply asking that person for his intention to perform the behaviour. (Fishbein, Ajzen 1980)

In order to assure that intention can help predicting behaviour two criteria must be fulfilled. First, the intention measurement must be consistent with the behaviour measurement. Hence, action, target, context and time must be the same for both measurements. Second, the intention must be consistent over time.

Therefore, to assure consistent intentions the time distance between the measurement of intention and behaviour should be as short as possible. (Fishbein, Ajzen 1980)

Albeit asking a person for his intention can help predicting behaviour, this does not lead to an understanding of why the person behaves in a certain way. In order to also understand behaviour, Ajzen & Fishbein identified two direct determinants of intention: attitude towards the behaviour and the subjective norm. (Fishbein, Ajzen 1980, Ajzen, Fishbein 1975)

Attitude towards the behaviour

In general, attitude towards behaviour is a person's evaluation whether that specific behaviour is good or bad and therefore should or should not be performed. Attitudes are defined as a function of behavioural beliefs. (Fishbein, Ajzen 1980) For example, in the present study this means if a person believes that reducing warm water consumption will help protecting the environment this person's attitude towards saving warm water is positive.

It is important to point out that the theory assumes the attitude towards behaviour to be a determinant of intention, not the attitude towards an object. Ajzen & Fishbein state, that attitude towards an object will only predict a general pattern of behaviour. However, the aim is to predict and understand a single behaviour. Therefore, it is the attitude towards that single behaviour which needs to be assessed and not the object towards which the behaviour is directed. (Fishbein, Ajzen 1980, Ajzen, Fishbein 1975)

In order to assure that the measurement of attitude provides an appropriate indicator for intention, the two concepts must be consistent. Also, it is important to assess a person's attitude towards his own behaviour, not the behaviour in general. (Fishbein, Ajzen 1980)

Overall, the more favourable a person's attitude towards a specific behaviour, the higher will his intention to perform that behaviour be. Contrary, the more negative the attitude, the less likely will be the intention to perform. (Fishbein, Ajzen 1980)

Subjective norm

In general, the subjective norm refers to the degree to which a person feels under social pressure by important others to behave in a certain way. As can be seen in Figure 2, the subjective norm is a function of beliefs, normative beliefs. Normative beliefs are the beliefs a person holds about whether important others

think he should behave in a certain way. However, these perceptions might not be true. (Fishbein, Ajzen 1980) For example, in the present study a person may belief that family and friends think he should save warm water and therefore perceive social pressure to do so. Furthermore it is important to note, that the subjective norm can have an influence on ones behaviour independent of the own attitude towards that behaviour. (Fishbein, Ajzen 1980)

Usually, people tend to hold positive attitudes towards behaviours if they believe that important others think they should behave that way. However, sometimes a person's own attitude and the normative belief may contradict. In that case the person's intention depends on the relative weight that person gives to each of the two factors and his motivation to comply with the normative beliefs. (Fishbein, Ajzen 1980)

As with attitude towards the behaviour, the measurement of the subjective norm also needs to be consistent with the measurement of intention. (Fishbein, Ajzen 1980)

Beliefs

As shown above, beliefs play a major role in Ajzen & Fishbeins's theory. They are the determinants of attitude and the subjective norm. A person forms beliefs through observation, information from external sources and his own experience. Over time these beliefs can be consistent, modified or even forgotten.

Behavioural beliefs: When forming behavioural beliefs a person associates the behaviour in question with a certain outcome. According to the theory, it is the salient beliefs about behaving in a certain way and the herewith associated outcomes that influence ones attitude towards the behaviour. In order to assure that the measurement of salient beliefs provides an appropriate indicator for attitude towards behaviour, the two concepts must be consistent. (Fishbein, Ajzen 1980)

Normative beliefs: As stated before, normative beliefs are a person's beliefs about what he assumes specific others think he should or should not do. However, it are just the salient others that will have an influence. As with behavioural beliefs, it is important that the concepts normative beliefs and subjective norm are consistent. (Fishbein, Ajzen 1980)

From the Theory of Reasoned Action to the Theory of Planned Behaviour

In 1985 Ajzen introduced an extension of the Theory of Reasoned Action, the Theory of Planned Behaviour. Ajzen recognised that there is one main limitation to the TRA; people do not have volitional control over all kinds of behaviour. There are behaviours over which people only have a limited control, for example stopping to smoke or losing weight. In order to address that limitation one additional component was added: Perceived Behavioural Control (PBC). (Ajzen 1985, Ajzen 2012) The complete model is show in Figure 3.

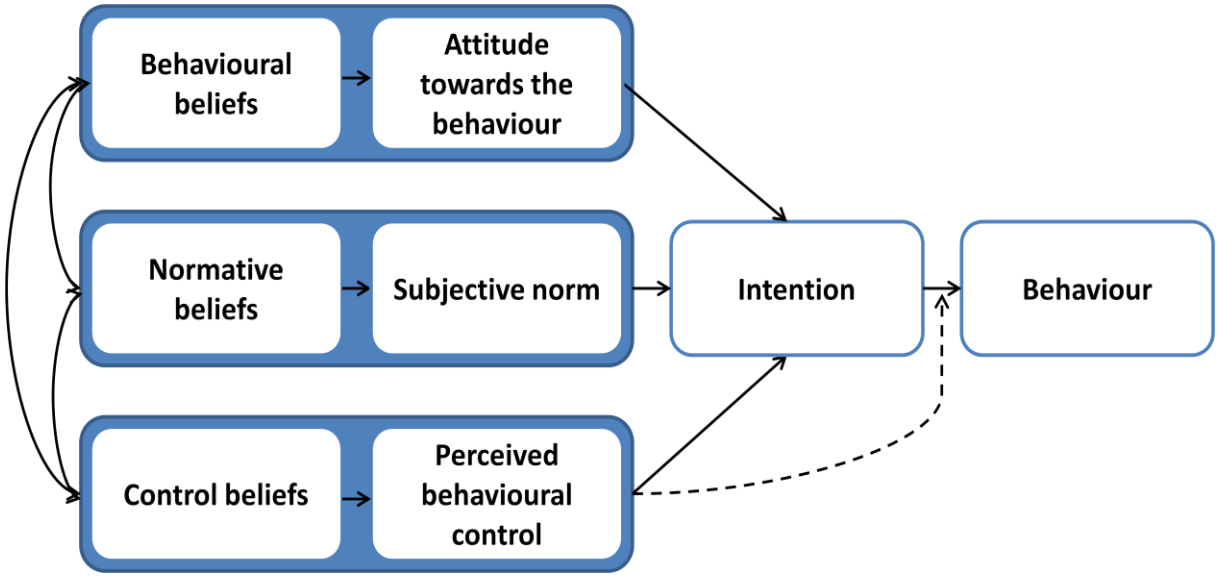

Figure 3 Theory of Planned Behaviour

Source: (Ajzen 2006)

In general, the theory assumes that the more positive the attitude towards behaviour, the more favourable the subjective norm and the stronger the perceived behavioural control, the higher should be a person's intention to perform the behaviour. Since each of the components has an influence on behaviour, they can serve as a starting point to influence a person in order to change his behaviour. (Ajzen 1991)

Perceived Behavioural Control & Control beliefs

Perceived behavioural control is defined as a person's perception of how easy or difficult it is to perform a specific behaviour. The rationale behind adding this construct to the theory is backed up by research which has proven that a person's behaviour is affected by his confidence in the own ability to perform. (Ajzen 1991) A person's ability to perform a specific behaviour may be limited by the following different aspects: lack of information, limited skills & abilities, the level of will power, emotions, pressure, time, opportunity and finally dependence on others. (Ajzen 1985)

Overall, PBC influences a person's intention to behave in a specific situation. Furthermore, the theory assumes that in some cases PBC provides an estimation of actual control and therefore together with intention can predict behaviour directly. (Ajzen 1985)

Perceived behavioural control is determined by a person's beliefs: control beliefs. They are the beliefs a person holds regarding whether he has the resources and opportunities to perform a behaviour. These beliefs can be based on the person's own previous experiences, friends' experiences, and secondary information about the behaviour as well as other factors that influence the perceived level of ease to perform the behaviour. The more confident a person is to have the resources and opportunities to perform the behaviour, the higher his perceived control will be. (Ajzen 1991)

In order to assure that the measurement of PBC provides an appropriate indicator for intention and/or behaviour, the three concepts must be consistent. (Ajzen 1991)

Other variables

Ajzen & Fishbein also acknowledge in their work that there might be other variables influencing a person's behaviour. These could be such as personality traits, intellectual and social abilities, or demographic variables. However, these variables are assumed to only have an indirect influence on behaviour as they are mediated by beliefs. It is not expected that including other variables would improve the prediction and understanding of behaviour. (Fishbein, Ajzen 1980, Ajzen 1985)

Further notes

As stated in the beginning of this section, the Theory of Planned Behaviour is built on the notion that human behaviour is rational. This must be seen as a limitation of the theory since it is generally agreed that human behaviour is not rational (Jackson 2005) but rather influenced by emotions and the consumer's self-concept. (Solomon et al. 2010) It also needs to be pointed out that in the TPB connections between attitudes towards the behaviour, subjective norm, and perceived behavioural control are drawn. However, reasoning behind these connections could not be found in the reviewed literature. Though, for example, it seems logical that a low degree of perceived behavioural control could influence a person's attitude in an unfavourable way. Nevertheless, these connections will not be taken into account in the further progress of this thesis as they are not of interest for the research. The aim of the research is to understand the behaviour of interest, namely reducing warm water consumption. Therefore, the focus of this thesis is on the constructs attitude towards behaviour, subjective norm, perceived behavioural control, intention and be-

haviour, as they will help understanding the behaviour and identify what needs to be addressed in order to change that behaviour.

2.3.2 The Attitude Concept

"*An attitude is a lasting, general evaluation of people, objects, advertisements or issues*". (Solomon et al. 2010)

It is highly relevant to identify attitudes because they do have an influence on actual behaviour. (Olson, Zanna 1993) This is also a main statement of the TPB. The relevance of reviewing the concept of attitudes lies in the fact that it is a more complex construct than PBC and subjective norm.

As stated before, Ajzen & Fishbein (1980) regard attitudes as a function of beliefs towards the object in question. However, most scientists today view attitudes as a construct consisting of three components, namely cognitive, affective and behavioural component. Hence, all three components must be assessed when investigating a person's attitude. (Kaiser, Wölfing & Fuhrer 1999, Solomon et al. 2010, Geuens, Van den Bergh & De Pelsmacker 2010, Olson, Zanna 1993, Bush, Ortinau & Hair 2009, Dembkowski, Hanmer-Lloyd 1994, Pooley, O'Connor 2000) The cognitive component comprehends a person's beliefs, knowledge and evaluation of the object in question. The affective component refers to the feelings a person holds towards the attitude object. Finally, the behavioural component represents the person's intention to behave with regards to the object. (Geuens, Van den Bergh & De Pelsmacker 2010)

Based on the fact that the multi-component-view of attitude is the most widely accepted amongst scholars, it was chosen to adopt that view into the assessment of the attitudinal component of the TPB. It is important to understand all three components of attitudes in order to understand their impact on behavioural intention. (Geuens, Van den Bergh & De Pelsmacker 2010, Bush, Ortinau & Hair 2009)

2.3.3 Adapted Theory of Planned Behaviour

The author of this thesis decided to adapt the attitude component of the Theory of Planned Behaviour according to the justification in the preceding section 2.3.2. It was shown that the multi-component-view of attitude is dominant amongst scholars. Moreover, it is believed that this view will provide superior and more detailed insights into a person's attitude. The adjusted theoretical framework is shown in Figure 4.

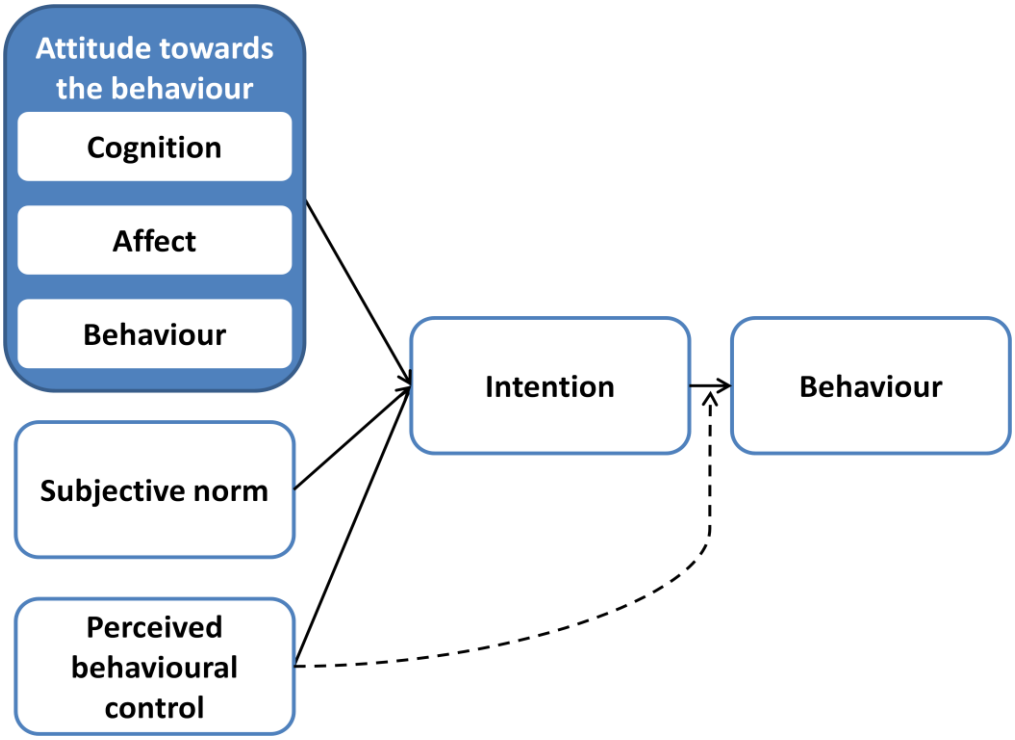

Figure 4 Adapted Theory of Planned Behaviour

Source: (Ajzen 2006) with adjustments made by the author based on (Solomon et al. 2010)

As can be seen in Figure 4, further small adjustments to the Theory of Planned Behaviour opposed to as shown in Figure 3 were made. In the TPB it is stated that attitude, subjective norm, and perceived behavioural control are determined by a person's beliefs. It is assumed, that Ajzen included beliefs in the model in order to explain how the three constructs are formed. Since beliefs constitute the three constructs attitude, subjective norm, and PBC, it is assumed not to be necessary to assess them separately. Beliefs are assumed to be predominantly equal to the corresponding construct. Finally, the interrelation between attitude, subjective norm, and PBC is not shown in this adjusted framework. The author does acknowledge the correlation. However, in accordance with the research objectives it was decided that it is not of relevance to the present project.

3

CASE COMPANY

As mentioned in the introduction, the research objectives are based on the case company Smile Energy and their product WaterGuide. Therefore, this chapter provides an introduction to the case company, their product WaterGuide and the competitive market situation.

3.1 Smile Energy

In December 2010 Thorkild Rasmussen started the company Smile Energy ApS in Skanderborg, Denmark. The company's aim is to develop products that help private households save energy and therewith protect the environment. The products will be sold through the company's webshop and in the Do it yourself (DIY)-chain Bauhaus. Moreover, the company aims at helping consumers to change habits and lower their energy consumption. The appliances will do so in an easy and fun way.

Up to this point the main focus of the company is its first product development: the WaterGuide. With this product idea Thorkild Rasmussen won over two investors, Energi Midt Udvikling A/S and Innovation Midt Vest A/S. The product will be described in detail in the following section 3.2.

The target group identified by Smile Energy are families in the age group of 30-55 with children. Education is not a segmentation criterion as it is assumed that all families will be attracted by the opportunity to save energy. It is planned to mainly use Public Relations as a communication tool. Thorkild Rasmussen has a background in journalism and will use this expertise to get free publicity in printed as well as electronic media. Furthermore, online communications as well as participation in fairs are planned.[3]

[3] The information is obtained from verbal and written personal contact with Thorkild Rasmussen. Furthermore, information is obtained from Smile Energy's business plan which can be provided upon request.

3.2 The Product: WaterGuide

The idea for the WaterGuide arose from Thorkild Rasmussen's private life. Consuming a lot of energy and water when showering, he searched for a way to raise awareness in a fun and competitive way. So far the product has not been launched. However, the launch in Denmark is supposed to take place in the end of 2012. It is intended to expand the business to Germany approximately one year after the launch in Denmark.

The WaterGuide, shown in Figure 5, is a flow and energy meter installed in the shower between the faucet and the flexible tube. It measures and visualizes the warm water consumption during the shower. The amount of water used in litres, the water temperature and time spent are displayed. Based on these three measurements the WG calculates overall energy consumption.

Figure 5 The WaterGuide

Each family member selects a symbol from the water world such as a fish or starfish, as can be seen in Figure 5. Each time a member of the family starts showering, the WaterGuide turns on and the person has to select his icon through pushing the button. Then, the WG starts measuring and displaying the time, water temperature and amount of water used. Based on that, the overall energy consumption is displayed in a bar which keeps filling (Figure 6). Depending on the energy used the WG shows three different levels of how *good/bad* ones consumption is. In the first level, the display is green and shows a happy smiley. Hence, the overall energy consumption is *good*. 30 seconds before entering the next level - yellow display and neutral smiley - a sound and the blinking display warn the user that he is about to leave the level in which his consumption is *good*. For example, when showering at a temperature of 38°C the green level lasts for about 3½ minutes and until about 6½ minutes the user showers in the yellow level. Again, before leaving

the yellow level the user is warned by sound and blinking. Finally, in the last level the display is red and the smiley is sad, indicating a too lavish consumption. The different stages are shown in Figure 6.

Figure 6 WaterGuide Consumption Levels

At the end of each shower the total amount of water used, the total time and the average temperature are shown. This is followed by a ranking that compares each users last shower data, as shown in Figure 7. The comparison of each user's last consumption data is supposed to trigger a feeling of competition within the family. However, competition that is fun. Most likely especially siblings will have fun trying to be *better* than their brothers or sisters.

Figure 7 WaterGuide Consumption Overview per Family Member

Overall, the WaterGuide is a device that raises awareness about consumption while showering and makes it fun and easy to change habits of all family members. The estimated saving potential varies by type of heating. For example, an average family of four with gas furnace can save approximately € 124 and 81kg of CO2 in a year. This is based on the assumption that each family member can reduce his shower time by one minute due to the raised awareness. Another measurement for the saving potential is the actual outcome of the company's first product test with 20 Danish families at Energi Midt. On average, they managed to cut down their hot water consumption by a little more than 30% when comparing their before- and after consumption.[4]

[4] The information is obtained from verbal and written personal contact with Thorkild Rasmussen. Furthermore, information is obtained from Smile Energy's business plan which can be provided upon request. Finally, the user manual (to be found in Appendix 3) served as a source.

3.3 Market Situation

Before establishing a marketing strategy it is extremely important to conduct an analysis of the market conditions. Hence, potential competitors must be identified. These can either offer the same product, or products the customer sees as an alternative. (Geuens, Van den Bergh & De Pelsmacker 2010) Therefore, in the following, potential competitors of the WaterGuide will be introduced briefly. According to Thorkild Rasmussen, devices that help households reduce their water and energy bill are competitors of the WG.[5]

There are several different products that help consumers save warm water and therewith energy costs. The most basic way is to attach a flow controller to the water tap on the sink. This reduces the amount of water used from about 15 litres per minute to 7 litres. Additionally, estimations show that it saves approximately € 111 in energy costs a year. Water saving shower heads are also a well-established tool to reduce warm water consumption in the shower. They use about 8 litres of water a minute compared to 15 litres when using a conventional shower head. Energy costs can be reduced by about € 97. Consumers can also install a thermometer in the shower in order to raise awareness how warm they shower. (Greenyworld GmbH 2012)

Another option for the consumer to reduce water and energy consumption is a good water flow heater. For example, Siemens sells one with an 'eco-button'. Simply pressing that button saves up to 20% energy and water. (Siemens-Elektrogeräte GmbH 2012) In the broader sense energy and water efficient dishwashers and laundry machines can then be considered as competition as well.

Overall, it becomes clear that there are different products that can help households to reduce their water and energy consumption. However, none is like the WaterGuide. The WG is the only device that raises awareness about the consumer's consumption in the shower and therefore influences and changes behavior. Thus, it is unique and no direct substitutes exist.

[5] The information is obtained from verbal and written personal contact with Thorkild Rasmussen.

4

METHODOLOGY

As mentioned in the introduction, the objective of this research is to investigate the warm water consumption behaviour of German families with children. It will be investigated what their attitudes towards reducing their warm water consumption are and how they perceive feedback from smart energy meters. The aim of this chapter is to describe the applied research approach in order to address the identified research objectives. First, a brief outlook on the philosophical stance will be given. This is followed by an outline of the research approach and research strategy. Then, a detailed description of the chosen methods of primary data collection will be provided as well as how the data will be analyzed. Finally, validity, reliability and limitations of the chosen approach will be discussed.

4.1 Philosophy of Science

All research develops new knowledge. Therefore, it is important to specify how the world is perceived by the researcher before conducting research and interpreting its results. Hence, it needs to be clarified which research philosophy the researcher belongs to. The research philosophy one adopts holds certain assumptions about how the researcher sees the development of knowledge and its nature. This supports the methodological decisions the researcher makes. Besides determining ones research philosophy, it needs to be identified which ontology and epistemology the researcher belongs to. (Lewis, Thornhill & Saunders 2009)

Research Philosophy

The research philosophy underlying the present study is pragmatism. In this view it is not the philosophical stance of the researcher which influences the research approach. Rather, it is about finding the research approach appropriate to answer the particular research question. Hence, the researcher can have variations in his ontology and epistemology. Furthermore, this implicates that quantitative and qualitative research can be mixed and are seen as supplementary. This is also called mixed methods and has the advan-

tage that a phenomenon can be researched in depth and breadth. (Lewis, Thornhill & Saunders 2009, Alasuutari, Bickman & Brannen 2008, Armitage 2007)

Ontology

Ontology is the nature of truth, the belief of what can be real and what cannot. (Willis 2007) There are two differing aspects, objectivism and subjectivism. In objectivism a social entity is seen as existing independent of social actors. In subjectivism "*social phenomena are created from the perceptions and consequent actions of social actors*". Due to the ongoing social interaction these phenomena can change constantly. (Lewis, Thornhill & Saunders 2009) In this research subjectivism will be the underlying ontology. The author believes that the social phenomenon of environmental protection, in this research more specifically energy and water conservation, can only be understood if the subjective motivations of individuals are explored. The individual's view of the world influences how he perceives a situation and affects his actions and social interactions.

Epistemology

Epistemology is the study of knowledge and how it is acquired. (Steup 2005) The two differing viewpoints in epistemology are that only observable phenomena constitute acceptable knowledge contrary to the belief that subjective meanings such as feelings and attitudes are acceptable knowledge as well. (Lewis, Thornhill & Saunders 2009) The author believes that both - observable phenomena and subjective meanings - constitute acceptable knowledge. There can be cases in which collecting observable data is appropriate, cases in which assessing feelings in a narrative way is appropriate, or cases in which presenting data about feelings in a statistical way is appropriate. In the present study the author believes that in order to generate knowledge about German families warm water consumption behaviour it is appropriate to assess their feelings and attitudes in a statistical manner. Furthermore, in order to create knowledge concerning how German families perceive smart energy meters for the shower a narrative approach seems appropriate.

4.2 Research Approach

There are two research approaches the researcher can adopt. The deductive approach develops hypothesis based on a chosen theory and then designs the research strategy to test the hypothesis. In the inductive approach data is collected first and then theory is developed based on the gathered data. Deductive research often implies the collection of quantitative data whereas inductive research usually implies the collection of qualitative data. (Bush, Ortinau & Hair 2009, Lewis, Thornhill & Saunders 2009)

The present research does not completely follow either approach. However, it is closer to the deductive approach. In chapter 2 an extensive review of relevant theory and literature was given. Based on that theory the quantitative research design is developed. Nevertheless, it was chosen not to establish hypothesis. Instead of proving or disproving specific hypothesis the aim is to gain general insights providing answers to the research question and its sub-questions. Therefore, in addition to the quantitative data, qualitative data will be collected as well.

4.3 Research Strategy

The overall strategy in this thesis is the use of case study research, which is the preferred approach when the research question is a "why" or "how" question. Furthermore, a case study is appropriate when the research strategy does not require control over behavioural events and when its focus is on a contemporary event. (Yin 1994) As all these criteria are given in the present research, the case study approach was identified as appropriate.

In general, a "*case study allows an investigation to retain the holistic and meaningful characteristics of real-life events*". It is defined as "*an empirical enquiry that investigates a contemporary phenomenon within its real-life context […], relies on multiple sources of evidence […] and benefits from the prior development of theoretical propositions to guide data collection and analysis.*" (Yin 1994)

A common criticism of the case study research is that no scientific generalization can be made based on a single case. (Yin 1994) This limitation needs to be taken into account. Hence, the goal is to get a broad and deep understanding of the chosen case and not to generalize the results to the whole population.

A single-case study design was chosen because the present case is unique. The case company's product WaterGuide is the only one of its kind. Hence, the case in the present study is the product WaterGuide with the unit of analysis being German families with children.

As highlighted in the case study definition, relevant theory must be identified prior to data collection as it will guide what data to collect in order to investigate the research question. (Yin 1994) Therefore, prior to data collection in chapter 4.4, the theoretical framework was established in chapter 2. Furthermore, the definition points out that a case study is based on multiple sources. This is also given in the present work. In

chapter 2.1 various secondary data concerning the given topic was reviewed and in the following chapter 4.4 primary data will be gathered.

As Yin (1994) states, case studies can be exploratory, descriptive and explanatory and can also be a mix of qualitative and quantitative research. In the present study the research approach is a combination of exploratory and descriptive research. Exploratory research gathers insights and helps getting a deeper understanding of consumer behaviour, attitudes and motivation. The methods used are qualitative. (Bush, Ortinau & Hair 2009) In the present research the method used is semi-structured interviews (chapter 4.4.2). Descriptive research gives answers to how, when, where, what, who questions by collecting numerical data. Hence, its methods are quantitative. (Bush, Ortinau & Hair 2009) In this project an online survey is conducted (chapter 4.4.1). Summarizing, the research approach is a mixed methods approach carried out in a sequential manner. (Bergman 2008) This is in accordance to the pragmatic view underlying this project. The overall research process is summarized in Figure 8.

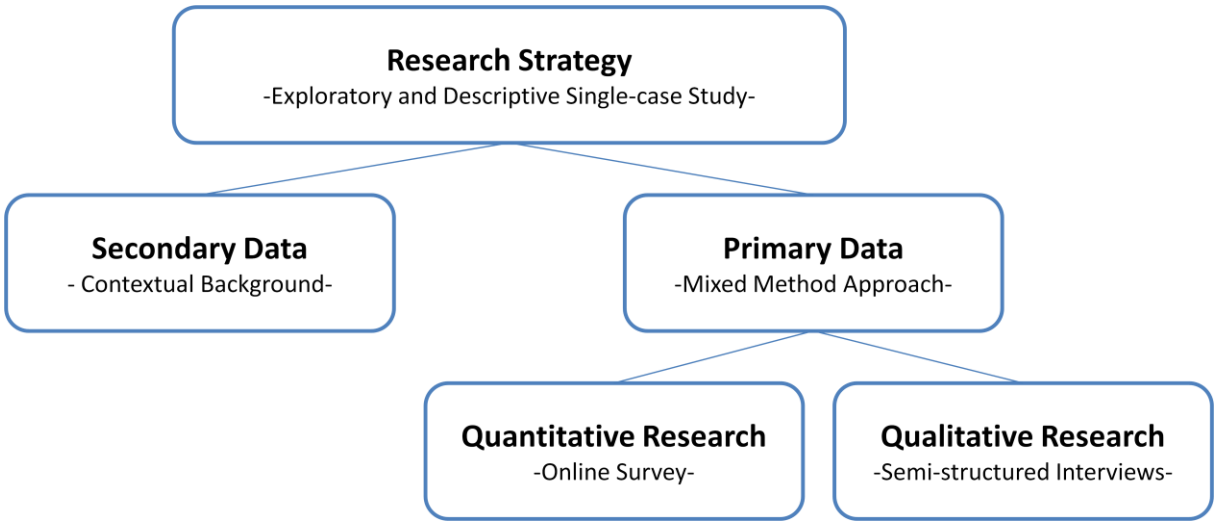

Figure 8 The Research Process

Source: Author

4.4 Methods of Data Collection

In order to gain insights regarding the research problem and in order to provide managerial implications, primary data will be collected using the mixed method approach. Hence, quantitative as well as qualitative research methods will be applied. Both are described in the following two sub-sections.

4.4.1 Quantitative Research Design

"*Quantitative research places heavy emphasis on using formal standardized questions and predetermined response options in questionnaires or surveys administered to a large number of respondents.*" (Bush, Ortinau & Hair 2009)

In the present study quantitative research was conducted in the form of an online survey. The objective is to gather insights that will help answering the research sub-questions: 'How is the warm water consumptions behaviour of German families with children?' and 'What motivates them to reduce their consumption?'. This is highly relevant to explore because "*understanding behaviour of target groups is an essential element*". (Geuens, Van den Bergh & De Pelsmacker 2010) Hence, the insights gained from the quantitative research will help giving recommendation on how to market the WaterGuide.

Before conducting the survey it was pre-tested. Eight people were asked to participate in the survey and informed the researcher about comprehension problems and anything that came to their mind. This led to the reformulation of questions in order to assure comprehension. It also led the author to the decision to adjust the scale points from a 6-point scale to a 4-point scale.

It was chosen to conduct the survey in German language as it can be assumed that the respondents English language proficiency is likely to be insufficient. The questionnaire consists of 16 questions out of which 6 are demographic questions. Hence, 10 questions aim at gaining insights into the respondents' warm water consumption behaviour. These questions were carefully constructed based on the theoretical framework presented in chapter 2. Question 1 and 2 address the general attitudes towards environmental friendly behaviour. Questions 3 to 9 are based on the adapted Theory of Planned Behaviour introduced in section 2.3.3. Besides the literature about the TPB, the online guide by Ajzen (2006) on how to construct a TPB questionnaire was found helpful for the questionnaire design. The different constructs assessed in question 10 are mainly based on the consumer behaviour constructs introduced in section 2.2. All questions are structured hence they are closed-ended. However, question 10, 15 and 16 offer the respondent the option to add further comments. Besides question 14, which asked for the monthly net household income, all questions were mandatory. Because a high dropout rate when asking for income was feared, it was decided to make it an optional question. All other questions were classified as highly important for the results and therefore had to be answered. The main survey questions 1 to 10 are presented in English language at the end of this section.

In order to assure valuable data which is compatible for augmentative analysis different scales were used. Interval scales, which enable indentifying hierarchical order and differences between data points, were used in question 1 to 8. Ordinal scales, which allow ranking of responses, were applied in question 9 and 10. The remaining demographic questions were either based on a nominal or ratio scale. All interval scaled questions had four scale points. Based on the authors perception and the information received in the pre-test more scale points would not have led to more significant results. It was deliberately decided not to include an *either/nor* answer because it is assumed that this would lead respondents to take *the easy way out* and not to think about their answers thoroughly. (Bush, Ortinau & Hair 2009)

Since there was no monetary budget a rather creative idea was needed in order to reach the target population of the survey: 8.080 million German families with children. (Statistisches Bundesamt 2011) Therefore, nonprobability sampling was applied. The author's personal relation to a school secretary was found to be of help. The school principal of that school as well as the school principal of the neighbour school allowed the hand out of a flyer (Appendix 1) to all the students. The two schools are located in western Germany. In total, the teachers handed out flyers to 1042 of their students. The flyer asked the parents to go online to complete the survey. In order to provide an incentive to participate a drawing of three prices was offered.

The questionnaire ran from March 27th until May 20th. Hence, respondents were given a time period of approximately 7 weeks to answer the survey. During that time 106 people started the questionnaire out of which 101 completed it (95,3%). Drop outs occurred in the beginning, middle and end of the survey (question 2, 5, 13, 15). Hence, no conclusions can be drawn why people didn't complete it. Out of the 101 completed surveys 12 were found to be answered by children (age 12 to 20). Since the questionnaire aims at parents and it can be assumed that children do not have the knowledge to correctly answer the questions, the 12 answers were excluded from the analysis. Overall this leads to 89 complete and usable answers. Hence, the response rate was 8,5%.

The complete questionnaire as conducted in German language can be found in Appendix 2. The survey, except the demographic questions, translated into English language is shown on the following pages.

1. Please indicate your beliefs in regards to the following statements.

	Disagree (1)	Slightly disagree (2)	Slightly agree (3)	Agree (4)
I am concerned about the environmental conditions our kids will have to live in.	O	O	O	O
Politics should become more active in protecting the environment.	O	O	O	O
The major part of the population does not act in an environmentally conscious way.	O	O	O	O
Environmental pollution affects my health.	O	O	O	O
I worry about environmental problems.	O	O	O	O
Environmental problems are exaggerated.	O	O	O	O
Protecting endangered species is not necessary.	O	O	O	O
It is the responsibility of every citizen to protect the environment.	O	O	O	O

2. Please indicate how often the following activities are carried out in your household.

	Always (4)	Mostly (3)	Sometimes (2)	Never (1)
We leave electronic devices on stand-by.	O	O	O	O
We use chemical cleaning supplies.	O	O	O	O
We turn off the light when leaving the room.	O	O	O	O
We use shopping bags several times.	O	O	O	O
We collect and recycle paper.	O	O	O	O
We recycle glass.	O	O	O	O
We use the car for short distances.	O	O	O	O
We buy organic food.	O	O	O	O
We separate waste.	O	O	O	O
We recycle returnable bottles.	O	O	O	O

3. Please indicate your beliefs in regards to the following statements.

	Disagree (1)	Slightly disagree (2)	Slightly agree (3)	Agree (4)
It is important to save warm water.	O	O	O	O
Reducing warm water consumption helps the environment.	O	O	O	O
It is not necessary to reduce ones warm water consumption.	O	O	O	O
Every person saving warm water has a positive effect on the environment.	O	O	O	O

4. Please indicate your feelings towards reducing warm water consumption.

	Disagree (1)	Slightly disagree (2)	Slightly agree (3)	Agree (4)
I feel like I am doing something good for the environment when saving warm water.	O	O	O	O
I feel that it is important to reduce warm water consumption.	O	O	O	O
I feel like a better person when saving warm water.	O	O	O	O
I feel that reducing warm water consumption is pointless.	O	O	O	O

5. Please indicate to which extent the following statements apply to you.

	Never (1)	Sometimes (2)	Mostly (3)	Always (4)
I turn off the tap when brushing my teeth.	O	O	O	O
I only turn on the washing machine when I have a full load.	O	O	O	O
I turn off the shower tap when putting on soap.	O	O	O	O
I try to shower fast in order to save warm water.	O	O	O	O
I try to reduce the amount of showering/bathing.	O	O	O	O
I only turn on the dishwasher when it is full.	O	O	O	O

6. Please indicate to which extent you agree with the following statements.

	Disagree (1)	Slightly disagree (2)	Slightly agree (3)	Agree (4)
Our friends would support us reducing our warm water consumption.	O	O	O	O
Our family would support us reducing our warm water consumption.	O	O	O	O
Our friends think that we should reduce our warm water consumption.	O	O	O	O
Our Family thinks that we should reduce our warm water consumption.	O	O	O	O

7. Please indicate to which extent you find the following statement realizable.

	Difficult (1)	Rather difficult (2)	Rather easy (3)	Easy (4)
Reducing the warm water usage in our household would be...	O	O	O	O

8. Please indicate to which extent you agree with the following statement.

	Disagree (1)	Slightly disagree (2)	Slightly agree (3)	Agree (4)
It is my own decision to reduce the warm water consumption in our household.	O	O	O	O

9. Please indicate how likely the following statement is:
It is my intention to reduce my warm water usage within the next 6 month.

O very unlikely
O unlikely
O rarely
O maybe
O likely
O very likely

10. Following you find different reasons for saving warm water. Please rank the order in which they apply to your household. 1 is the most important and 7 the least important reason to save warm water. (Each number can only be used once.)

	1	2	3	4	5	6	7
We want to reduce energy costs.	O	O	O	O	O	O	O
We want to reduce water costs.	O	O	O	O	O	O	O
We are concerned about the environment.	O	O	O	O	O	O	O
We feel pressured to do so by our neighbours.	O	O	O	O	O	O	O
It is a good feeling to contribute to the protection of the environment.	O	O	O	O	O	O	O
We feel morally obligated to do so.	O	O	O	O	O	O	O
Important others should have a positive image of me.	O	O	O	O	O	O	O

Other (please indicate other reasons to save warm water)

4.4.2 Qualitative Research Design

"*Qualitative research is the collection of data in the form of text or images using open-ended questions, observation or "found" data.*" (Bush, Ortinau & Hair 2009)

In order to answer the main research question 'How do German families with children perceive awareness raising smart energy meters for the shower' it was decided to conduct qualitative data in the form of semi-structured interviews. The objectives of the qualitative research are to gain insights into how German families with children perceive the WaterGuide, to identify whether it has a market potential, and to gather valuable insights that will help establishing recommendations concerning how to position and market the WaterGuide in Germany.

Therefore, five German families were given a WaterGuide for a period of 6 weeks. As an incentive to participate in the product test and the interview, the families got to keep the WaterGuide after the test period. The initial contact with the test families was established through a private contact of the author. However, the author did not know the test families prior to this study. In the initial meeting all families received the WaterGuide as well as the user manual (Appendix 3) and quick guide (Appendix 4) in German language. Besides a brief description of what the product does, no further explanation was provided. This is due to the fact that one of the questions in the interview aimed at identifying the ease of installation and product usage. An overview of each family structure is given in Appendix 5.

Semi-structured Interviews

The interviewing approach used is in-depth interviews. An in-depth interview is conducted by a trained interviewer and consists of a set of semi-structured questions. The objective of an in-depth interview is to discover insights about beliefs, feelings, and opinions that the respondent holds about the topic of interest. Therefore, probing questions are used to get as detailed information as possible. (Bush, Ortinau & Hair 2009) Since the objective of the qualitative research is to gain insights into the test families beliefs and opinions about the WaterGuide, the semi-structured interview approach was identified as suitable.

In order to eliminate the risk of insufficient answers due to language problems the interviews were conducted in German language. With the intention of assuring a comfortable and relaxed interview setting it was chosen to conduct the interviews in the families' homes. The interviews lasted between 20 and 60 minutes. The digital record of the interviews can be found on the attached CD.

Formulating the Interview Questions

The following questions served as a guideline for the interviews with the test families. The actually asked questions may vary between interviewees based on the depth of information given and the direction towards which the interviewees answer. It may also occur that one question leads the interviewee to give an extensive answer and thereby unknowingly answer other questions. Hence, those might not need to be asked specifically. Probes and prompts are used in order to get as detailed information as possible.

Product	
Ease of use	▪ Did you have any problems installing your WaterGuide? Any technical trouble while using it?
Product perception	▪ In general, how do you like the WaterGuide? What do you perceive as positive/negative about it? ▪ How do you perceive the visualization of your consumption? ▪ To which degree did the family engage in a competition and enjoy it?
Behavioural influence	▪ To which degree did the WaterGuide raise awareness regarding warm water consumption in the shower? Which family members felt surprised by their consumption? ▪ Did the WaterGuide change your attitude towards saving warm water? ▪ Did the meter influence actual behaviour? Whose behaviour changed most? ▪ Overall, were the different family members willing to reduce comfort in order to save money/protect the environment?
Other	▪ What would you adjust in order to improve the product?
Marketing/Communication Strategy	
Decision making	▪ Who in the family would propose buying the WaterGuide and who would influence the decision? ▪ Who in your family would make the final buying decision for the product? ▪ Who would make the actual purchase? ▪ Which steps would you carry out before actually buying the product?

Positioning	▪ What kind of product is the WaterGuide? (Into which product category would you classify the WaterGuide?) Hence, which products do you consider as alternative/substitute options? ▪ What are the two most important product attributes/benefits within that product category (on which you would base your buying decision)? ▪ How would you rate the WaterGuide and the competitors on these attributes?
Price	▪ Which price would you be willing to pay for the WaterGuide? ▪ How long should the maximum payback time be?
Distribution Channels	▪ Where would you expect the product to be sold?
USP's	▪ Which attributes/benefits of the WaterGuide are most important to you? ▪ When referring the product to friends and family which characteristics would you point out? ▪ Why would you buy the WaterGuide?
Other	▪ How high/low is your perceived risk when buying the WaterGuide? (e.g. financially, social, emotional) ▪ How important are quality labels for your buying decision (such as TÜV)? ▪ Are there any final comments you would like to make?

As can be seen, the interview is structured into two main sections: 'Product' and 'Marketing Strategy'. The product section includes general questions concerning the WaterGuide. The questions aim at identifying how product characteristics are perceived and if the respondents think the device could be improved. Furthermore, several questions aim at gaining insights whether the WaterGuide had an influence on actual behaviour. The questions in the second section aim at gathering essential information in order to provide recommendations regarding how to market the WaterGuide in Germany. The questions are set up based on the following theoretical reasoning.

A first step is to understand the decision making process of the target audience. This includes identifying who is involved and which role each person plays. (Percy, Elliott 2009) Second, the positioning for the product must be determined. Therefore, it needs to be identified in which market the consumer sees the

product and how the product is perceived on important attributes relative to the competitors. In order to derive USP's to be communicated, it must be assessed which product characteristics are most important to the consumer. (Geuens, Van den Bergh & De Pelsmacker 2010, Percy, Elliott 2009) The marketing mix consists of the 4 Ps product, price, place, and promotion. (Geuens, Van den Bergh & De Pelsmacker 2010) Hence, questions aiming at determining price and distribution channels are included as well. However, promotion is not considered as it is not the aim of this project to develop specific recommendations on which marketing instruments to use.

4.5 Method of Data Analysis

This section will provide an overview of how the primary data will be analyzed. First, the method of data analysis for the quantitative data is described followed by a description of how the qualitative data is analyzed.

4.5.1 Quantitative Data

In order to mathematically analyze quantitative data it must be coded. This means that each response option must be assigned a numerical value. This enables the researcher to carry out calculations which could not be done with alphabetical data. (Bush, Ortinau & Hair 2009) The codes used in the analysis are included in the English translation of the survey, which can be found in the end of section 4.4.1.

All data calculations are done using Excel. For the analysis of each question one-way tabulation is used. Moreover, descriptive statistics are applied in order to draw conclusions from the findings. The mean (average of all responses), mode (most frequent occurring response) and standard deviation (average dispersion around the mean) will provide helpful insights into understanding the data. (Bush, Ortinau & Hair 2009)

Since the survey assesses complex constructs such as attitude, each question includes a set of statements which will provide an indication of the overall construct. There are, for example, seven statements aiming at gaining an understanding of respondents' beliefs regarding environmental protection. Sometimes a *total average* will be calculated in order to help interpreting the data. This will be done by summating the average of each statement which is then divided by the number of statements. Furthermore, there are cases in which statements are formulated negatively. In order to be able to include those into the calculation they

will be reversed. For example, 41 respondents answered *disagree* to the statement 'Environmental problems are exaggerated'. In order to make this a positive statement, it will be assumed that those 41 people would have answered *agree* to the opposing statement 'Environmental problems are underrated'.

Finally, in order to compare sub-groups of the sample - such as big versus small families – the data will be filtered accordingly and then analysed with the above mentioned methods.

4.5.2 Qualitative Data

In order to be able to analyze the qualitative data the interviews need to be taped. The audiotapes of all five interviews can be found on the attached CD. Instead of transcribing the interviews word by word it was decided to write down a summary of each interviewees answer to each question. This can be found in Appendix 7.

Usually, the researcher analyzing qualitative data uses coding to develop categories that consist of similar topics. (Bush, Ortinau & Hair 2009) However, since the interview was highly pre-structured and questions were set up based on pre-determined categories – such as price, decision making – further coding is found not to be necessary. The data is analyzed separately for each category and in some cases tables are used to demonstrate the results. Furthermore, quotes are used to emphasize findings.

4.6 Reliability and Validity

Any research should be tested for reliability and validity in order to determine whether it can be relied on. Reliability is the extent to which primary research would lead to the same results when repeated. Validity refers to whether the research "does what it is intended to do". (Carmines, Zeller 1979)

Concerning reliability it can be assumed that the undertaken research is reliable. The detailed documentation of how the primary research was conducted enables its repetition. If the survey would be conducted again it would most likely yield very similar results. This is because it can be assumed that respondents would still hold the same opinions about conserving warm water. However, conducting the survey with a different and bigger sample of the target group could lead to differing outcomes. Thus, this limits the generalizability of the results. The interviews can also be assumed to be reliable as conducting the interviews

again would not change the interviewee's beliefs and feelings about the WaterGuide. However, depending on the *mood* in the interview it could lead to less or more detailed outcomes.

It is assumed that the chosen research approach is appropriate for the present research and therewith is valid. The quantitative data provided important insights into the warm water consumption behaviour of German families with children. Together with the insights gathered in the interviews it is possible to answer the research question and establish valuable implications for the WaterGuide. Thus, the chosen research strategy is valid.

4.7 Limitations

Before analysing the data and developing managerial implications, it is highly important to clarify the limitations the qualitative and quantitative research underlie.

The questionnaire was conducted in a small geographic area in western Germany because the researcher did not have the means to reach respondents in the whole country. This must be seen as a limitation because answers may have been very different if asked in whole Germany. Thus, this lowers the generalizability of the survey findings to the entire German market. Furthermore, the rather small sample size also limits the generalizability of the results. With 8.080 million households with children in Germany (Statistisches Bundesamt 2011) and 89 completed surveys only 0,001% of the target population were reached. Thus, the author has to base his analysis and recommendations on the data available however the validity for the whole target group is highly limited.
Finally, the quantitative research is based on one main theory – the Theory of Planned Behaviour – which could limit the results as not all relevant constructs in the field of 'energy conserving behaviour' might be considered. Nevertheless, due to the limited scope of this paper it was not feasible to apply additional theory.

In regards to the qualitative data it must be pointed out that the researcher is not a trained interviewer which may limit the compassed results. Nevertheless, the researcher came to the feeling that most interviewees felt comfortable in the interview situation and opened up, providing detailed answers to the questions. Furthermore, the analysis of the qualitative data will underlie the researcher's interpretive bias. In addition, the small number of only 5 test families being interviewed highly limits the generalizability of the findings. It is merely a small fraction of the target group and therefore only provides initial insights.

5

ANALYSIS OF QUANTITATIVE DATA

The goal of the online questionnaire was to gain insights into the warm water consumption behaviour of German families with children. More specifically, their attitude towards saving warm water as well as what drives them to reduce their consumption, was assessed. In this chapter the quantitative data gathered will be analyzed. First, the general findings will be described in section 5.1. This will be followed by a discussion and analysis of the findings in relation to the theoretical framework (section 5.2). Finally, a sub-conclusion will be drawn in section 5.3. The complete survey results can be found in Appendix 6.

5.1 Survey Findings

The online survey was mainly answered by women, accounting for 68,5% of a total of 89 answers. It can be assumed that this due to most children handing papers they get in school to their mothers. Hence, most likely the mothers received the hand-out asking to participate in the survey and did so. The age of respondents varies between 30 and 59 years. However, with 65,1% most respondents are aged between 40 and 50 years. Overall, 29 families have one child, 46 families have two children, 13 families have three children and 1 family has four children. Hence, 84,3% of the respondents have one to two children whereas only 15,7% have three or four children. Overall, the age of the children covers a broad range between 1 and 23 years. The question regarding household income was answered by only 64% of the respondents. Furthermore answers such as '0' and '3' appear invalid. Therefore, this question will not be helpful for the further analysis. Most families live in a semi-detached house (25,8%) or house (29,2%) they own. The 21,3% of families living in a rented apartment are mainly families with one child. Regarding the education of the respondents the highest percentage with 34,8% has 'mittlere Reife' which in Germany it the certificate for leaving school after 10th grade. This is followed by 29,2% having a college degree. Overall, all different kinds of educational levels were present in the survey. Summarizing, the demographic data shows that there is a

broad variety of different family situations amongst the respondents. This complies with the target group of the case company, as described in section 3.1.

The first two questions aimed at gaining an understanding of the general attitude of German families with children towards environmental protection. Question one asked the respondents about their beliefs. Overall, the results show that they are quite aware of environmental problems. For example, 60,7% agree that politics should become more active in protecting the environment and 86,5% agree that it is every citizen's responsibility to protect the environment. Furthermore, with 49,4% slightly agreeing and 32,6% agreeing, the majority of respondents is worried about the existing environmental problems. Question two asked to which degree various environmental friendly activities are carried out in the household. Separating waste, recycling glass/returnable bottles/paper were all indicated as being always done by 87,6% or more of the families. Regarding taking the car for short distances 62,9% answered that they sometimes do it and 24,7% mostly do it. A total of 47,2% either always or mostly has electronic devices on stand-by.

Question three to five aimed at identifying the respondents' attitude towards saving warm water. Hence, they ask about their beliefs, emotions and behaviour respectively. As shown in Figure 9, on average respondents hold very positive beliefs about how important water conservation is.

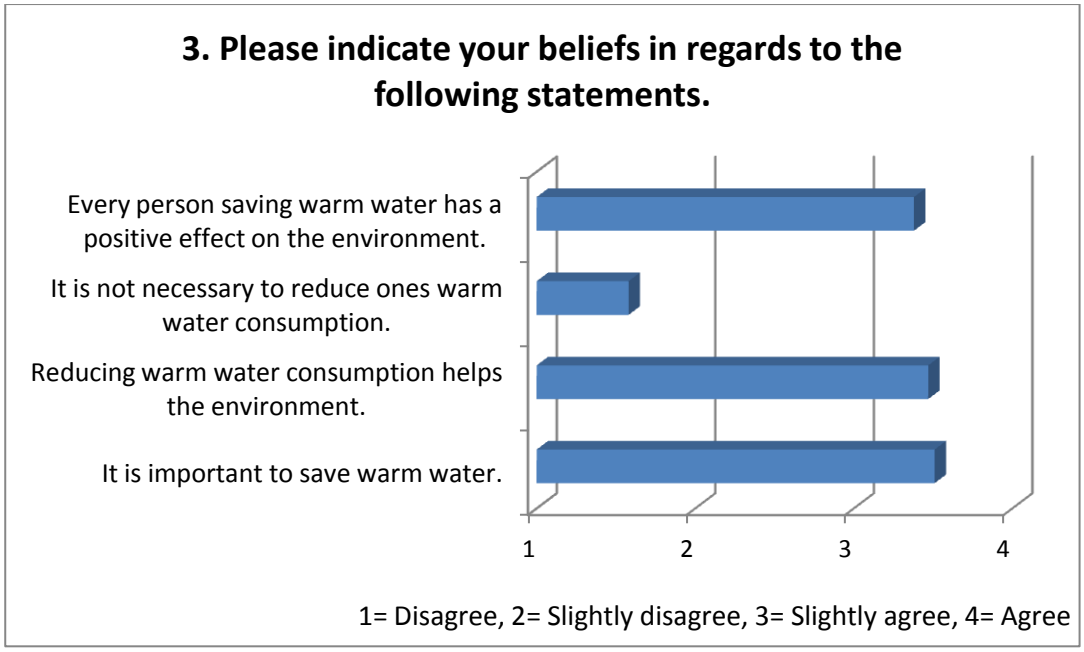

Figure 9 Average Ratings Survey Question 3

Source: Author, based on survey results shown in Appendix 6

For example, in sum 94,4% of the respondents either agree or slightly agree that it is important to save warm water as well as that it helps the environment. This is in accordance with 61,8% disagreeing with the claim that it is not necessary to reduce ones consumption.

In regards to their feelings the majority of respondents slightly agree that it gives them the feeling to protect the environment when saving warm water as well as that it feels important to do so. However, a total of 62,9% either disagree or slightly disagree that it gives them the feeling of being a better person. When it comes to actual water conserving behaviour 78,7% always turn off the tap when brushing teeth, 87,6% always wait to turn on the dishwasher until it is full and all respondents either always (68,5%) or mostly (31,5%) wait doing laundry until the machine is full. With regards to showering the results are less consistent. Only 31,5% always turn off the shower tap when soaping. With 44,9% the majority of the respondents mostly tries to shower fast in order to conserve warm water. However, 44,9% never try to shower less often.

Asking the respondents whether they believe their friends and family think they should conserve water, as well as whether they would support it, did not lead to explicit results as answers were rather evenly distributed. A tendency shown is that asking about friends' and families' support respondents tend to agree. Asking whether friends and family think the respondent should save more warm water the answer tendency is to disagree.

With 56,2% most respondents believe that it would be rather difficult to reduce warm water consumption in their household. However, 31,5% think it would be rather easy. A total of 84,3% either agree or slightly agree that it is their own decision to reduce their household consumption. In regards to their intention to conserve warm water within the next 6 month, 20,2% say it is likely and 10,1% that is it very likely. Most respondents answered maybe (37,1%). Another 19,1% indicated rarely, 9,0% indicated unlikely and 4,5% very unlikely.

The last question asked the respondents to rank different reasons that would motivate them to reduce their warm water usage. Cumulating all answers the following rank order resulted: reducing energy cost, reducing water cost, concern about the environment, good feeling contributing to environmental protection, feeling of moral obligation, to assure important others have a positive image of respondent, feeling pressured by neighbours.

5.2 Survey Discussion

In this section the quantitative data gathered will be analyzed in depth, taking the underlying theory into account. In the first step, each question will be interpreted sequentially. In the second step, the data will be analyzed with respect to potential differences within the sample. Specifically, it will be assessed whether there are dissimilarities between respondents differing in household size and living situation. Both criteria can be assumed to have an impact on warm water consumption behaviour. It can be assumed that families with more children have a higher consumption and might therefore be more focused on conserving. Also families living in a house have higher energy costs than families living in an apartment and might therefore be more focused on conserving. Hence, it is reasonable to look for differences and similarities in the results based on those two criteria.

Attitude towards environmental protection

The first two questions provide an indication about the respondents' general attitude towards environmental protection. For all statements supporting or acknowledging environmental consciousness, the first and second most frequent answer was either *slightly agree* or *agree* respectively. For the two negated statements most respondents disagreed. Overall this indicates that respondents hold highly positive beliefs toward environmental protection. The numbers support this conclusion. When calculating the average response cumulated for all statements the result is 3,29. With 3 being the code for *slightly agree*, this shows that overall respondents have a rather positive opinion about the topic at hand. Two statements are worth being highlighted separately. In total, 92,1% agree or slightly agree that a majority of the population does not behave environmentally conscious and 98,9% agree or slightly agree that every citizen has the responsibility to protect the environment. This strongly shows how aware German households are regarding their own and others responsibility towards the environment.

Taking a look at how respondents actually behave in regards to different eco-friendly behaviour the average response cumulated for all statements is 3,25. This means most respondents carry out the activities *mostly* with a slight tendency to *always*. This points out that the respondents behaviour is quite eco-friendly. However, two statements stand out. 68,5% sometimes and 11,2% never buy organic food implying that overall organic food is purchased seldom. 62,9% sometimes and 24,7% mostly use the car for short distances, meaning that the tendency to use a car for short distances in total is rather high. The reason why most people rarely behave eco-friendly in these two situations might be because it causes them higher costs and lessens their comfort respectively. The conclusion to be drawn is that German households have

the tendency to behave ecological however this is less present in situations that require them to spent more money or reduce their comfort.

Summarizing the data from these two questions gives a strong indication that in sum respondents have rather positive attitudes towards environmental protection. However, even though they are aware of the problem they are not always willing to behave accordingly.

Attitude towards warm water conservation

In order to assess respondent's attitude towards reducing warm water consumption the three attitude components cognition, affect and behaviour were asked about. In the following, each of the three components will be analyzed separately and then a conclusion about the overall attitude will be drawn.

With 58,4% most respondents agree that conserving warm water is important. Another 36,0% slightly agree. Hence, a total of 94,4% have an approving belief. The same is true for the statement that it helps protecting the environment when conserving warm water. Again, a total of 94,4% either agrees or slightly agrees (56,2% and 38,2% respectively). These results clearly show that respondents have a highly positive belief about how important it is to reduce warm water consumption (also see Figure 9). The numbers of the last two statements support this finding. The majority of respondents disagree with the statement 'It is not necessary to reduce ones warm water consumption'. Also most respondents agree that each person minimizing their consumption has a positive effect on the environment, totalling in 88,8% agreeing or slightly agreeing.

Asking respondents about their feelings towards saving warm water results are rather mixed, as can be seen in Figure 10. The first bar shows that most participants, a total of 77,5%, to some degree have the feeling of doing something good for the environment when reducing warm water consumption. However, that leaves almost a quarter of the sample not feeling this way. The mean value of 3,07 shows that the average answer is *I slightly agree*. However, the standard deviation of 0,81 also indicates that there is a noticeable difference between the answers. A clear majority of respondents have positive feelings regarding the importance of warm water conservation, with 51,7% slightly agreeing and 40,4% agreeing. As can be seen in the third bar, answers differ significantly when asking whether saving warm water gives the feeling of being a better person. With a mean of 2,22 the standard deviation of 1,01 supports this finding. The mean indicates that there is a tendency to slightly disagree. However, the standard deviation proves that

overall responses are rather dissimilar. The last statement assessing participant's feelings is negatively formulated: 'I feel that reducing warm water consumption is pointless'. The noticeably high amount of respondents not agreeing (73,0%) and the mean value of 1,35 indicating that on average disagreement prevails, clearly show that saving warm water is felt to be worthwhile. Overall, the results show that respondents do feel that it is important and worthwhile to reduce warm water consumption. However, regarding 'feeling like a better person' and 'feeling to do something good for the environment' results are mixed. The reason could be that even though people do feel the importance of conservation they do not have the feeling of having an actual impact themselves.

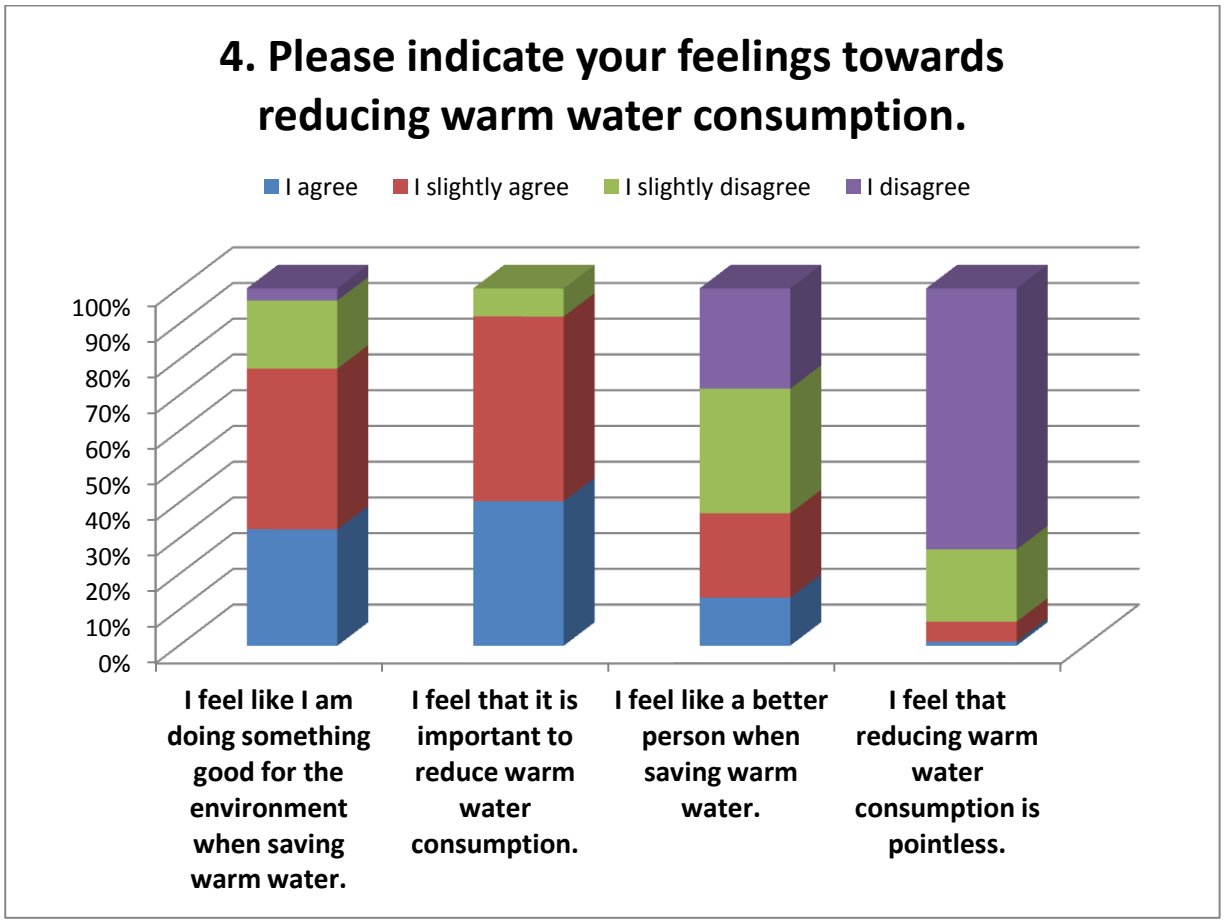

Figure 10 Results Survey Question 4

Source: Author, based on survey results shown in Appendix 6

The question aiming at the behavioural attitude component shows two differing outcomes. Three statements show a highly positive behaviour. With a mean of 3,67 there is a clear tendency of respondents turning off the tap when brushing their teeth. Results are even stronger for 'waiting to do laundry until there is a full load'. The mean value is 3,69 with a standard deviation of 0,47 indicating that responses are very simi-

lar, with the high tendency to agreement. Furthermore, the same is valid for 'only turning on the dishwasher when the load is full'. Here the mean value is even higher, 3,87 with a standard deviation of 0,38. Overall these three behavioural statements indicate highly eco-friendly warm water consumption behaviour amongst participants. Nevertheless, the remaining three statements show a less positive picture. 'Turning off water in the shower while soaping' has a mean value of 2,65 with a standard deviation of 1,12. This shows that on average respondents vary between *sometimes* and *mostly*. In addition, answers are highly dispersed. This shows that there lies a big saving potential for the families. Most likely, people's behaviour is due to habits and there is an opportunity to change it. 'Trying to shower fast in order to save warm water' shows mixed results. The majority of respondents (44,9%) mostly do so. However, there is a total of 34,8% never or sometimes doing it. The reason might be that showering faster lowers the comfort and relaxation experienced and people might not be willing to give that up. 44,9% answered that they are never trying to shower/bath less often. On average the answer tends to be *sometimes* (mean of 1,89). The standard deviation of 0,93 shows that overall answers are rather wide spread. The reason why most people do not try to shower/bath less often is most likely due to personal hygiene.

Overall, the behavioural component of attitude shows that in certain cases people behave very positive when it comes to conserving warm water. In other situations, which require a reduction of comfort, most respondents seldom carry out the behaviour. However, also in these cases there are participant that answered mostly and always. Hence, in total the behavioural component shows a clearly positive tendency.

After having analyzed each attitude component separately, an overall conclusion for the attitude must be drawn. In regards to the cognitive component it became evident that respondent hold highly positive beliefs towards saving warm water. The affective component showed that participants predominantly have positive feelings towards conservation but these are less strong when it comes to the potential of their own positive impact on the environment. The behavioural component showed that in most cases behaviour is highly in accordance with eco-friendly warm water consumption behaviour. In some situations, mainly when scarifying some kind of personal comfort, the behavioural conformity is lower. Summarizing, it can be concluded that German families with children have a predominantly positive attitude towards reducing warm water consumption with slight exceptions.

Subjective Norm

Table 1 shows results, mean values, and standard deviations of question six, which is concerned with the subjective norm. As is evident from looking at the numbers, results vary a lot. Asking whether friends and family would support reducing warm water consumption the majority slightly agrees. However, in both cases the standard deviation is rather high meaning that responses are quite dissimilar. The mean values show that the tendency is to either slightly agree or slightly disagree. Most respondent disagree that friends believe they should lower their warm water usage. Furthermore, a total of 65,2% disagrees or slightly disagrees that their family believes they should reduce warm water consumption. Calculating the overall average of all four statements leads to a mean value of 2,4. This shows that in total the most frequent answer lies between slightly disagree and slightly agree. This can be interpreted as the subjective norm being moderately strong. Thus, perceived social pressure to conserve warm water is not predominant but does exist.

6. Please indicate to which extent you agree with the following statements.						
	I disagree	I slightly disagree	I slightly agree	I agree	Mean	Standard Deviation
Our friends would support us reducing our warm water consumption.	13,5%	23,6%	**44,9%**	18,0%	2,67	0,93
Our family would support us reducing our warm water consumption.	4,5%	23,6%	**38,2%**	33,7%	3,01	0,87
Our friends think that we should reduce our warm water consumption.	**42,7%**	39,3%	15,7%	2,2%	1,78	0,79
Our Family thinks that we should reduce our warm water consumption.	29,2%	**36,0%**	25,8%	9,0%	2,15	0,95

Table 1 Results, Mean, and Standard Deviation for Question 6

Source: Author, based on survey results shown in Appendix 6

Perceived Behavioural Control

Perceived behavioural control was assessed with two statements. First, respondents had to indicate how difficult or easy they think it is to reduce the warm water consumption in their household. Figure 11 shows the results. It is evident that most respondents (56,2%) think it would be rather difficult to do so. Only a

minority of 5,6% thinks that it is easy. However, there are also 31,5% believing it is rather easy. In sum, these results indicate that respondents tend to have a somewhat weak confidence in their ability to reduce warm water consumption.

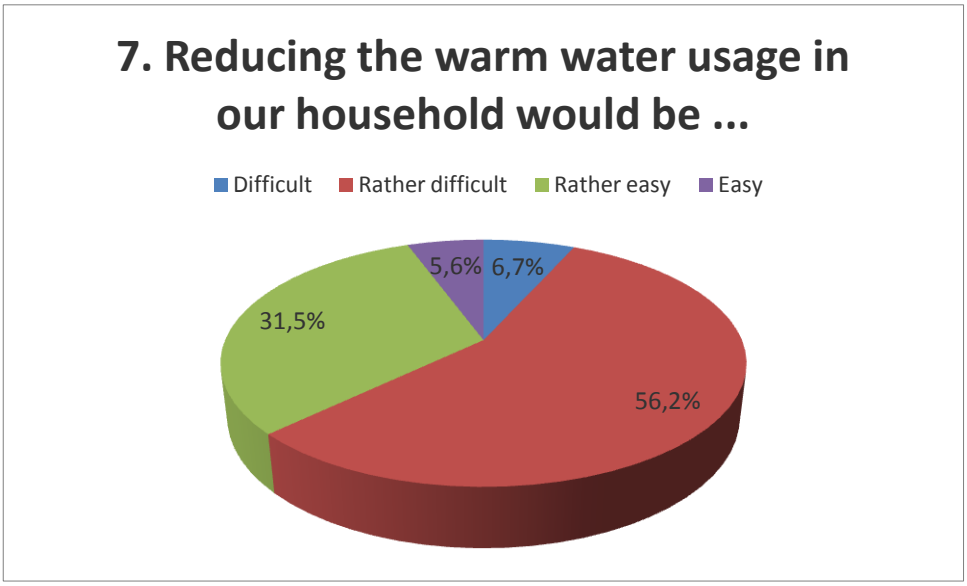

Figure 11 Results Survey Question 7

Source: Author, based on survey results shown in Appendix 6

Second, respondents were asked whether they think it is their own decision to reduce their household's warm water usage. 42,7% agreed and 41,6% rather agreed, indicating that overall respondents have a rather strong confidence in themselves. Summing up the two statements, respondent's perception of being able to perform conservation behaviour has the overall tendency to be moderate.

Intention

According to the Theory of Planned Behaviour (introduced in section 2.3) the three constructs analyzed before – attitude towards behaviour, subjective norm, and perceived behavioural control – influence a person's intention to perform the behaviour in question. Assuming that this is valid for the present case the three constructs have the following influence on intention, as is also illustrated in Figure 12.

1. Attitude towards warm water conservation was found to be mainly positive and therefore has an affirmative influence on intention.
2. The subjective norm was found to be moderately strong. Hence, the social pressure to conserve does have a middling influence on the intention to do so.
3. PBC showed that respondents have a rather mixed confidence in their ability to perform conservation. Since the confidence is not very strong it will tend to weaken the intention to conserve.

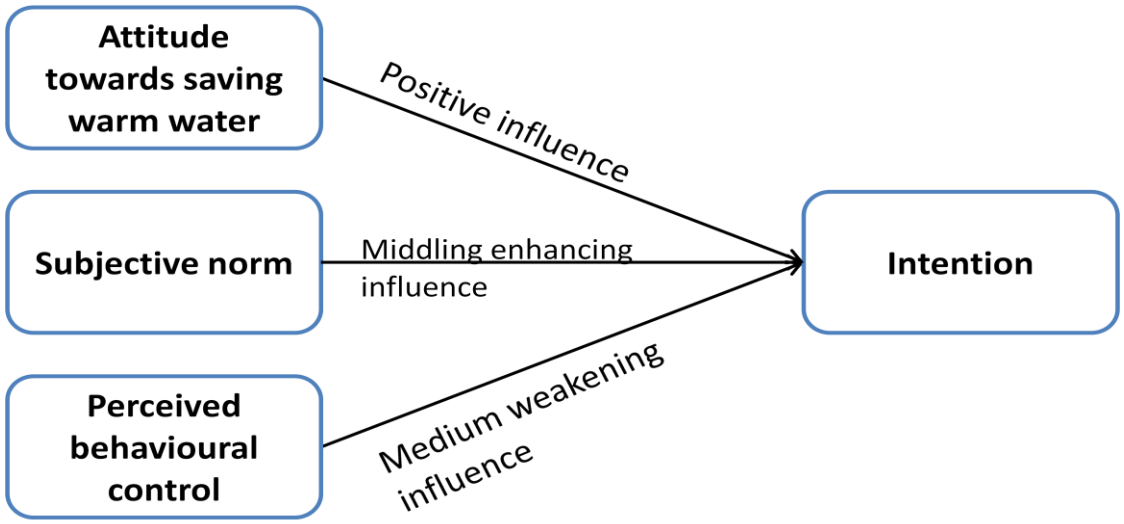

Figure 12 Constructs Influence on Intention

Source: Author

Together, the three components indicate that the intention to save warm water is likely to be positive but only medium intense.

Question 9 assessed how likely it actually is that respondents have the intention to reduce their warm water consumption within the next 6 month. The results are illustrated in Figure 13. The most frequent answer is maybe which supports the preceding findings. In sum the three positive answers – maybe, likely, and very likely – constitute 67,4% of the answers. This shows, that overall there is the tendency of households wanting to reduce their consumption. Nevertheless, the percentage of respondents with a negative answer (32,6%) is rather high as well and cannot be denied. It highlights that there is a significant amount of German families with children that is not concerned about reducing their warm water consumption. The reason could be that they simply do not care about it, believe that they are not able to, or already are using a minimum amount of warm water.

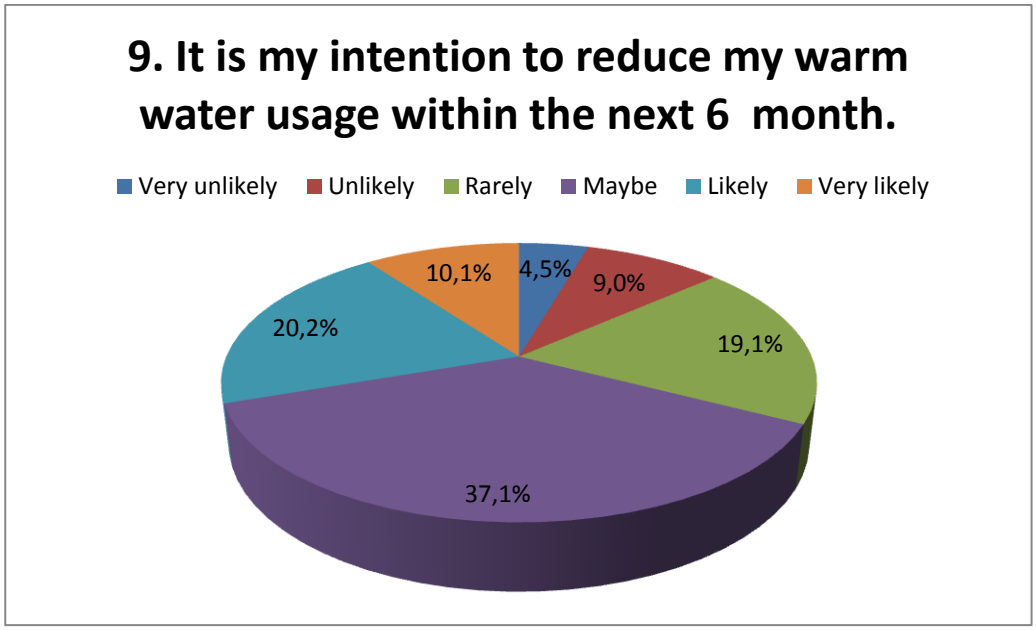

Figure 13 Results Survey Question 9

Source: Author, based on survey results shown in Appendix 6

Motivation

Finally, it was assessed what motivates German families with children to reduce their warm water consumption. It becomes evident that the main driver is of financial nature. Saving energy cost and saving water cost ranked reason number one and two. In the third rank is environmental concern. This goes hand in hand with the previous finding that respondents are quite environmentally concerned. The hedonic motivation of feeling good about helping protect the environment is ranked reason four. Hence, it does play a middling important role to respondents. Moral obligation, the image others have of oneself as well as social pressure by neighbours are irrelevant drivers, as indicated by their low ranks. Finally, it should be mentioned that the ranking results were very distinct, meaning that no two ranks were close to being in reverse order.

Comparison based on different household sizes

As mentioned before it is interesting to assess whether there are differences in the warm water consumption behaviour between small and big families. Therefore, in this part families with up to two children will be compared to families with three or four children. Though, the number of families in the sample with one

or two children is substantially higher than the number of big families (75 and 14 respectively). Hence, this distorts the results and lowers the informational value of the analysis.

Concerning respondent's attitude towards conserving warm water, the bigger families have a slightly more positive attitude. The cognitive component only has minor differences in the distribution of answers, and the cumulated average (3,44) is the same. Hence, results show the same for both sub-groups; small and big families have highly confirmative believes about the importance of warm water conservation. Regarding the emotional component the data shows that big families have slightly more positive feelings. The behavioural component shows that bigger families perform all assessed behaviours more often than small families. The cumulated average for small families is 3,03 compared to 3,37 for big families. Overall, that leads to the conclusion that bigger families do have a slightly more positive attitude towards warm water conservation than smaller families.

Results concerning the subjective norm show no differences between the two groups. Thus, the perceived social pressure to reduce warm water consumption is the same for small and big families – it exists but is not very significant. The perceived behavioural control is quite similar between the two groups as well. On average, families with three or four children perceive their ability to lower their household warm water consumption a bit higher – 2,43 compared to 2,35 – than small families. Nevertheless, overall the tendency is that it is rather difficult to do so. When asking whether respondents think it is their own decision to reduce warm water consumption big families agreed a bit less than smaller families – 3,14 compared to 3,24. However, the overall tendency to *rather agree* is the same. Summing up, the slightly higher confidence of big families to be able to reduce their consumption evens out with their slightly lower confidence in it being their own decision. Thus, the perceived behavioural control is predominantly the same for the two groups.

Concerning respondent's intention to lower their warm water consumption within the next 6 month, the majority of small families answered maybe (38,7%) and the majority of big families answered likely (35,7%). Nevertheless, overall their intention is quite alike with an average of 3,92 for small families and an average of 3,79 for big families – meaning that the tendency is to maybe wanting to lower consumption. When asking for reasons to save warm water the ranking is the same for both sub-groups. Hence, not matter how big the family the main reason is to save money.

Overall, besides big families having a slightly more positive attitude towards saving warm water, no significant differences between families with more or less children could be found.

Comparison based on different living situations

As mentioned before, it is interesting to assess whether there are differences in the warm water consumption behaviour between households in different living situations. Therefore, families living in an apartment and families living in a house will be compared. Though, the number of families in the sample living in an apartment is lower than the number of families living in a house (27 and 48 respectively). Hence, this distorts the results and lowers the informational value of the analysis.

The cognitive component of the attitude concept shows some differences between the household types. In all statements assessed, respondents living in a house had more positive beliefs towards saving warm water. This is supported by the cumulated means, which is 3,27 for families living in an apartment and 3,52 for families living in a house. The emotional component shows similar results. Families living in a house tend to have more positive feelings towards warm water conservation. The behavioural component shows that people living in a house behave more conscious when using warm water. The mean value of 3,13 shows that on average they mostly behave positive. For people living in an apartment the average is 2,86 showing that they on average sometime behave positive with the tendency to mostly do so. In sum, all three components show that families living in a house have a somewhat more positive attitude towards conserving warm water than families living in an apartment.

Regarding the subjective norm, results show that respondents living in a house perceive more social pressure to reduce their warm water consumption. However, their confidence to be able to do so is also slightly higher. Nevertheless, their perception that it is their own choice is lower than of families living in an apartment – 3,08 and 3,41 respectively.

The majority of both, families living in a house and families living in an apartment, indicate to maybe wanting to reduce their consumption within the next 6 month. However, with an average of 4,06 respondents living in a house have a slightly stronger intention than families living in an apartment with an average of 3,89. Concerning the reasons why to reduce warm water usage results between the two sub-groups show the same ranking.

In sum, it can be concluded that families living in a house have a more positive attitude towards conserving warm water and also a slightly higher intention to do so. In addition, they perceive a higher social pressure to do so and feel less confident about the control they have over it.

5.3 Summary of Quantitative Analysis

At first, it was found that respondents do have a quite positive attitude towards environmental protection in general. The attitude of German families with children towards warm water conservation was found to be predominantly positive. Especially beliefs were highly positive. The feelings regarding the importance of reducing warm water consumption were quite positive as well. Most behaviour was found to be positive with some exceptions. Those exceptions were mainly found in situations which would require a reduction in personal comfort.

The overall positive attitude is assumed to have an enhancing influence on intention to perform warm water conservation. However, a moderately strong social pressure was identified which can be assumed to have a middling effect on the intention. Furthermore, results showed that respondent's confidence in their ability to reduce warm water consumption is somewhat weak and will therefore have a debilitating effect on intention. Finally, it was found that actual intention is existent with the slight tendency to be likely. The main reason to reduce the household's consumption was identified to be of financial nature followed by environmental concern.

In addition, it was analyzed whether there are differences between differing family size and living situation. For small and bigger families no major differences were found. Merely bigger families tend to have a more positive attitude towards warm water conservation. Regarding differing living situations it was identified that people living in a house have a more positive attitude and a higher intention to reduce their warm water consumption. This is most likely due to them having higher overall energy costs and therefore a stronger need to reduce them.

6

ANALYSIS OF QUALITATIVE DATA

As described in section 4.4.2, five families tested the WaterGuide for six weeks and were interviewed afterwards. A summary reducing the answers of each family to short but comprehensive sentences can be found in Appendix 7. These interviews will be analyzed in the present chapter. The objective of the interviews was to gain insights into how the families perceive the awareness raising energy meter WaterGuide. First, general findings will be summarized which is followed by an in depth discussion of the interview findings.[6]

6.1 Interview Findings

The first part of the interview focused on product related questions. None of the test families experienced problems with the installation and usage of the WaterGuide. Asking to indicate their general opinion about the product, interviewees mainly mentioned positive aspects. They said that it is good to know how long and warm you shower. This raises awareness, motivates to shower faster and can lead to behavioural change. One interviewee mentioned that the WG and the changing levels (green, yellow, red) can also cause stress and another one pointed out that it does not allow additional grooming such as shaving. All families perceived the visualization of their consumption (in numbers as well as smileys and colours) as helpful in order to adjust showering behaviour because it raises awareness. It was furthermore characterized as easy to understand and fun. In regards to a competition between the family members about who consumes less, answers differ. Family 4 and 5 did not engage in a competition, Family 2 only in the beginning. Family 3 engaged in a competition but described it as being frustrating. Family 1 said that especially the children developed a competition. All families highlighted that the WaterGuide raised awareness regarding warm water consumption. Two families said that it also had a positive influence on their attitude towards saving warm water. Two families already had a highly positive attitude before. However, "*the WaterGuide makes it easier to actually behave in accordance to our attitude*" (Family 1, Minute 4:44). The last

[6] The sources of this chapter are the interviews to be found on the attached CD. Detailed references will only be provided for quotations (indicating interviewee and minute).

family said it influenced their attitude only slightly. A positive influence of the WaterGuide on actual behaviour and the willingness to reduce ones comfort of taking a long shower was reported by three families. The other two mentioned a minimal or partly (only some family members) influence.

The second set of questions aimed at gaining valuable insights in order to provide recommendations how to market the WaterGuide in Germany. Asking who in the family would propose buying the device, who would make the final buying decision, and who would actually buy it, the answer was either both parents or the husband. All families would gather information about the product, ask friends (if available) whether they would recommend it and then evaluate the product before making the buying decision. Concerning in which product category the WG belongs all interviewees defined it as *energy saving products*. When asking about the two most important product attributes, the one mentioned most is the saving potential. Other attributes mentioned were price, ease of use, and functional technology. In regards to the price willingness interviewees differ highly with answers ranging from € 20 up to € 120. Two families mentioned that it depends on the cost-benefit ratio. They also said that a maximum payback time between 1-2 years is important to them while the other families classified a payback time as irrelevant. There are several distribution channels the interviewees would expect the WG to be sold in: mainly DIY, online, and sanitary retailers as well as electronic retailers and energy/water providers. Further questions aimed at identifying what the interviewees see as important product characteristics. The following were mentioned: visualization, ease of use, saving potential, teaching tool for children, fun, raising awareness, interesting to see consumption in actual numbers.

Final questions identified that none of the families sees any kind of risk when buying the WaterGuide. However, Family 1 and 3 mentioned that it can create stress for the children as they might feel forced to always shower fast. Family 3 (Minute 15:35) also points out that "*it can create additional conflicts with teenagers in puberty because too long grooming time is already a topic of discussion*". Concerning quality labels, only Family 2 believes that it would increase the products credibility. The other families do not perceive it as important but mention that it *would be nice* if the WaterGuide had a 'TÜV' or 'Umweltengel' label.

6.2 Interview Discussion

The analysis of the interviews will be divided into two sections. First, the set of questions asking about the product will be discussed. Hence, it will be identified how the WaterGuide is perceived by the different families. Second, the marketing related questions will be discussed.

6.2.1 Product Perception

In this sub-section the interview questions identifying how the WaterGuide is perceived will be analysed. This will be done for each family separately followed by a brief overall summary of the product perception.

Family 1

Overall, Family 1 perceived the WaterGuide as highly positive and helpful for reducing their warm water consumption. This is clearly indicated by their statement: "*There is nothing negative to say about the WaterGuide. It is a highly positive device and even the kids always made sure to stay in the green level.*" (Minute 1:04) The visualization of the consumption was found to be very helpful. Especially seeing how much water one uses was perceived as helpful: "*It is really difficult to estimate how much water you use and therefore I would have underestimated it.*" (Minute 3:50) Also, the chart shown after showering - comparing each person's usage - led to a competition, mainly between the children. Overall, the family thinks that the WG definitely helps raising awareness.

Since the family is already very eco-friendly the WG did not change their attitude. However, "*it makes it easier because of the visualization of your actual consumption*" (Minute 4:54) Therefore, the WG did change their behaviour to be more conserving. Especially the mother reduced her long and hot showers. A highly interesting finding is that the WG actually helped changing her showering habits: "*You adjust to it and after a while you do not notice it anymore. Then it becomes normal to shower less long.*" (Minute 6:01) Thus, the family was willing to reduce the comfort of a long shower in order to save money and protect the environment.

Family 2

Family 2 had mixed feelings towards the WaterGuide. Asking what they find positive and negative about it, the first comment of the husband was "*It creates stress. You cannot shower relaxed if the device starts making noises*". (Minute 0:56) However, they still believe that it helps raising awareness and therewith does motivate to reduce shower time. Another drawback was that both parents could not read the display with-

out using their glasses. The mother indicated that she already showered no more than 2 minutes and therefore the WG did not make a difference for her. Summing up those statements, it can be said that Family 2 did perceive the WaterGuide as positive but with some exceptions. The visualization was perceived as fun and the smileys and sound motivated the children to stay in the green level. A competition only arose in the beginning but did not last.

The family states that the WG did raise their awareness and therewith also changed their behaviour. Now they pay more attention to their warm water consumption and are trying to reduce it. For example, the father used to leave the water running while soaping but does not do that anymore. Overall, they were willing to reduce the comfort of a long shower sometimes but certainly not always. The motivation to stay within the green level even lead the daughter to some creative thinking: "*In order to wash her long hair she changed to an unused symbol so that it wouldn't add up on her account.*"

Family 3

All in all Family 3 had a positive perception of the product. In the beginning they felt it was fun to shower with the WaterGuide, especially for the children. After some time they adjusted their behaviour and managed to stay within the green level. Therefore, they are considering uninstalling the device at some point since it has served its purpose.

The visualisation was also perceived as very positive and made it easy to understand ones consumption. The chart in the end comparing each person's consumption created a competition within the family. However, that also led to the children being upset and frustrated when not being in the first spot. Overall, it increased the family's awareness. Especially seeing the time and amount of litres used was perceived as very helpful. Nevertheless, since the family already has a very positive attitude towards conserving warm water and already tries to shower short it did not change their attitude. Thus, it only had a minor influence on their actual behaviour. The change that did happen is that comfort was reduced as the WaterGuide "*makes you aware when you're just standing there letting the water drop down on you*". (Minute 5:21) This led to a rather significant change in perception: "*taking a shower turns into being a task instead of being something you enjoy*" (5:36) Hence, even though the actual change of showering time was minor in this family – since it was already low – it had a major impact on the way they perceive the act of taking a shower. Sometimes they felt that this change is something good but sometimes it also bothered them to feel obligated not to take a comforting and relaxing long shower.

Family 4

Family 4 had mixed feelings towards the WaterGuide. It was perceived as helpful to see how long one showers. However, they feel that it is impossible not to get into the red level when carrying out more extensive grooming such as shaving. Nevertheless, the visualisation did help in order to be more aware and therefore helped trying to adjust ones behaviour. No competition arose between the family members.

Besides trying a bit to shower less long, the WG did not have a positive influence on the family's attitude towards saving warm water in general. Only the wife was willing to reduce some comfort in order to reduce her consumption. However, the husband was not willing to whatsoever.

Family 5

Family 5 had an entirely positive perception of the WaterGuide. They found it very helpful to know how long and hot one showers as it helps reducing consumption. Hence, the visualisation was highly helpful. A competition did not emerge. Overall, it did raise awareness and helped shorten showering time. Especially the mother was surprised about her consumption and tried to reduce it. Interestingly, the WaterGuide did not only change their attitude towards saving warm water in the shower: "*we also adjusted our behaviour when brushing teeth and taught our son to turn off the water while brushing*". (Minute 3:59) Overall, the WG did lead to a change in actual behaviour. The family was partly willing to reduce comfort in order to save money.

In sum, it can be said that the WaterGuide was perceived quite positive. All families indicated that the visualisation of their consumption is very helpful and that it raised their awareness regarding how much they consume and therewith motivated them to lower it. Even though the degree to which the families adjusted their behaviour varies, all of them somehow changed it. The interviews with Family 1 and 3 showed that the WaterGuide even has the potential to change habits. In Family 5 it actually influenced the warm water consumption behaviour outside the shower. Of course, a behavioural change is only possible if people are actually willing to. As can be seen in Family 4, the father had no willingness to change his behaviour and therefore the WG had no impact on him. Finally, all families found it to be a good tool to teach their children about the topic.

6.2.2 Strategic Marketing Plan

In this sub-section the interview questions aiming at getting insights in order to develop specific managerial marketing implications will be analyzed. This will be done by analysing all families' answers in conjunction for each topic, e.g. decision making, price and so on.

Decision Making

Table 2 shows who is part of the decision making in each family and which role they play. It becomes evident that the main initiator – the person suggesting to buy the WaterGuide – is the husband in a family. In most cases no one influences the decision making. However, when it comes to the final decision there is the clear tendency for both parents to decide together. Finally, the husband will most likely carry out the actual purchase.

Role	Family 1	Family 2	Family 3	Family 4	Family 5
Initiator	Husband	Husband	Wife*	Husband	Both
Influencer	-	Wife	-	-	Both
Decider	Both	Husband	Both	Wife	Both
Purchaser	Husband	Husband	Wife*	Either	Husband
* The wife with a technical interest (homosexual marriage).					

Table 2 Decision Participants and their Roles

Source: Author, based on interview answers shown in Appendix 7

Furthermore, it was asked which different decision steps the family would carry out before buying the WG. All families would search for information about the product and then evaluate if it is needed. In addition, two families said they would read/listen to recommendations. Hence, the following decision stages can be assumed to be valid: need arousal – gather product information – evaluate if product is needed – purchase – use.

Product Category and Positioning

When asking into which product category the interviewees would classify the WaterGuide, all of them gave the same answer: energy saving products. Some mentioned products such as a water flow controller as an alternative product within the category. Hence, the result is clear without ambiguity.

In order for the researcher to later on recommend a positioning, the interviewees were asked to indicate which two product attributes or product benefits are most important to them and how they think the WG performs on these two characteristics. Table 3 shows their answers regarding which are the two most important attributes.

	Family 1	Family 2	Family 3	Family 4	Family 5
1st most important attribute	Ease of use	Saving potential	Price	Functional Technology	Saving potential
2nd most important attribute	Price	Ease of use	Saving potential	Saving potential	-

Table 3 Two Most Important Product Attributes of the WG

Source: Author, based on interview answers shown in Appendix 7

It becomes evident that the saving potential is the most important product characteristic. Two families indicated it as being the most important and another two families as the second most important product attribute. No other characteristic was mentioned as often. At first, it is not clear which attribute the second most important is. Both – ease of use and price – are mentioned once as most important and once as second most important. Thus, they could both be identified as the second most important attribute. However, Family 4 mentioned functional technology as the most important attribute. This can be understood as the technology having to be convenient for its purpose which can also be interpreted as the technology having to be easy to use. Based on this reasoning, ease of use can be identified as the second most important product attribute.

The interviewees were also asked to indicate how they rate the WaterGuide's performance in those two attributes. Two families rated the saving potential as very good. Family 3 said the saving potential is small. However, this is only due to the fact that they already have a very low consumption and consequently cannot save much more. Family 4 criticized that they do not know how much they actually saved and therefore could not rate how well the WaterGuide performs. Regarding the ease of use everyone pointed out that the WG performs very well on that attribute.

USP's

Three questions were asked to identify which product characteristics are important to the user and therefore should be emphasised in the marketing communication.

Family 1 simply liked everything about the product. However, they pointed out that mainly the ease of use and the visualization/sound were the most important about the product. When recommending the WG to friends and family they would especially point out that it is fun for the children and teaches them about their warm water consumption. "*All the friends of our kids know that we have the device. One even showered here to try it.*" (Minute 20:16) This clearly shows how engaged the children are. Overall, the saving potential would be the main reason for Family 1 to buy the WaterGuide.

That it is self-explaining how to use and install the WG was very important to Family 2. The saving potential is what they would point out when referring it to friends and family and it would also be their reason to buy it. Nevertheless, as saving money is not very important to them, they would most likely not buy the WG.

Family 3 said that the most important to them in the WaterGuide is that it raises awareness and makes saving fun (due to the visualization). When referring it to friends and family they would mainly point out that it is interesting to see ones actual consumption in numbers. Also the children told their friends that it is fun to shower with the WG. When buying the product it would be because of the competition it creates within the family to save warm water. However, "*we would only buy it if it was recommended by friends*". (Minute 15:10)

The most important to Family 4 was that the different levels (green, yellow, and red) helped evaluating how *good/bad* ones consumption is. The family would only refer it "*if we knew how much we actually saved*" (Minute 38:00) because they neither know how much money they saved nor how much they helped the environment. Furthermore, they would simply not buy the WG as saving warm water is not important to them.

Family 5 highlighted that the WG is especially helpful to raise awareness and that the visualization reminds you every time to shower more consciously. Talking about it with family and friends they would mainly stress that it is good for families to reduce warm water consumption in a way that makes the children enjoy it. The constant remainder how much one consumes would be their reason to actually buy the WG.

Summing up, the most important product attributes can be identified as:

- Awareness it raises due to the visualisation
- The resulting saving potential
- Fun and teaching for the whole family

Price and Distribution

Asking the families how much they would be willing to pay for the WaterGuide, answers vary significantly. Family 4 and 5 had the lowest willingness to pay: €20. Family 4 justified their answer with the fact that they do not know how much the WG actually helps them save. The husband estimated that they could save €20 in a year. Since he would expect a payback-time of 1-2 years he concluded that he is willing to spend around €20. The price willingness of Family 3 is also rather low with €30. However, this is most likely due to that fact that they already have a low consumption level and therefore do not really need the WG. In consequence, their price willingness is low. The other two families showed higher price willingness. Family 2 would pay around €50-75 depending on how much they could actually save. They also said that the maximum payback-time should be 1½ years. In Family 1 the wife would pay €90 and her husband would be willing to spend around €120. It becomes obvious that there are very different levels of how much people would spend for the WaterGuide. This could be due to different household income levels. It could also be due to differing importance the families place on reducing their warm water consumption. For example, Family 5 was quite happy with the product and said that it helped them reducing their consumption. Nevertheless, they would not pay more than €20. Hence, even though they liked the product and its effect, it might just not be that important to them.

Besides their price willingness the interviewees were asked where they would expect the WG to be sold. All of them would expect it to be sold in DIY stores. In addition, sanitary retailers and the Internet were mentioned by most families. Interestingly, two of the families also mentioned that this is a product their water or energy suppliers could offer.

Perceived Risk

Finally, it was asked to which level the families associate any kind of risk with buying the WaterGuide. All families said that they do not think there is a risk involved when buying the product. However, Family 1 and 3 pointed out that it can create stress for the children. They might feel obligated to shower fast which could upset them. Hence, the parents should "*avoid that by telling the kids that it is ok to sometimes take a long shower*". (Family 1, Minute 23:05)

6.3 Summary of Qualitative Analysis

Summarizing it can be said that the WaterGuide was perceived as a helpful device to raise awareness about one's warm water consumption in the shower. The intensity of influence it had on actual behaviour varied mainly based on two factors – the level of consumption before using the WG and the importance assigned to saving money and protecting the environment. The most impressive result is that it actually has shown the potential to change showering habits.

Furthermore, different questions relevant for the marketing strategy were asked. The managerial implications of the results will be assessed in detail in the following chapter 8. At this point it can be summarized that the main finding is that saving potential and ease of use were the two most important product characteristics on which a buying decision would be based and hence should be used in the communication.

7

MANAGERIAL IMPLICATIONS

In the present chapter the findings from the quantitative and qualitative analysis will be combined in order to provide managerial implications for the case company Smile Energy and their product the WaterGuide. At first, the market potential of the WG will be discussed. Hence, whether there is a justification to introduce the product on the German market. This will be followed by a brief discussion of the 4 P's in section 7.2. Subsequently, a recommendation about how to position the product in the German market will be provided. Finally, an adequate communication strategy will be developed. For all provided recommendations it is important to keep in mind that the sample size of both – the quantitative and qualitative research – are rather small. This limits the generalizability of the results and therewith the applicability of the conclusions.

7.1 Market Potential

Before developing marketing implications for the WaterGuide, it has to be assessed whether there exists a market for the product. Hence, there must be a need for the product and its benefits.

First of all, the quantitative data showed that German families with children have a quite positive attitude towards environmental protection and behave rather eco-friendly. This general finding is a first indication that a product helping them to be more eco-friendly could potentially have the chance of succeeding in the market.

Investigating the attitude towards saving warm water also showed positive results. Beliefs and feelings about the importance of conserving warm water were highly positive. In general, this was confirmed by the respondents' behaviour as well. Thus, their positive attitude most likely also indicates that they are willing to save warm water. Therefore, a product helping them to do so could be interesting for them. Especially, results showed that when it comes to 'turning off the water while soaping' and 'trying to shower fast in

order to save warm water' people's behaviour is less consistent. This shows that there is a big potential for German families to reduce their warm water consumption in the shower. In other situations, such as 'only doing laundry when there is a full load', they already behave very conscious. In sum, the finding is that it is important for families to conserve warm water. The fact that they mainly lack doing so in the shower proves that there is a big potential for the WaterGuide.

The data also showed that a lot of families believe it would be difficult for them to reduce their warm water consumption. Accordingly, the WaterGuide presents a way to help them in doing so. As became evident from the interviews, all test families agreed that the WG raised their awareness and that the visualisation of their consumption enabled them to reduce it.

The survey also showed that most families have, to some degree, the intention to reduce their consumption. This furthermore supports that there is a market for the WaterGuide. However, there are families with little to no intention. Also, the interview with Family 4 showed that, even though they thought the WG raised awareness, the product is simply not relevant to families that have no willingness to reduce their consumption. Thus, there clearly is a market for the product but it will only be considered by families with the willingness and need to lower their warm water usage.

Finally, the interviews clearly showed that all families found the visualisation of one's consumption as very helpful and that it raised their awareness. The WaterGuide even helped changing behaviour and habits:

- Taking shorter showers became normal (Family 1)
- Now the water is turned off while soaping (Family 2)
- Taking a shower is now a task instead of pleasure (Family 3)
- Spill over effect: now water is turned off when brushing teeth (Family 5)

Hence, the interviews proved that the WaterGuide serves its purpose and leads to the promised and hoped for results.

Summarizing, it can be concluded that there is a substantial market potential for the WaterGuide in Germany within the defined target market, families with children. Conserving warm water is believed to be highly important and it was clearly identified that a main opportunity to do so lies in the showering behav-

iour. The perceived difficulty to lower warm water consumption and the rather high intention to do so furthermore prove that there will be a need for the WaterGuide.

7.2 4 P's of the Marketing Mix

"*Marketing is the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to create and exchange value, and satisfy individual and organisational objectives.*" (Geuens, Van den Bergh & De Pelsmacker 2010)

This citation describes the traditional instruments of the marketing mix, the 4P's: product, price, place and promotion. In the present case the product is already developed, the WaterGuide. Hence, price, place, and promotion still need to be planned. Promotion will be discussed in section 7.3.3 which develops a communication strategy. Thus, in this section price and place need to be assessed.

Price

As became evident in the interview analysis, the test families indicated extremely differing price willingness'. It ranged between € 20 - 120. Hence, a concrete recommendation cannot be given. Obviously the price must enable the company to cover production and other costs as well as some surplus. The only recommendation that can be given at this point is to communicate to the customer how much saving potential the WaterGuide yields in order to raise their price willingness. Even though 3 out of 5 families indicated that the payback-time is not important to them, it is still recommended to also communicate it. It can be assumed that it will have an effect on the customer's price willingness if he sees that he will have a return of in investment in less than a year.[7] Especially since the saving potential was found to be the most important product characteristic.

Place

Place refers to the distribution channels of the product. Based on the interviews, it can be recommended to distribute the WaterGuide online and in DIY stores. In order to assure a quick and nationwide presence in Germany, Smile Energy should start selling the WG in the three biggest DIY chains in Germany, namely Obi, Bauhaus, and Toom. (Euromonitor International 2012) Obviously it could also be offered in additional German DIY chains. The online channel could be served by means of the web-stores of the DIY chains and trough the companies own online shop.

[7] This information is obtained from verbal and written personal contact with Thorkild Rasmussen.

Furthermore, interviewees also expected the WG to be found in sanitary retailers. However, in the beginning this should not be the focus as it can be assumed that sanitary retailers have far less outlets and are most likely not organized in area-wide chains.

Finally, two interviewees mentioned that they would expect the product to be offered by their energy or water provider. This could, for the future, be an interesting distribution channel Smile Energy should consider and investigate whether there is a sales potential in it.

7.3 The Strategic Planning Process

In order to compass a communication strategy several planning steps must be taken, as shown in Figure 14.

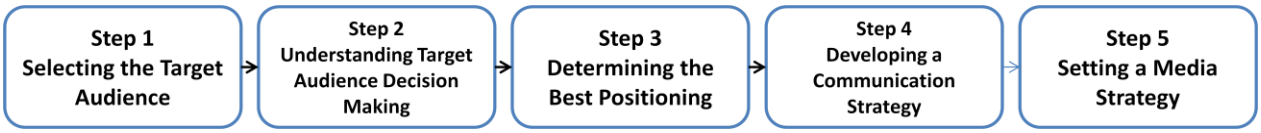

Figure 14 Implementing the Strategic Planning Process

Source: (Percy, Elliott 2009)

A main part of marketing communications is to first identify which groups of customers to target. However, in the present case the first step was already carried out by the case company. The chosen target group are German families with children in the age group 30-55. There are 8,08 million families with under aged children in Germany. (Statistisches Bundesamt 2011) This clearly shows that the chosen target group is substantial enough to be profitable. Thus, at this point steps 2 to 4 of the planning process will be carried out. Step 5 will not be considered as it is not the objective of this research to develop a specific media strategy.

7.3.1 Target Audience Decision Making

"*Marketing Communication is aimed not just at individuals, but at individuals in a role.*" (Percy, Elliott 2009)

Therefore, it must be identified who is involved in the buying decision, which role they play and which decision stages they undertake. There are five potential roles: initiator, influencer, decider, purchaser and user. (Percy, Elliott 2009) In the case of the WaterGuide the whole family is the user. Therefore, only the other roles need to be identified. This was already done in the interview analysis and is shown in Table 2. Results showed that mainly the father initiates the purchase and both parents make the final buying decision.

Hence, marketing communication should aim at both parents. The actual purchase is carried out by the father, which implies that the point of purchase communication should be aimed at men.

The decision process was identified in the analysis as follows: need arousal – gather product information – evaluate if product is needed – purchase – use. This shows that the decision process in the category is rather simple. Thus, not a lot of thinking is done when deciding whether to buy the WaterGuide or not. This leads to the conclusion that this is a low-involvement decision. This conclusion is further supported by the interview finding that there is no risk involved in the decision.

7.3.2 Positioning of the WaterGuide in the German Market

Positioning is "*a core element of marketing strategy and hence of marketing communications*". (Geuens, Van den Bergh & De Pelsmacker 2010) It is the unique position a product has in the target group's mind. Hence, it is also how the product is differentiated from its competitors. Generally, positioning is based on product attributes and benefits. In order to decide on a positioning different from the competition, it needs to be identified which benefits are the most important for the consumer within the product category. Then, the positioning must be based on an attribute important for the consumer at which the product performs superior. Thus, two steps must be carried out: identifying the market and therewith the competitors and deciding on a positioning hence seeking a differential advantage. (Geuens, Van den Bergh & De Pelsmacker 2010, Percy, Elliott 2009)

The Market

First, the market in which the WaterGuide competes must be identified. However, this cannot be done from the company's point of view. Rather "*the market actually defines itself by how consumers see the market*". (Percy, Elliott 2009) Therefore, one interview question asked the test families into which product category they would categorize the WG. All families indicated that they see it as an energy saving product. When asking for alternative products within the category a water flow controller for the tap was mentioned by three families. One also mentioned water saving shower heads as an alternative. The alternatives considered show that even though the interviewees answered 'energy saving' as the category, they actually only thought of saving energy used for warm water. Consequently, the product category the WaterGuide belongs to is 'products reducing warm water energy usage'. Accordingly, the category need the device satisfies is the need to reduce ones warm water energy consumption.

Differential Advantage

In order to establish an effective positioning three steps need to be carried out, as shown in Table 4.

Step 1	Make initial decisions • With regard to the product category, choose: central versus differentiated • With regard to other brands, choose: user versus product orientation
Step 2	Select appropriate benefits. Identify benefits that • Are important to the target group • The product can deliver • Can be delivered better than from other brands
Step 3	Use correct benefit focus • Positive purchase motivation: emphasis on emotional consequences • Negative purchase motivation: focus directly on the benefits

Table 4 Three Steps to Effective Positioning

Source: adapted from (Percy, Elliott 2009)

Step 1. The WaterGuide should be positioned differentiated, meaning that besides the primary category benefits it needs to focus on additional benefits. The primary category benefits were identified as saving potential and ease of use. It is self-evident that the competitors - water flow controllers and water saving shower heads – both deliver well on those two benefits. Therefore, the WaterGuide must be differentiated. Which benefits should be used to differentiate the WG will be assessed in Step 2. However, the positioning should be based on the product, meaning that product characteristics are the message.

Step 2. The interview analysis identified that the visualisation of consumption which creates awareness and therewith enables changing ones behaviour was the most important product benefit. Furthermore, the saving potential and the fun it creates for the children were highly important product attributes. Since saving potential is a primary category benefit it cannot serve as a differentiator. Consequently the benefit that performs best as distinguishing the WaterGuide from its competitors is the visualisation of consumption. The WG is the only product that can deliver this benefit. As the same is valid for the fun the product creates that could be emphasised as well. However, the main focus in order to gain a differential advantage should be on the attribute most important to the consumer: 'The WaterGuide visualizes consumption which creates awareness and therewith helps improving shower behaviour'.

Step 3. In the last step it needs to be identified how the benefit should be emphasized in marketing communication. Hence, it is already a first part of the communication strategy to be developed in section 7.3.3. The underlying purchase motivation can be assumed to be negative hence a problem needs to be solved or avoided. More specifically, the problem of consuming too much energy for warm water needs to be solved. If the motivation is negative the benefit must be communicated through providing information. This can be done for example by pointing out the negative emotion which can be solved through the benefit. (Percy, Elliott 2009)

Summarizing, it was identified that the WaterGuide is in the 'products reducing warm water energy usage' market. In order to differentiate itself from the competition - water flow controllers and water saving shower heads – it was determined that the benefit 'visualization of consumption' must be emphasized in the marketing communication.

7.3.3 Communication Strategy

Establishing the communication strategy is the final step in the planning process. Here, the communication objectives must be decided on.

Category need should be the first objective for the WaterGuide marketing communication. Category need must be an objective when a product is first introduced into the market. Also, it is necessary when the target group needs to be reminded of their need for a product within the category. This is usually the case when the product category is infrequently purchased. (Geuens, Van den Bergh & De Pelsmacker 2010, Percy, Elliott 2009) Since the WG is a new product and it can be assumed that 'products reducing warm water energy usage' are purchased highly infrequently it becomes evident that category need must be a communication objective. The quantitative analysis showed that the main motivations to reduce warm water energy consumption are in order to save money and to protect the environment. Hence, the benefits of being able to reduce household costs and help protecting the environment should be emphasized in order to establish category need.

Second, brand awareness must be a communication objective. According to Percy & Elliott (2009) brand awareness and brand attitude must always be a communication objective. Brand awareness is needed in order for the consumer to consider the brand. There are two types of brand awareness: recognition and recall. Brand recognition means that the awareness of the brand reminds the consumer of his need. Brand

recall means that the consumer has a need and then remembers the brand. (Percy, Elliott 2009) Taking a look at the target audience decision making process it becomes clear that in the present category the need occurs first. Hence, the brand awareness strategy must be brand recall. This implies that in the communication the name WaterGuide needs to be linked to the category need and be mentioned repeatedly. This will enable that the consumer links the WG to the need when it occurs in real life. Furthermore, it is important to link it in that exact order: the need and then the WaterGuide satisfying it. (Percy, Elliott 2009)

Finally, brand attitude must be a communication objective. The target audience must have a positive attitude towards the WaterGuide in order to consider buying it. That means they must evaluate the brand and its ability to satisfy their need positively. (Percy, Elliott 2009) Since the WaterGuide is a new product brand attitude must be newly created. In order to build a positive brand attitude one of four potential strategies must be applied to the marketing communication. Figure 15 shows the four possible strategies.

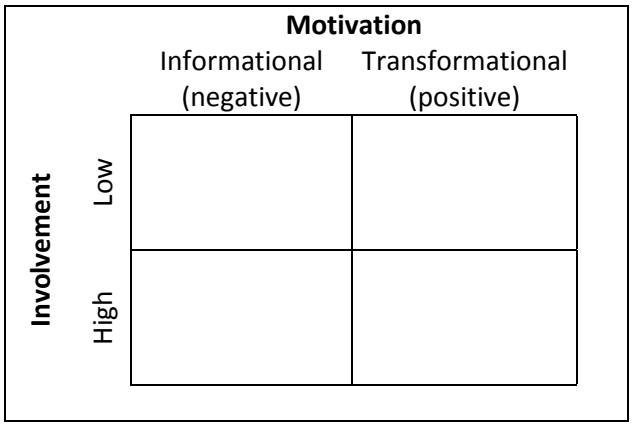

Figure 15 Rossiter-Percy Brand Attitude Strategy Grid

Source: (Percy, Elliott 2009)

As identified earlier, there is no perceived risk when buying the WaterGuide hence in the present category involvement is low. It was also identified before that the motivation is negative, meaning that the consumer wants to solve a problem. In this case that is the problem of having too high energy and water bills. In consequence, the attitude strategy is low-involvement informational. This has several implications for the communication. As mentioned before, the problem should be presented first followed by being solved by the brand. Thus, it should be pointed out that household energy costs are high and can be reduced with the help of the WaterGuide. It would even be possible to present the benefit in an extreme way. The most important is to clearly communicate the benefit. Hence, overall the message should be kept simple. As it is a low-involvement situation it is recommended not to claim more than two benefits. (Percy, Elliott 2009)

Thus, in order to address all three communication objectives the following two product benefits should be emphasized in the communication: *visualisation of one's consumption which enables to change behaviour* and therewith *reduces the household's energy costs*.

In the end, it should be pointed out that all marketing communication must be integrated. Thus, all messages in all communication channels must be consistent. That means the message and look and feel must be consistent. Even though a media strategy is not part of this research it should be mentioned that for recall brand awareness and a low-involvement informational brand attitude the following media is usually recommended: television, radio, newspaper, magazines and sponsorships. (Geuens, Van den Bergh & De Pelsmacker 2010, Percy, Elliott 2009)

8

CONCLUSION

In the beginning of this thesis it was highlighted that even though consumers are becoming more and more green, there still are major differences in which areas they are trying to behave environmentally friendly and how intensive they are trying to do so. The energy consumption for warm water was found to be a potential area for a private household to reduce their consumption and therewith their impact on the environment. Based on that, the main research question and its sub-questions were developed. The purpose of this thesis was to answer these questions through conducting primary research. The answers derived will be presented in the remainder of this final chapter.

How is the warm water consumption behaviour of German families with children?

The warm water consumption behaviour of German families with children was assessed with the help of the Theory of Planned Behaviour based on which the online questionnaire was set up. Results showed that German families with children have a predominantly positive attitude towards reducing warm water consumption. Their behaviour was mainly confirmatory. However, results also showed that the behaviour is less eco-friendly when it involves reducing personal comfort – such as reducing shower time. Concerning the intention to lower the household's warm water consumption, findings show only a slightly positive tendency. Finally, no significant differences could be found between families with 1-2 or 3-4 children. However, families living in a house were found to have a more positive attitude towards conserving warm water and also a slightly higher intention to do so than families living an apartment. In sum, the results showed that German families with children do behave eco-friendly in their warm water consumption but that there is still a great potential to improve it.

What motivates them to reduce their consumption?

The questionnaire furthermore explored what motivates German families with children to reduce their warm water consumption. Results showed that the main driver to reduce ones consumption is of financial nature. Environmental concern was ranked third after saving energy and water costs. This clearly shows that *being green* is to some degree important to German families but saving money is the main driver of eco-friendly behaviour.

Do German families with children present a profitable market for the smart energy meter WaterGuide?

Both, the survey and interview results showed that there is a big market potential for the WaterGuide. The survey found that German families with children perceive the conservation of warm water as important. It also showed that they mainly lack doing so in the shower. Furthermore, the families believe that it is difficult for them to reduce their warm water consumption. All these findings clearly indicate that there is a big potential for the WaterGuide. This was furthermore supported by the results from the test families which showed that the WG has the potential – besides motivating families to reduce their consumption – to actually change showering habits.

How should the WaterGuide be marketed?

At first, it was identified that the WaterGuide belongs to the product category 'products reducing warm water energy usage'. Based on that, it was determined how the WG should be positioned in the German market. The results from the primary data led to the conclusion that the WG needs to be differentiated from its competitors based on a unique benefit important to the target group. That benefit was found to be the visualisation of consumption. Thus, any communication must stress that 'The WaterGuide visualizes consumption which creates awareness and therewith helps improving shower behaviour'.

Furthermore, the necessary communication objectives were identified. Category need must be established as the WG is a new product. This can be done by highlighting that the WG enables the family to reduce household costs and helps protecting the environment. Furthermore, brand awareness must be created in the form of recall awareness. This can be done by linking the name WaterGuide to the category need in any chosen communication.

Finally, brand attitude was identified as a communication objective and the attitude strategy was found to be low-involvement informational. This implies that in the communication the problem should be presented first, followed by being solved by the brand. Thus, it should be pointed out that household energy costs are high and can be reduced with the help of the WaterGuide. Overall, the message should be kept simple and it is recommended not to claim more than two product benefits.

How do German families with children perceive awareness raising smart energy meters for the shower?

Initially, an online survey was conducted to get an understanding of the warm water consumption behaviour of German families with children. This lead to the insight that they believe that reducing ones warm water consumption is important. However, it also showed that they believe it is rather difficult for them to do so. These results are a first indication that an awareness raising smart energy meter for the shower has the potential to be perceived as highly helpful for German families with children in order to reduce their warm water consumption.

The interviews conducted with the 5 test families supported that preliminary assumption. All families indicated that the visualisation of their consumption was very helpful and raised their awareness about how much they actually consume. The display of their consumption in three different levels motivated and enabled them to reduce their shower time. However, the degree to which the families adjusted their behaviour varied by their willingness to reduce comfort and by the importance they place on saving money and protecting the environment. Nevertheless, in sum all test families perceived the awareness raising smart energy meter WaterGuide as highly positive.

Finally, it needs to be pointed out again that the research results and the derived recommendations are limited by the rather small sample size in both, the quantitative and qualitative research. Hence, it would be highly valuable to conduct this research on a larger scale in order to get more precise and more generalisable results. Furthermore, it would be extremely interesting to monitor and measure to which degree the families adjust their showering behaviour and hence how much actual saving potential the WaterGuide presents for German families with children.

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APPENDICES

Appendix 1: Handout in schools

Copenhagen Business School
HANDELSHØJSKOLEN

Sehr geehrte Damen und Herren, liebe Eltern,

mein Name ist Nadine Schindler und ich führe im Rahmen meiner Masterarbeit an der Copenhagen Business School eine wissenschaftliche Umfrage durch. Diese zielt auf deutsche Familien mit Kindern ab. Das Thema der Umfrage ist:

„Warmwassernutzung in privaten Haushalten"

Ihre Meinungen und Einschätzungen zu diesem Thema sind enorm wichtig für den Erfolg der Umfrage und werden selbstverständlich vertraulich behandelt.

Ich bin auf eine zahlreiche Teilnahme angewiesen und möchte Sie daher herzlich bitten, sich bis zum **30.04.2012** an der Umfrage zu beteiligen. Ich schätze Ihre Hilfe sehr und jede Beteiligung hilft mir enorm.

Die Umfrage findet online statt:

https://www.surveymonkey.com/s/Schindler

Als Dank werden unter allen Teilnehmern **3 Preise** verlost:

1. **Movie Park Bottrop: All Inclusive (unbegrenzt Speisen und Getränke) Tageskarten für die ganze Familie**
2. **Aqua Park Oberhausen: Wochenend-Tageskarten für die ganze Familie + € 20 Speisegutschein**
3. **Amazon: Gutschein im Wert von €30**

Freundlicherweise wurde mir genehmigt, diese Nachricht an Ihrer Schule auszuhändigen. Die Teilnahme ist selbstverständlich freiwillig und alle Daten werden anonym erhoben. Bei Fragen können Sie mich gerne unter SchindlerNadine@web.de kontaktieren.

Vorab vielen herzlichen Dank für Ihre Mithilfe.

Mit freundlichen Grüßen

Nadine Schindler

Appendix 2: Online Survey in German Language

Masterarbeit Nadine Schindler Umfrage beenden

Sehr geehrte Teilnehmerin, sehr geehrter Teilnehmer,

im Rahmen meiner Masterarbeit an der Copenhagen Business School führe ich eine wissenschaftliche Umfrage unter deutschen Familien mit Kindern durch. Das Thema der Arbeit ist der Energieverbrauch deutscher Haushalte durch Warmwassernutzung.

Ich bin auf Ihre zahlreiche Teilnahme angewiesen und bitte Sie daher herzlich um Ihre Mithilfe bis zum 30.04.2012. Das Ausfüllen der Umfrage wird ca. 10 Minuten Zeit in Anspruch nehmen. Jede Frage ist für spätere Ergebnisse äußerst wichtig, daher bitte ich Sie, diese wahrheitsgemäß zu beantworten. Alle Daten werden selbstverständlich anonym behandelt.

Als Dank für Ihre Teilnahme haben Sie am Ende der Umfrage die Chance, an einem Gewinnspiel teilzunehmen. Sie können folgende Preise gewinnen:

1. Movie Park Bottrop: All Inclusive (unbegrenzt Speisen und Getränke) Tageskarte für die ganze Familie

2. Aqua Park Oberhausen: Wochenend-Tageskarte für die ganze Familie + € 20 Speisegutschein

3. Amazon: Gutschein im Wert von € 30

Sollten Sie Fragen haben, oder an den Ergebnissen interessiert sein, so kontaktieren Sie mich gerne unter SchindlerNadine@web.de.

Ich bedanke mich vorab recht herzlich für Ihre Teilnahme.

Mit freundlichen Grüßen

Nadine Schindler

Masterarbeit Nadine Schindler Umfrage beenden

Die folgenden Fragen beziehen sich allgemein auf das Thema Umweltschutz.

1. Bitte geben Sie Ihre Meinung/Wahrnehmung zu den folgenden Aussagen an.

	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu
Unsere Kinder werden in schlechteren Umweltverhältnissen leben müssen, als wir heutzutage.	○	○	○	○
Die Politik muss im Bereich Umweltschutz aktiver werden.	○	○	○	○
Ein Großteil der Bevölkerung verhält sich nicht umweltbewusst.	○	○	○	○
Umweltprobleme belasten meine Gesundheit.	○	○	○	○
Ich mache mir Sorgen wegen der vorhandenen Umweltprobleme.	○	○	○	○
Umweltprobleme werden übertrieben.	○	○	○	○
Umweltfreundliches Verhalten ergibt nur Sinn, wenn dies jeder tut.	○	○	○	○
Vom Aussterben bedrohte Arten zu schützen ist unnötig.	○	○	○	○
Es ist die Verantwortung eines jeden Bürgers, die Umwelt zu schützen.	○	○	○	○

14%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

2. Bitte geben Sie an, wie oft die folgenden Aktivitäten in Ihrem Haushalt durchgeführt werden.

	Immer	Meistens	Manchmal	Nie
Wir haben Elektrogeräte auf Stand-by stehen.	○	○	○	○
Wir benutzen chemische Reinigungsmittel.	○	○	○	○
Wir machen das Licht aus, wenn wir einen Raum verlassen.	○	○	○	○
Wir verwenden Einkaufstüten mehrfach.	○	○	○	○
Wir sammeln und recyceln Papier.	○	○	○	○
Wir recyceln Glas.	○	○	○	○
Wir fahren auch kurze Strecken mit dem Auto.	○	○	○	○
Wir kaufen Bio-Lebensmittel.	○	○	○	○
Wir trennen Müll.	○	○	○	○
Wir recyceln Pfandflaschen.	○	○	○	○

21%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

Die folgenden Fragen dienen der Erfassung Ihrer Haltung zu umweltbewusstem Verhalten. Konkret geht es um den Energieverbrauch durch die Nutzung von **Warmwasser**.

3. Bitte geben Sie Ihre Meinung zu den folgenden Aussagen an.

	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu
Es ist wichtig, Warmwasser zu sparen.	○	○	○	○
Das Einsparen von Warmwasser hilft der Umwelt.	○	○	○	○
Es ist nicht notwendig seinen Warmwasserverbrauch zu reduzieren.	○	○	○	○
Das Sparen von Warmwasser eines jeden einzelnen hat positive Auswirkungen auf die Umwelt.	○	○	○	○

29%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

4. Bitte geben Sie Ihre Empfindungen zum Einsparen von Warmwasser an.

	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu
Es gibt mir das Gefühl etwas Gutes für unsere Umwelt zu tun, wenn ich Warmwasser spare.	○	○	○	○
Ich empfinde es als wichtig, den Warmwasserverbrauch zu reduzieren.	○	○	○	○
Es gibt mir das Gefühl ein besserer Mensch zu sein, wenn ich Warmwasser einspare.	○	○	○	○
Ich empfinde das Einsparen von Warmwasser als sinnlos.	○	○	○	○

36%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

5. Bitte geben Sie an, inwieweit die folgenden Aussagen auf Sie zutreffen.

	Nie	Manchmal	Meistens	Immer
Ich drehe den Wasserhahn aus, während ich meine Zähne putze.	○	○	○	○
Ich warte mit der Wäsche, bis ich eine Maschine voll habe.	○	○	○	○
Ich drehe in der Dusche das Wasser ab, während ich mich einseife.	○	○	○	○
Ich dusche eher, als das ich bade.	○	○	○	○
Ich versuche schnell zu duschen, um Warmwasser zu sparen.	○	○	○	○
Ich versuche weniger oft zu duschen/baden.	○	○	○	○
Ich stelle die Spülmaschine nur an, wenn sie voll ist.	○	○	○	○
Ich benutze die Wassersparfunktion der Toilette.	○	○	○	○

43%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

6. Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen.

	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu
Unsere Freunde würden es befürworten, dass wir sparsamer Warmwasser verbrauchen.	○	○	○	○
Unsere Familie würde es befürworten, dass wir sparsamer Warmwasser verbrauchen.	○	○	○	○
Unsere Freunde sind der Meinung, dass wir sparsamer Warmwasser verbrauchen sollten.	○	○	○	○
Unsere Familie ist der Meinung, dass wir sparsamer Warmwasser verbrauchen sollten.	○	○	○	○

50%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

7. Bitte geben Sie an, inwieweit Sie die folgende Aussage für umsetzbar halten.

	Schwer	Eher schwer	Eher leicht	Leicht
Den Warmwasserverbrauch in unserem Haushalt zu reduzieren wäre...	○	○	○	○

8. Bitte geben Sie an, inwieweit Sie der folgenden Aussage zustimmen.

	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu
Es ist meine freie Entscheidung, den Warmwasserverbrauch in unserem Haushalt zu senken.	○	○	○	○

57%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

9. Bitte machen Sie zu der folgenden Aussage eine Angabe:
Es ist meine Absicht, in den nächsten 6 Monaten meinen Warmwasserverbrauch zu reduzieren.

- ○ sehr unwahrscheinlich
- ○ unwahrscheinlich
- ○ kaum
- ○ möglicherweise
- ○ wahrscheinlich
- ○ sehr wahrscheinlich

64%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

10. Im Folgenden sind mögliche Gründe zum Einsparen von Warmwasser aufgelistet. Bitte geben Sie an, in welcher Rangfolge diese auf Ihren Haushalt zutreffen. Dabei ist 1 der wichtigste Grund Warmwasser zu sparen und 7 der am wenigsten wichtige Grund. (Jede Zahl kann dabei nur einmal vergeben werden.)

	1	2	3	4	5	6	7
Wir möchten Energiekosten sparen.	○	○	○	○	○	○	○
Wir möchten unsere Wasserkosten reduzieren.	○	○	○	○	○	○	○
Wir sind um unsere Umwelt besorgt.	○	○	○	○	○	○	○
Wir fühlen uns durch unsere Nachbarn dazu unter Druck gesetzt.	○	○	○	○	○	○	○
Es ist ein gutes Gefühl etwas zum Umweltschutz beizutragen.	○	○	○	○	○	○	○
Wir fühlen uns moralisch dazu verpflichtet.	○	○	○	○	○	○	○
Damit uns wichtige Personen ein positives Bild von uns haben.	○	○	○	○	○	○	○

Sonstiges (bitte geben Sie an, aus welchen weiteren Gründen Sie Warmwasser sparen)

71%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

Die folgenden Fragen dienen der Erfassung haushaltsspezifischer Informationen.

11. Bitte geben Sie Ihr Geschlecht an.

- ○ weiblich
- ○ männlich

12. Bitte geben Sie Ihr Alter an.

79%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

13. Bitte geben Sie Anzahl und Alter Ihrer, im Haushalt wohnenden, Kinder an.

Anzahl der Kinder	
Alter Kind 1	
Alter Kind 2	
Alter Kind 3	
Alter Kind 4	

14. Bitte geben Sie das monatliche Nettohaushaltseinkommen an.

86%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

15. Bitte geben Sie Ihre Wohnsituation an.

- ○ Mietwohnung
- ○ Eigentumswohnung
- ○ Doppelhaushälfte zur Miete
- ○ Doppelhaushälfte
- ○ Haus zur Miete
- ○ Allein stehendes Haus
- ○ Sonstiges (bitte angeben)

16. Bitte geben Sie Ihren höhsten Bildungsstand an.

- ○ Hauptschulabschluss
- ○ mittlere Reife
- ○ Fachabitur
- ○ Abitur
- ○ Fachhochschulstudium
- ○ Universitätsstudium
- ○ Sonstiges (bitte angeben)

93%

Zurück Weiter

Masterarbeit Nadine Schindler Umfrage beenden

Liebe Teilnehmerin, lieber Teilnehmer,

vielen lieben Dank, dass Sie sich die Zeit genommen haben an meiner Umfrage teilzunehmen. Ihre Angaben werden für die weitere Analyse äußerst hilfreich sein.

Gerne können Sie die Umfrage auch an Freunde und Bekannte, mit Kindern, weiterleiten.

Um an dem Gewinnspiel teilzunehmen, geben Sie bitte Ihre E-Mail Adresse an. Diese wird selbstverständlich vertraulich behandelt und nicht in Zusammenhang mit Ihrer Beantwortung gebracht. Die glücklichen Gewinner werden kurz nach Ende der Umfrage (30.04.2012) benachrichtigt.

Mit freundlichen Grüßen

Nadine Schindler

17. Ihre E-Mail Adresse:

100%

Zurück Fertig

Appendix 3: WaterGuide User Manual

Congratulations on your new Water Guide!

WaterGuide is for families who want inspiration for better energy habits in the shower. It is a practical tool that raises awareness about the time spent in the shower, and how much hot water you use.

It is not intended that you should feel monitored by Water Guide. The meter is deliberately designed so that it works with a twinkle in "its eye". We believe that by visualizing the water and energy consumption, and by adding some fun and competition, it can inspire people to cut back on consumption. When we sometimes use more water and energy than we need, we are not necessarily aware of it. It is rather because we are stuck in some old habits.

For adults, WaterGuide can be a helping hand when trying to break any bad habits. And for children it can help to raise awareness so that they create some good habits for life.

Content:

- Installation
  - Installation of Water Guide
  - Water Guide in daily use
  - Start the bath and select user
  - Switch to new user or neutral user
  - What you can see on the screen
  - What colours and smileys mean
  - Cleaning Water Guide
  - Saving Tips: How to save hot water

• Extra settings

  - Sounds on / off
  - Level
  - Language

Set up / Installation:

The Water Guide is battery powered and ready to use when mounted on your shower mixer tap. After that you can enjoy many years of good company with the little smiley who, in his own funny way, reminds you and your children about your hot water saving skills.

Requirements for using a WaterGuide:

The shower mixer must have only one exit, and it is to face downwards. If your shower mixer has two exits, e.g. both up and downwards, you *can* mount the WaterGuide on the downward exit. But in this case the WaterGuide will not necessarily register your total water consumption, as one of the exits is bypassing the meter.

What is in the box:

- WaterGuide meter
- 4 pcs. AA-batteries
- 2 pcs. rubber gaskets
- 1 wrench
- Quick guide
- This User Manual

What you need for installation:

A small screwdriver. The included wrench. And possibly a pair of pliers.

How to use the WaterGuide:

To make it as user friendly as possible we have chosen to have only one button. Whether in daily use or when changing the settings the button works the same way: One press at the button moves the cursor one place. The symbol or value, on which you place the cursor, is chosen after app. 2 seconds.

Installing your WaterGuide:

Step 1:

Unscrew the lid for the battery compartment with a screwdriver. Take off the lid including the battery box. Insert the 4 batteries (make sure they are mounted as shown on the box). Now, put back the battery box in the lid (the box can only fit in one position, so you cannot turn it upside down). Put in place the lid and the battery box and tighten the two screws.

Step 2:

Unscrew the shower hose with the wrench included. Or, if necessary, use a pair of pliers (you might want to protect the chrome surface with a cloth).

Step 3:

Put a rubber gasket in the tap connector of the WaterGuide and use your fingers to screw it on the mixer tap. Adjust the position and tighten with the wrench.

Step 4:

Use your fingers to screw the shower hose on the exit connection on the bottom side of the WaterGuide. If there is no gasket in the hose connector you should use the rubber gasket included in your box. Use the wrench or pliers to tighten the connector.

Step 5:

Now, you are soon ready to take a shower with your own smiley featured WaterGuide. All you have to do to activate the meter is to press the button or open your shower.

Step 6:

Select user. You have 6 personal icons from the water universe to identify the members of your family. Each press on the button makes you jump to a new icon. The one you mark is automatically chosen after 2 seconds and it is shown in the top left corner.

If you don't want to join the competition just skip choosing a user icon. This way, your consumption and your smiley is still shown during the shower.

Step 7:

Ready, set go! You are now ready to shower and to let you inspire by the WaterGuide's unique way of visualizing the consumption of hot water. It gives you an overview. And it makes it a lot easier to save water and energy. Remember that the WaterGuide turns off automatically after 5 minutes of inactivity. You don't have to do anything.

Daily use of WaterGuide

WaterGuide measures both how much water you use, and how hot the water is. From these two values it calculates your energy consumption. And it is the energy consumption that determines, whether your bath is green, yellow or red. And whether the smiley is happy or angry – or right between.

Start your shower and select user

• You wake your WaterGuide from sleep mode by pressing the button once or by opening the mixer tap. You can then select the user.

• By pressing the button you jump between the six user icons. The icon, on which you place the cursor, is chosen after app. 2 seconds and displayed in the upper left corner.

• If you don’t wish to select a user icon, e.g. if a guest takes shower, then you just don’t do anything. The WaterGuide still shows the consumption as usual, but the result is not included in the competition between the different users.

• WaterGuide is designed to make it easy for you to turn off the water, e.g. while shampooing or shaving legs. You don’t need to select user again. You just open the mixer tap and the WaterGuide continues to count from where you stopped. Every time you turn off the water, you get a status on how well you are doing saving water - also compared to the others in the family. The WaterGuide turns off automatically after app. 5 minutes of inactivity.

• When the WaterGuide is in sleep mode, you can always refresh your memory on your latest shower data by pressing the button and selecting your user icon. This allows you to see the consumption figures for your last shower. If you want to do this, just don’t open the water.

• The WaterGuide does not register any consumption until the water temperature exceeds 23 degrees. Until then the timer shows 0:00, and the color of the display is white. This is to make the competition fairer, so that the first person to shower in the morning is not "punished" when emptying the pipes for cold water.

If you choose a wrong user icon

• If you accidentally select the wrong icon, simply press the button again and choose your right icon. If the water was already running, it doesn’t matter. The WaterGuide remembers data from the start of the shower and will automatically put it on your right “account” when correcting it. In this case just remember not to turn off the water before correcting your user icon.

Select user immediately after another person

• If a new user wants to shower immediately after another, you obviously don’t have to wait 5 minutes for the WaterGuide to shut down – and then select a new user. As soon as the first user has turned off the water and finished his shower, you can press the button to make the user icons appear. When a new user is selected, the data for the previous user is automatically stored.

What you can see on the display

Picture: Green display, drops falling:
• Drops fall when the water is running. The screen will not turn green, until the water temperature has exceeded 23 degrees. And the data counter is likewise inactive below this minimum temperature.
• The Process-bar shows how close you are to entering a new color (red energy class will flash a full process bar, however, from start to finish).
• Here-and-now water flow is shown in liters per minute.
• The current temperature of the water.

• Timer. Here you can see the duration of your shower (note: with the water running

Picture: Red display, no drops:
• No drops indicate that the shower is finished (or paused e.g. when shampooing).
• The energy consumption during the actual shower in kilojoule (kJ) (till now).
• Water consumption during the actual shower (till now).
• Average temperature of the shower.
• Time spent in the shower with running water (till now).
• Red display color indicates that you have taken your time in the shower.

Picture: White display, energy bars:
• When you finish your shower, either because you are done, or because you pause, the display switches between your personal result and a comparative scoreboard.
• In the comparative screen you can see who in the household was better at conserving energy and water. Note: The list is based on the *last* shower of each user. It is not a list of your *accumulated* consumption.
• The winner, who used least energy, is to the left with the smallest energy bar. The one who spent the most is at the far right. The height of the bars is calculated proportionately from the largest consumption, which will peak the scale.
• Icons that have not been in use for the past 25 Baths in total disappear from the result screen. Consequently, only the current users appear.

Picture: Display with smiley and low-battery icon:

• The four AA-batteries are calculated to last at least 12 months *in average*. When the small battery icon with the cross is lit, it's soon time to change batteries. Note that the battery consumption can vary greatly from family to family. If you e.g. have a lot of light in the bathroom, the consumption is bigger, because the WaterGuide compensates by turning up the backlight. And, obviously, the more showers, the more power you use.

The meaning of the colours and the smileys of WaterGuide

When you are really good

Picture: Green display

If you manage to finish your shower with a green, happy smiley, you're really good to both the environment and your wallet. The WaterGuide is set, so you have approx. 3 ½ minutes with the water running if you shower at 38 degrees water temperature. If you lower the temperature, you can spend more time in the shower and still achieve a green, happy smiley. Conversely, if the water is warmer than 38 degrees, you have less time available.

To help you to shower more environmentally sound the WaterGuide warns you with a few beeps and a blinking display before you enter the yellow energy class.

When you are average

Picture: Yellow display

If you are a yellow showerer, you are fairly average. You could do better. But also, you could definitely be worse and don't need to feel ashamed. If you want to obtain a yellow smiley, you have up to approx. 6 ½ minutes to enjoy yourself in the shower at the average 38 degrees.

Also here you get an acoustic warning and a flashing display before it turns red.

When your consumption is a bit heavy

Picture: Red display

If you need more than approx. 6 ½-minute with the shower running at standard temperature, you are careful with your personal hygiene and wellbeing. But you will not win any energy saving award and could probably benefit from some of the water saving tips below.

Too difficult? Or too easy?

If you and your family find it either too easy or too difficult to obtain a green smiley, it's very easy to change the default settings of the difficulty of the WaterGuide. See details under "Additional Settings".

Shower facts:

- In an average 5 minute shower you will use around 6.000 kJ (kilojoule). This equals app. 1,6 kWh (kilowatt-hours).
- In an average 5 minute shower you will use app. 45 litres of water. Try checking on your WaterGuide how much you use. It is very easy to read out of the display.

Saving Tips: How to cut down on your warm water consumption. Regardless of how energy conscious you are, you can almost always improve just a little bit. And even small improvements matter – both to the environment and to your private economy. In fact, many of us could save lots of energy and water and money by some simple and perhaps small adjustments. When you shower with a Water Guide, it is measuring both water quantity and temperature of the water. From these two values it is calculating how much energy is used to heat the water. This means you have three levers to turn if you want a green smiley and protect the environment as well as your wallet:

- You can turn down the shower's pressure or mount a water saving shower head.
- You can lower the temperature a few degrees.
- You can reduce the time spent in the shower.

- Turn off the water while shampooing or shaving legs. A Danish study indicates that almost 3 out of 4 don't turn off the water, and this means that far more water than necessary is used. Water that goes directly into the drain.
- If you don't have a thermostatic shower mixer, consider buying one. It saves a lot of water because it makes it much easier to turn off the water while lathering or shaving. With a thermostatic shower mixer you don't have to adjust the temperature of the water, every time you reopen it. It stays the right temperature during the shower.
- Consider buying a water saving shower head. You may not know whether your shower head is conserving or wasting water. If not, it might be advisable to find out, since the cost difference can be huge. Up to several hundred € a year in an ordinary family. With your WaterGuide it is very easy to give your shower head a check: Turn on the water fully and read on the display, how many liters per minute are used. A good water saving shower gives about 7-10 liters per minute without lack of showering comfort.
- You can also buy a small flow restricting disk to put in your existing shower. It limits the amount of water that can pass and works a bit the same way as water saving shower head.

Cleaning of the WaterGuide

Water Guide meter is designed with a smooth surface to make cleaning easier. The best way to keep it nice and shiny for many years is by drying it with a towel after each shower to avoid limescale build up. If this is not done the lime can be removed with a universal detergent with lime removing effect. Or you can use a solution of limescale agent (never use it non-diluted). Never use scouring pads or abrasives on the WaterGuide as it would scratch it and make it dull.

Tip: You may want to use car wax on your dry and clean Water Guide. It makes it extra water repellant and easier to keep clean.

Additional settings

We have tried to make the WaterGuide as easy as possible to get along with in daily life. Therefore, you find only one button and all you have to do is to select user. However, if you make a long press (more than app. 7 seconds.) you get some extra menu options, where you can change the difficulty level, turn sounds on and off and change the menu language.

Simply move the cursor to what you want to modify, and some options appear. When you have finished your selection, you can either scroll down to "Back" at the bottom of the screen, making you jump backwards one by one to the other menu options. Or you can exit the settings by making another long press of app. 7 seconds.

Level
Sound
Language

Difficulty level

”Easy”: Choose this if you find it too difficult to obtain a green smiley during your shower.
”Medium”: The default set level on your WaterGuide.
”Hard”: Choose this if you’re really good at making a green shower and need extra challenge.

Sound:

”On”: Sounds are on (default setting)
”Off”: Choose this, if you want to turn off the sounds

Language:

”English”: Choose English as your menu language.
”German”: Choose German as your menu language.
”French”: Choose French as your menu language.

Appendix 4: WaterGuide Quick Guide

Quick Guide - Get started with your WaterGuide

Requirements for your shower:

The shower mixer must have only one exit, and it is to face downwards.

What is in the box:

- WaterGuide meter
- 4 pcs. AA-batteries
- 2 pcs. rubber gaskets
- 1 wrench
- This Quick guide
- User manual

What you need for installation:

A small screwdriver. The included wrench. And possibly a pair of pliers.

How to use the WaterGuide:
To make it as user friendly as possible we have chosen to have only one button. Whether in daily use or when changing the settings the button works the same way: One press at the button moves the cursor one place. The symbol or value, on which you place the cursor, is chosen after app. 2 seconds.

Mounting of your WaterGuide:
Step 1:

Unscrew the lid for the battery compartment with a screwdriver. Take off the lid including the battery box. Insert the 4 batteries (make sure they are mounted as shown on the box). Now, put back the battery box in the lid (the box can only fit in one position, so you cannot turn it upside down). Put in place the lid and the battery box and tighten the two screws.

Step 2:

Unscrew the shower hose with the wrench included. Or, if necessary, use a pair of pliers (you might want to protect the chrome surface with a cloth).

Step 3:

Put a rubber gasket in the tap connector of the WaterGuide and use your fingers to screw it on the mixer tap. Adjust the position and tighten with the wrench.

Step 4:

Use your fingers to screw the shower hose on the exit connection on the bottom side of the WaterGuide. If there is no gasket in the hose connector you should use the rubber gasket included in your box. Use the wrench or pliers to tighten the connector.

Step 5:

Now, you are soon ready to take a shower with your own smiley featured WaterGuide. All you have to do to activate the meter is to press the button or open your shower.

Step 6:

Select user. You have 6 personal icons from the water universe to identify the members of your family. Each press on the button makes you jump to a new icon. The one you mark is automatically chosen after 2 seconds and it is shown in the top left corner.

If you don't want to join the competition just skip choosing a user icon. This way, your consumption and your smiley is still shown during the shower.

Step 7:

Ready, set go! You are now ready to shower and to let you inspire of the WaterGuide's unique way of visualizing the consumption of hot water. It gives you an overview. And it makes it a lot easier to save water and energy. Remember that the WaterGuide turns off automatically after 5 minutes of inactivity. You don't have to do anything.

Appendix 5: Family Structure of Test Families

Family	Household Members	Life Form	Household Type	Consider themselves environmentally conscious	Interviewee
Family 1	M F C 1, 7 years C 2, 10 years	Married	Owned House	Yes	M & F
Family 2	M F C 1, 12 years C 2, 16 years	Married	Owned House	Yes	M & F
Family 3	F F C 1, 6 years C 2, 11 years	Homosexual Marriage, Foster Chil-dren	Owned House	Yes	F
Family 4	M F C 1, 9 years C 2, 13 years	Married	Owned House	Not really	M & F
Family 5	M F C 1, 8 years	Married	Owned Apartment	Not very conscious but try to be	F

M= male parent; F= female parent; C= child

Appendix 6: Survey Results

1. Bitte geben Sie Ihre Meinung/Wahrnehmung zu den folgenden Aussagen an.

Answer Options	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu	Rating Average	Response Count
Unsere Kinder werden in schlechteren Umweltverhältnissen leben müssen, als wir heutzutage.	4	17	**40**	28	3,03	89
Die Politik muss im Bereich Umweltschutz aktiver werden.	2	5	28	**54**	3,51	89
Ein Großteil der Bevölkerung verhält sich nicht umweltbewusst.	0	7	38	**44**	3,42	89
Umweltprobleme belasten meine Gesundheit.	14	28	**32**	15	2,54	89
Ich mache mir Sorgen wegen der vorhandenen Umweltprobleme.	3	13	**44**	29	3,11	89
Umweltprobleme werden übertrieben.	**41**	35	10	3	1,72	89
Vom Aussterben bedrohte Arten zu schützen ist unnötig.	**64**	17	4	4	1,42	89
Es ist die Verantwortung eines jeden Bürgers, die Umwelt zu schützen.	0	1	11	**77**	3,85	89
				answered question		**89**
				skipped question		**0**

2. Bitte geben Sie an, wie oft die folgenden Aktivitäten in Ihrem Haushalt durchgeführt werden.

Answer Options	Immer	Meistens	Manchmal	Nie	Rating Average	Response Count
Wir kaufen Bio-Lebensmittel.	2	16	**61**	10	2,11	89
Wir trennen Müll.	**78**	11	0	0	3,88	89
Wir verwenden Einkaufstüten mehrfach.	**59**	27	2	1	3,62	89
Wir recyceln Glas.	**81**	3	4	1	3,84	89
Wir recyceln Pfandflaschen.	**84**	2	2	1	3,90	89
Wir sammeln und recyceln Papier.	**80**	5	3	1	3,84	89
Wir benutzen chemische Reinigungsmittel.	5	28	**49**	7	2,35	89
Wir fahren auch kurze Strecken mit	4	22	**56**	7	2,26	89

dem Auto.						
Wir machen das Licht aus, wenn wir einen Raum verlassen.	33	**54**	2	0	3,35	89
Wir haben Elektrogeräte auf Stand-by stehen.	9	33	**36**	11	2,45	89
					answered question	**89**
					skipped question	**0**

3. Bitte geben Sie Ihre Meinung zu den folgenden Aussagen an.

Answer Options	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu	Rating Average	Response Count
Es ist wichtig, Warmwasser zu sparen.	2	3	32	**52**	3,51	89
Das Einsparen von Warmwasser hilft der Umwelt.	3	2	34	**50**	3,47	89
Es ist nicht notwendig seinen Warmwasserverbrauch zu reduzieren.	**55**	21	8	5	1,58	89
Das Sparen von Warmwasser eines jeden einzelnen hat positive Auswirkungen auf die Umwelt.	6	4	29	**50**	3,38	89
					answered question	**89**
					skipped question	**0**

4. Bitte geben Sie Ihre Empfindungen zum Einsparen von Warmwasser an.

Answer Options	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu	Rating Average	Response Count
Es gibt mir das Gefühl etwas Gutes für unsere Umwelt zu tun, wenn ich Warmwasser spare.	3	17	**40**	29	3,07	89
Ich empfinde es als wichtig, den Warmwasserverbrauch zu reduzieren.	0	7	**46**	36	3,33	89
Es gibt mir das Gefühl ein besserer Mensch zu sein, wenn ich Warmwasser einspare.	25	**31**	21	12	2,22	89
Ich empfinde das Einsparen von Warmwasser als sinnlos.	**65**	18	5	1	1,35	89
					answered question	**89**
					skipped question	**0**

5. Bitte geben Sie an, inwieweit die folgenden Aussagen auf Sie zutreffen.

Answer Options	Nie	Manchmal	Meistens	Immer	Rating Average	Response Count
Ich drehe den Wasserhahn aus, während ich meine Zähne putze.	2	6	11	**70**	3,67	89
Ich warte mit der Wäsche, bis ich eine Maschine voll habe.	0	0	28	**61**	3,69	89
Ich drehe in der Dusche das Wasser ab, während ich mich einseife.	17	25	19	**28**	2,65	89
Ich versuche schnell zu duschen, um Warmwasser zu sparen.	10	21	**40**	18	2,74	89
Ich versuche weniger oft zu duschen/baden.	**40**	23	22	4	1,89	89
Ich stelle die Spülmaschine nur an, wenn sie voll ist.	0	1	10	**78**	3,87	89
					answered question	**89**
					skipped question	**0**

6. Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen.

Answer Options	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu	Rating Average	Response Count
Unsere Freunde würden es befürworten, dass wir sparsamer Warmwasser verbrauchen.	12	21	**40**	16	2,67	89
Unsere Familie würde es befürworten, dass wir sparsamer Warmwasser verbrauchen.	4	21	**34**	30	3,01	89
Unsere Freunde sind der Meinung, dass wir sparsamer Warmwasser verbrauchen sollten.	**38**	35	14	2	1,78	89
Unsere Familie ist der Meinung, dass wir sparsamer Warmwasser verbrauchen sollten.	26	**32**	23	8	2,15	89
					answered question	**89**
					skipped question	**0**

7. Bitte geben Sie an, inwieweit Sie die folgende Aussage für umsetzbar halten.

Answer Options	Schwer	Eher schwer	Eher leicht	Leicht	Rating Average	Response Count
Den Warmwasserverbrauch in unserem Haushalt zu reduzieren wäre...	6	**50**	28	5	2,36	89
				answered question		**89**
				skipped question		**0**

8. Bitte geben Sie an, inwieweit Sie der folgenden Aussage zustimmen.

Answer Options	Ich stimme nicht zu	Ich stimme eher nicht zu	Ich stimme eher zu	Ich stimme zu	Rating Average	Response Count
Es ist meine freie Entscheidung, den Warmwasserverbrauch in unserem Haushalt zu senken.	4	10	37	**38**	3,22	89
				answered question		**89**
				skipped question		**0**

9. Bitte machen Sie zu der folgenden Aussage eine Angabe: Es ist meine Absicht, in den nächsten 6 Monaten meinen Warmwasserverbrauch zu reduzieren.

Answer Options	Response Percent	Response Count
sehr unwahrscheinlich	4,5%	4
unwahrscheinlich	9,0%	8
kaum	19,1%	17
möglicherweise	**37,1%**	**33**
wahrscheinlich	20,2%	18
sehr wahrscheinlich	10,1%	9
answered question		**89**
skipped question		**0**

10. Im Folgenden sind mögliche Gründe zum Einsparen von Warmwasser aufgelistet. Bitte geben Sie an, in welcher Rangfolge diese auf Ihren Haushalt zutreffen. Dabei ist 1 der wichtigste Grund Warmwasser zu sparen und 7 der am wenigsten wichtige Grund. (Jede Zahl kann dabei nur einmal vergeben werden.)

Answer Options	1	2	3	4	5	6	7	Response Count
Wir möchten Energiekosten sparen.	**52**	25	5	3	2	1	1	89
Wir möchten unsere Wasserkosten reduzieren.	13	**37**	19	9	9	2	0	89
Wir sind um unsere Umwelt besorgt.	13	15	**42**	14	3	1	1	89
Wir fühlen uns durch unsere Nachbarn dazu unter Druck	1	2	0	2	3	19	**62**	89

gesetzt.								
Es ist ein gutes Gefühl etwas zum Umweltschutz beizutragen.	6	8	13	**46**	14	2	0	89
Wir fühlen uns moralisch dazu verpflichtet.	4	1	5	10	**49**	17	3	89
Damit uns wichtige Personen ein positives Bild von uns haben.	0	1	5	5	9	**47**	22	89
							answered question	**89**
							skipped question	**0**

Appendix 7: Summary of Interviews

	Answers Family 1	**Answers Family 2**
Did you have any problems installing your WaterGuide? Any technical trouble while using it?	No problems at all. It is very user friendly.	No, it was very easy.
In general, how do you like the WaterGuide? What do you perceive as positive/negative about it?	Very positive. There is nothing negative about the WaterGuide. The kids liked it a lot.	Raised awareness. Display too small if you need glasses. Motivates to shower faster. Husband perceived it as stressful.
How do you perceive the visualization of your consumption?	Very good. The additional sound is also helpful.	Fun.
To which degree did the family engage in a competition and enjoy it?	The family, especially the children, engaged in a competition.	Only in the beginning.
To which degree did the WaterGuide raise awareness regarding warm water consumption in the shower? Which family members felt surprised by their consumption?	Especially seeing the water amount used shown in litres helped raising awareness. The mother was most surprised because she thought she consumed less.	Had a positive effect on awareness. Especially husband and son were surprised by their consumption. (Wife already took short showers and was always in the green level.)
Did the WaterGuide change your attitude towards saving warm water?	Already had a positive attitude towards saving warm water. But WaterGuide makes it easier to translate it into action.	Yes.
Did the meter influence actual behaviour? Whose behaviour changed most?	Definitely. You adjust your behaviour over time and after a while taking shorter showers feels natural. The WaterGuide helped change behaviour and led to new habits. Mother changed most. Kids changed their behaviour a lot as well. However, sun is annoyed because he wants to win the competition but also loves taking long showers. To avoid this dilemma he started wanting to take bath instead.	Yes, we are more aware now. Change: stop water while soaping.
Overall, were the different family members willing to reduce comfort in order to save money/protect the environment?	Yes.	Yes, but not always

What would you adjust in order to improve the product?	Offer different sizes of the WaterGuide. It seemed too big for our shower.	Show cumulated water consumption in litres over time.
Who in the family would propose buying the WaterGuide and who would influence the decision?	Husband.	Husband would propose purchase and then discuss with wife.
Who in your family would make the final buying decision for the product?	Both parents.	Husband.
Who would make the actual purchase?	Husband.	Husband.
Which steps would you carry out before actually buying the product?	Search for information such as saving potential and potential follow up costs.	Search for information. Read/listen to recommendations.
What kind of product is the WaterGuide? (Into which product category would you classify the WaterGuide?) Hence, which products do you consider as alternative/substitute options?	Energy saving product. Alternative products are such as water flow controller.	Energy saving product. Water flow controller.
What are the two most important product attributes/benefits within that product category (on which you would base your buying decision)?	1. Ease of use 2. Price	1. Save water & energy. 2. Ease of use.
How would you rate the WaterGuide on these attributes?	1. Very good. Easy to use for every age. 2. N/A (price not known)	1. Good saving potential. 2. Very user friendly.
Which price would you be willing to pay for the WaterGuide?	Wife: € 90 after knowing that it is a good product Husband: € 120	Depending on cost-benefit ratio between € 50 - 75.
How long should the maximum payback time be? Where would you expect the product to be sold?	Payback time is not relevant. DIY, online, sanitary retailers; might also be offered by energy providers	1 ½ years. DIY, sanitary retailers
Which attributes/benefits of the WaterGuide are most important to you?	Ease of use, visualization, sound. Simply liked everything about the product.	Easy to install, self-explaining use of product.

When referring the product to friends and family which characteristics would you point out?	Very good for kids to learn about water consumption. The kids told friends about it and one of their friends even showered at their house to see and try the WaterGuide.	Potential to save energy.
Why would you buy the WaterGuide?	Because of the saving potential.	Potential to save energy.
How high/low is your perceived risk when buying the WaterGuide? (e.g. financially, social, emotional)	No risk. However, risk that children feel forced to shower short and think they're not allowed to take a relaxing shower once in a while. Parents have to point out in the beginning that it is ok to sometimes take a longer shower.	No risk.
How important are quality labels for your buying decision (such as TÜV)?	Not important. ("Umweltengel" might be good)	TÜV increases credibility.
Are there any final comments you would like to make?	No.	The daughter used one of the non-used symbols when washing hair, so it wouldn't add up to her consumption. Display should be bigger. We are not very focused on saving money so we most likely wouldn't buy the WaterGuide.

	Answers Family 3	**Answers Family 4**
Did you have any problems installing your WaterGuide? Any technical trouble while using it?	It was fast and easy to set up.	No.
In general, how do you like the WaterGuide? What do you perceive as positive/negative about it?	It was fun, especially for the kids. You get used to it and change your behaviour, so we might remove it after a while.	Good to know how long you shower. Not possible to stay in green/yellow level when having to shave. Turned off sound because it was annoying. Woke up the others in the morning because it was too loud. Single lever tap was in the way of the display.
How do you perceive the visualization of your consumption?	Positive, easy to understand.	Increased awareness.

To which degree did the family engage in a competition and enjoy it?	Did engage in competition but also became frustrating.	No competition. However, kids teased father for always being in the red level.
To which degree did the WaterGuide raise awareness regarding warm water consumption in the shower? Which family members felt surprised by their consumption?	It increased awareness. Especially time and litres used were helpful to see.	Raised awareness. Family members tried to reduce consumption.
Did the WaterGuide change your attitude towards saving warm water?	No, because we already were aware and had a positive attitude towards saving warm water. We already tried to shorten our shower time.	A bit.
Did the meter influence actual behaviour? Whose behaviour changed most?	Minimal.	Wife had ambition to shower shorter.
Overall, were the different family members willing to reduce comfort in order to save money/protect the environment?	Yes, because it made us even more aware. Showering became a task instead of please which sometimes was annoying.	The wife reduced comfort in order to shower faster. However, the husband wasn't willing to.
What would you adjust in order to improve the product?	Kids shouldn't be able to accidentally change settings.	Option to lower the sound. Display should be better to read for people with glasses. Make sure single-lever tap isn't in the way.
Who in the family would propose buying the WaterGuide and who would influence the decision?	Wife with technical interest. And kids if they heard about it from friends.	Husband, because of technical interest.
Who in your family would make the final buying decision for the product?	Both parents.	Wife.
Who would make the actual purchase?	The mother who would suggest the purchase.	Could be either of the parents.
Which steps would you carry out before actually buying the product?	Search for information, check the price, evaluate if the product is needed.	Cost-benefit calculation, ask friends about recommendation
What kind of product is the WaterGuide? (Into which product category would you classify the WaterGuide?) Hence, which products do you consider as alternative/substitute options?	Energy saving products.	Energy (warm water) saving products. Water flow controller. Water saving shower head.

What are the two most important product attributes/benefits within that product category (on which you would base your buying decision)?	3. Price 4. Benefit (= saving potential)	3. Functional Technology 4. Saving potential
How would you rate the WaterGuide on these attributes?	3. N/A (price not known) 4. Small (because they were already aware and consumed little)	3. Easy to handle. However, it must be explained in the beginning how overall energy consumption is calculated. 4. Not that good. (Because they don't know how much they actually saved.)
Which price would you be willing to pay for the WaterGuide?	No more than € 30.	Depends on actual costs. (Husband checks his water costs and starts calculating how much he pays for one year of showering. Based on that he calculates how much money his estimated saving potential of 10% would be: € 20.) Based on his calculation the husband says he would be willing to pay € 20.
How long should the maximum payback time be? Where would you expect the product to be sold?	Not important. DIY, online, electronics retailer	Payback time important. 1-2 years. Online, DIY
Which attributes/benefits of the WaterGuide are most important to you?	Raises awareness, its fun (not just numbers).	The different levels showing how good/bad consumption is.
When referring the product to friends and family which characteristics would you point out?	Kids like it because of the smiley and the sound (also talked about it to friends). It is interesting to see actual numbers about consumption.	Wouldn't refer it to friends until they know how much they can/do actually save.
Why would you buy the WaterGuide?	Recommendation of friends, competition it creates in the family.	Wouldn't buy it because saving warm water isn't important to them. They would rather save elsewhere.
How high/low is your perceived risk when buying the WaterGuide? (e.g. financially, social, emotional)	No risk. But depending on age of children it can create stress for them.	No risk.
How important are quality labels for your buying decision (such as TÜV)?	Umweltengel would be good.	TÜV. But wouldn't be very important for buying decision.

Are there any final comments you would like to make?	The son once cried when the WaterGuide didn't show the happy smiley. Consumption in the family was already very low.	Changed the WaterGuide to easier level. Husband thinks other water saving products make more sense. Husband would like to know exactly how the status bar is calculated. Because this would make saving easier. Husband worries about safety because batteries are on the bottom and water might get in.

	Answers Family 5
Did you have any problems installing your WaterGuide? Any technical trouble while using it?	No.
In general, how do you like the WaterGuide? What do you perceive as positive/negative about it?	It was good to know how warm and long you actually shower.
How do you perceive the visualization of your consumption?	It was helpful in order to adjust ones behaviour.
To which degree did the family engage in a competition and enjoy it?	No competition.
To which degree did the WaterGuide raise awareness regarding warm water consumption in the shower? Which family members felt surprised by their consumption?	It raised awareness and led us to shorten shower time. Especially mother was surprised by her consumption.
Did the WaterGuide change your attitude towards saving warm water?	Yes. Parents also adjusted their water consumption behaviour outside the shower (e.g. while brushing teeth). And tried to teach it to their son.
Did the meter influence actual behaviour? Whose behaviour changed most?	Yes it did.

Overall, were the different family members willing to reduce comfort in order to save money/protect the environment?	A bit. However, environment wasn't considered.
What would you adjust in order to improve the product?	Nothing.
Who in the family would propose buying the WaterGuide and who would influence the decision?	Both parents.
Who in your family would make the final buying decision for the product?	Both parents.
Who would make the actual purchase?	Most likely husband.
Which steps would you carry out before actually buying the product?	Gather information about the product and discuss with husband/wife.
What kind of product is the WaterGuide? (Into which product category would you classify the WaterGuide?) Hence, which products do you consider as alternative/substitute options?	Water/energy saving products
What are the two most important product attributes/benefits within that product category (on which you would base your buying decision)?	5. Saving potential (didn't come up with a second attribute)
How would you rate the WaterGuide on these attributes?	5. Very good
Which price would you be willing to pay for the WaterGuide?	€ 20.
How long should the maximum payback time be? Where would you expect the product to be sold?	No relevant. DIY, sanitary retail, water suppliers.

Which attributes/benefits of the WaterGuide are most important to you?	Visualization, awareness it raises.
When referring the product to friends and family which characteristics would you point out?	It helps saving money and the kids like it. Especially good for families.
Why would you buy the WaterGuide?	In order to always being made aware how much you're consuming and that you should shorten your shower time.
How high/low is your perceived risk when buying the WaterGuide? (e.g. financially, social, emotional)	No risk.
How important are quality labels for your buying decision (such as TÜV)?	Not relevant.
Are there any final comments you would like to make?	No.