



# Market Research for Company X

Identifying the interest in an electricity usage optimization service in the Pirkanmaa region

Emma Rae

Samuli Viitanen

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## **ABSTRACT**

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Rising living costs and the significant role of electricity in everyday life create a need for the optimization of electricity usage. This optimization can help reduce electricity consumption and save on costs while also tailoring usage according to individual needs.

The purpose of this thesis was to conduct a market research study that can be utilized in the decision-making process for establishing a potential business. The incentive for the work came from the core team of the potential business, to which one of the thesis authors belongs. The objective was to investigate whether there is interest in such an electricity usage optimization service in the Pirkanmaa region and to identify potential customer segments. The aim was also to clarify the current wishes and needs of potential customers regarding the service and to provide a brief assessment of the current market situation, particularly in relation to competitors.

To achieve this information, a literature review and market research were conducted. The literature review was conducted by using relevant internet and academic literature sources. The market research was conducted on consumers in the Pirkanmaa region and employed both qualitative and quantitative research methods to create as comprehensive a data set as possible. The tools used for gathering the data were an online survey and telephone interviews. The survey received 50 usable responses, and seven individuals were interviewed.

The results indicated moderate interest in the electricity usage optimization service and helped to form an understanding of the most significant wishes and needs of consumers regarding the service. However, the generalizability of the survey results was low due to the small number of responses, the sampling method used, and the oversaturation of a specific customer group. As one recommendation, a deeper market study with a broader sample size was suggested. Other development proposals included the creation of a marketing plan and a deeper competitor analysis.

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Keywords: market research, electricity usage optimization, consumer needs

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## **1 INTRODUCTION**

This thesis aims to ascertain whether there is demand for a household electricity optimization service in the Pirkanmaa region. And if there is demand, what are the potential customer groups and their needs, and would starting such a company be reasonable?

### **1.1 Research background**

The rise of electricity costs and other living costs has put households in a challenging position. Electricity usage, especially electric heating, is a potential area where costs can be cut by optimizing its usage. An electricity usage optimization service aims to improve energy efficiency and lower electricity usage without lowering home living comfort. This is achieved by optimizing energy usage to the most cost-effective times and lowering it when the costs are high and electricity usage is unnecessary. This is done by installing hardware that controls electricity usage in the home with real-time data. The optimization service is most effective regarding electric heating.

A group of people, referred to in this thesis as 'the core group', are interested in potentially starting a company that would specialize in an electricity usage optimization service. However, starting a company can be risky. The current economic situation following the COVID-19 pandemic and the ongoing military crisis globally, especially the one in Ukraine, affirms the importance of having a comprehensive understanding of the market before starting a company. Therefore, market research is a crucial step in the process of entering a market, as reducing risk is the exact purpose of market research (Hague, Hague & Morgan 2013, 3).

### **1.2 Objective and purpose**

The objective of this research is to understand the current market surrounding electricity optimization services from the consumer perspective. This means find-

ing out if consumers are aware of an electricity optimization service, understanding what consumers expect from such a service, what are the things that affect their purchase decision, and how much they are willing to pay for the service. The findings of this research are to be used when making a decision to start a company specializing in the optimization of electricity usage in households.

The research questions guiding the thesis can be determined as follows:

1. Are there potential customers interested in the electricity optimization service in the Pirkanmaa region?
2. What are the factors affecting their decision to purchase the service?
3. How much are they willing to pay for the service?

The scope of this research is limited to the Pirkanmaa region in Finland as the core group of people interested in starting the company are located there, and they have determined it as their preferred entry point to the market.

### **1.3 Concepts and theory**

The theoretical framework is based on concepts relevant to this research case, including market research and service design. The theoretical framework is based on versatile literature on these topics.

Market research forms the base for this thesis. Service design is also a crucial element, as the goal of the thesis is to understand consumer needs and how the optimization service could meet those needs. Service design is used to solve issues organizations face and it is centered around customer experiences. It can be used to innovate existing value propositions or new services, even businesses (Stickdorn, Hormess, Lawrence & Schneider 2018, 18-21.)

## 1.4 Methods and data

The primary research is done using a mixed method with two main tools: a questionnaire and individual interviews. The first was used as a quantitative research method and the latter as a qualitative. The quantitative method brings in more data but does not allow for a deeper evaluation. The qualitative method combats this with richer data but in fewer numbers. (National University n.d.)

The questionnaire was constructed with Google Forms and shared in relevant Facebook groups, which allowed for a wide reach of respondents in an economical and easy manner. The questionnaire was used to gather background information on potential customers and their current electric heating solutions and their knowledge and interest in electricity optimization services.

The individual interviews were carried out with volunteers compiled from the respondents of the questionnaire and the networks of the thesis authors. These interviews offered a deeper insight into the consumers' needs and allowed for interaction that helped bring up new viewpoints and ideas outside of the limited questionnaire questions.

Combining both quantitative and qualitative research methods offers an encompassing view of the market potential of household electric heating optimization in the Pirkanmaa region. This multifaceted approach helps make a justifiable decision on whether there is a need for electricity optimization services in the Pirkanmaa region.

A literature review is used as secondary research. The literature review is utilized throughout the thesis, but it is tightly connected to the theoretical framework and is crucial in forming a base for the thesis. The literature review also allows for surface-level competitor analysis to gather a slight understanding of the competitive market situation.

## **1.5 Structure**

This thesis consists of eight chapters. This subchapter briefly explains each chapter to help readers understand its structure.

The first chapter of this thesis briefly introduces the research topic, background, objectives, methods, and relevant theory. The second, third, and fourth chapters are dedicated to exploring the theoretical framework in more depth, and they form the basis for the thesis. The fifth chapter describes the conducted research in more depth. The data collected through this research is presented in chapter six, and the discussion and recommendations based on the results are in chapter seven. Finally, chapter eight pulls together the conclusions of this thesis.

## 2 ELECTRICITY OPTIMIZATION

Energy is one of the basic needs of modern society. Electricity is especially in an important position in our society, and its importance is continuously increasing as our society utilizes electricity evermore. Electricity is used nearly everywhere: lighting, heating, and many of the devices utilized in everyday life operate through electricity – from hairdryers to electric cars. Electricity enables many of the things that are nowadays considered self-evident. (Fortum 2022.)

The electricity consumption in Finland has for the most part stayed above 80,000 GWh for the last twenty years (Statistics Finland 2024a). Households have constituted for around 22,000 to 24,000 GWh of this total amount (Statistics Finland 2024b). If Finland's goals of full decarbonization by 2050 are achieved, electricity consumption would rise notably, also in heating (Rogues et al. 2021, 72-73).

Consumers' electricity contracts have experienced changes in recent years. Spot-priced electricity contracts have become more popular, making up over 30% of electricity contracts at the end of 2023. This is a notable increase to the 14% at the end of 2022. In 2020, the number was as low as 8%. New contract types, such as hybrid contracts, have increased. Fixed-term contracts have remained the most popular, but their numbers have gone down a bit in the last couple of years, and in 2023, they made up under 50% of all electricity contracts. (Kanervo 2024.) Spot-priced refers to electricity contracts, where the price changes hourly depending on the electricity market. In contrast, fixed-price contracts have a fixed price that does not fluctuate. Hybrid contracts are a mixture of the two.

Regulating energy usage is important for everyone, and choosing sustainable energy sources helps lower the environmental effects of growing electricity usage (Fortum 2022). Regulating electricity usage according to the pricing is highlighted, especially with spot-priced energy contracts, as they are very susceptible

to changes in pricing. Similarly, regulation is appropriate with a fixed-price contract that has a high fixed price. The changes in the price of electricity for households in the last few years can be seen below in Figure 1.

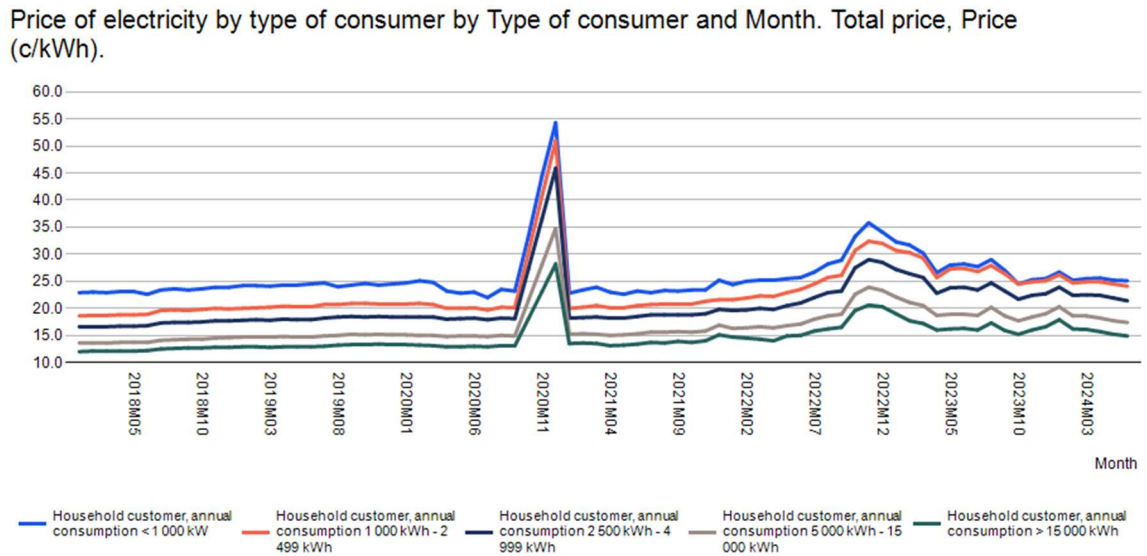


FIGURE 1. Total price of electricity by household consumption (Statistics Finland 2024c).

The price is shown from the start of 2018 to June of 2024. The prices took a huge leap in 2020 around the COVID-19 pandemic and again after the halfway point of 2022 likely due to the Russian invasion of Ukraine and its effects. The prices have since stayed near or above the levels before the first leap. In 2024 the electricity prices have stayed mostly between 15-25 cents per kWh.

Electricity usage optimization refers to the strategies used to lower the use of electricity and the costs associated with it. It can be done manually by keeping track of electricity consumption and prices and adjusting one's electricity usage by hand. This can become quite troublesome and laborious. Automated solutions have entered the market to make this optimization easier. These solutions vary greatly from simply delivering electricity consumption information more efficiently and accurately to fully automated systems controlling electricity usage. (Motiva 2024.)

## 2.1 Electricity in heating

Perhaps one of the most notable uses of electricity for consumers is in heating. In 2022, electricity was the primary heating source in 35,3 percent of detached houses and 28,7 percent of row houses and semi-detached houses in Finland (Statistics Finland 2024d). Electricity has remained a top heating source in households in recent years, alongside wood and district heat, as seen below in Figure 2.

Energy consumption in households by Energy source and Year. Heating of spaces, Energy consumption in households, GWh.

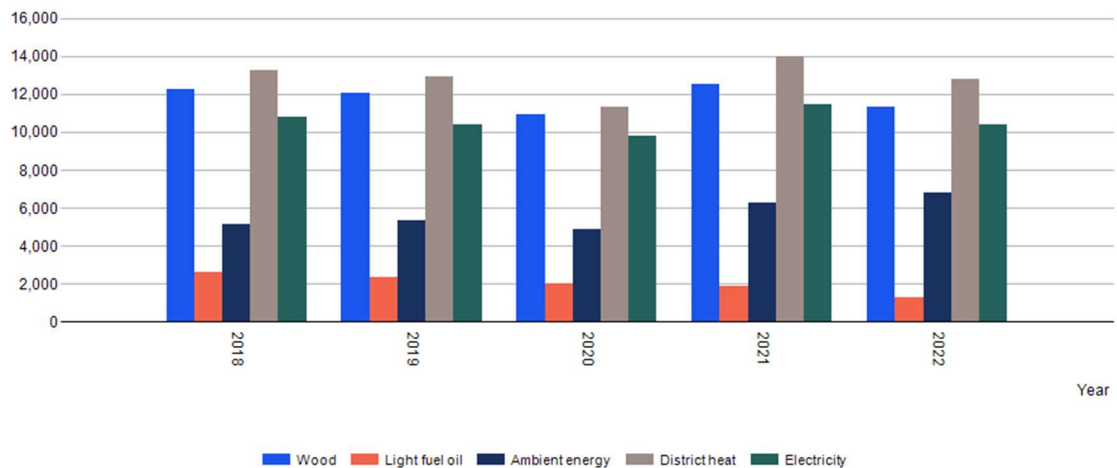


FIGURE 2. Energy consumption of housing between 2018-2022, heating of spaces (Statistics Finland 2024e).

As can be seen in Figure 2, electricity makes up around 10,000 GWh yearly in heating. This makes up almost half of the entire electricity consumption of households, showcasing how notable the cost of electric heating can be. This makes room for electricity optimization.

## 2.2 Competition in electricity optimization services in Pirkanmaa

In order for a company to succeed, it needs to perform better than its competitors. To do this, there needs to be information gathered on the competitors to understand how they operate and what value they bring to the customer. This can help the other organization adjust their operations accordingly to offer the customers greater value in comparison. Competitor analysis is not a one-time thing, as companies often evolve continuously and change their tactics. This calls for carrying out competitor analysis at least somewhat regularly. (Bensoussan & Fleisher 2012.)

Although this thesis focuses on determining the customer segments and potential interest in an electricity usage optimization service, a surface-level competitor analysis was deemed appropriate information for the core group of the potential company. An overview of the competitors helps in developing an understanding of the market.

Existing and emerging competitors can vary greatly as they have developed their businesses in varying contexts. Differences, such as unique views of competition, varying customer needs, and available resources, affect businesses in different manners. Companies no longer follow set rules when it comes to competition; they may balance on the line of legality and throw away logic and ethics. Due to this new approach to business competition, it is increasingly important to properly understand competitors and their business context. (Bensoussan & Fleisher 2012.)

The competitor analysis was performed by finding companies on the internet that offer similar services and analyzing their strengths and weaknesses. The search provided a variety of existing companies. Most notably, multiple electricity companies with established customer bases in Finland offered electricity usage optimization services as an additional part of their operations. On the other hand,

there were smaller companies, such as start-ups, that specialized in electricity usage optimization as their primary operation.

The offered solutions ranged from simply providing energy usage data to consumers in a clear manner to similar automated solutions the core group is considering. The focus ranged from overall electricity usage to specific targets, such as heating or electric car charging.

The identified strengths and weaknesses of these companies are shown in Table 1 below. The strengths and weaknesses were divided into two categories: larger and smaller operators.

TABLE 1. Strengths and weaknesses of the competitors.

<p><b>Strengths of larger operators:</b></p> <ul style="list-style-type: none"> <li>- more resources</li> <li>- existing customer base and communication methods</li> <li>- varied services</li> </ul>	<p><b>Strengths of smaller operators:</b></p> <ul style="list-style-type: none"> <li>- flexibility, quick to react to changes in the market (lower hierarchy in the company)</li> <li>- focus on specific needs, creativity</li> </ul>
<p><b>Weaknesses of larger operators:</b></p> <ul style="list-style-type: none"> <li>- slower processes in decision-making and implementing changes</li> <li>- set in their ways, innovation may be limited</li> <li>- larger operators may feel distant to consumers</li> </ul>	<p><b>Weaknesses of smaller operators:</b></p> <ul style="list-style-type: none"> <li>- limited resources</li> <li>- unfamiliarity among customers</li> <li>- having to build a customer base and brand image</li> </ul>

### **3 SERVICE DESIGN**

This chapter introduces the concept of service design. The second subchapter introduces the service design process and the two parts of it that are relevant to this thesis.

#### **3.1 Introduction to service design**

Services differ from products in that they are often intangible and delivered through activities and processes. However, the extremities of purely tangible or purely intangible are rare, and services are generally simply more intangible than products. (Wilson, Zeithaml, Bitner & Gremler 2020, 37-39.) An electricity usage optimization service, although in itself quite intangible, is carried out through tangible methods, such as control panels and mobile apps.

Tangible products are available in excess in today's society. This surplus of goods has highlighted the importance of services as they often aim to make life easier instead of just adding another physical thing (Tuulaniemi 2011, 16). Products and services need to provide value that makes them desirable to the customer. Wilson et al. (2020, 44) say that this value is realized when the customer interacts with the product or service.

Service design is a process that is focused on developing services. Its goal is to make the services more customer-centric, which would then help heighten the value created by the service through a better customer experience. This would, in turn, make the service more desirable to the customer. (Polaine et al. 2013, 36.) Service design is done to identify both the opportunities and problems in a service or its customer experience. It is not too focused on individual numbers but rather aims to form tangible ideas for development. (Stickdorn et al. 2018, 104.)

Creating and developing services helps ensure that they remain practical, functional, and desirable in the eyes of the customers. Service design recognizes how important this relationship between a customer and the producer of a service is. Understanding consumer needs and behavior is crucial in maintaining this relationship. (Polaine et al. 2013, 36-37.)

A key point that Stickdorn et al. (2018, 25-26) bring up, is the importance of business relevance in service design. They argue that service design cannot be sustainable if it is only based on creating better experiences and not also on business goals and technological aspects. They also highlight that service design is a human-centered approach that aims to meet not only the customers' needs but also the needs of other stakeholders.

The challenges with service design often come from the intangible characteristics of services, for example, the service experiences between customers can vary heavily depending on the individual customer and how the service is provided. (Wilson et al. 2020, 261.) Also, defining service design in exact detail can be difficult, as the playing field for it is constantly changing, and the number of services available is very high (Tuulaniemi 2011, 12).

There are multiple tools that can be used in service design depending on the type of problem at hand and what type of data is needed. One of the core tools in service design is research data as it provides valuable information. This data can be collected through various means, for example, interviews, photos or statistics. (Stickdorn et al. 2018, 36-37.)

### **3.2 The service design process**

One of the most known service design models is the double diamond, coined by the British Design Council (Palvelumuotoilu Palo 2018). The double diamond can be seen visualized below in Figure 3.

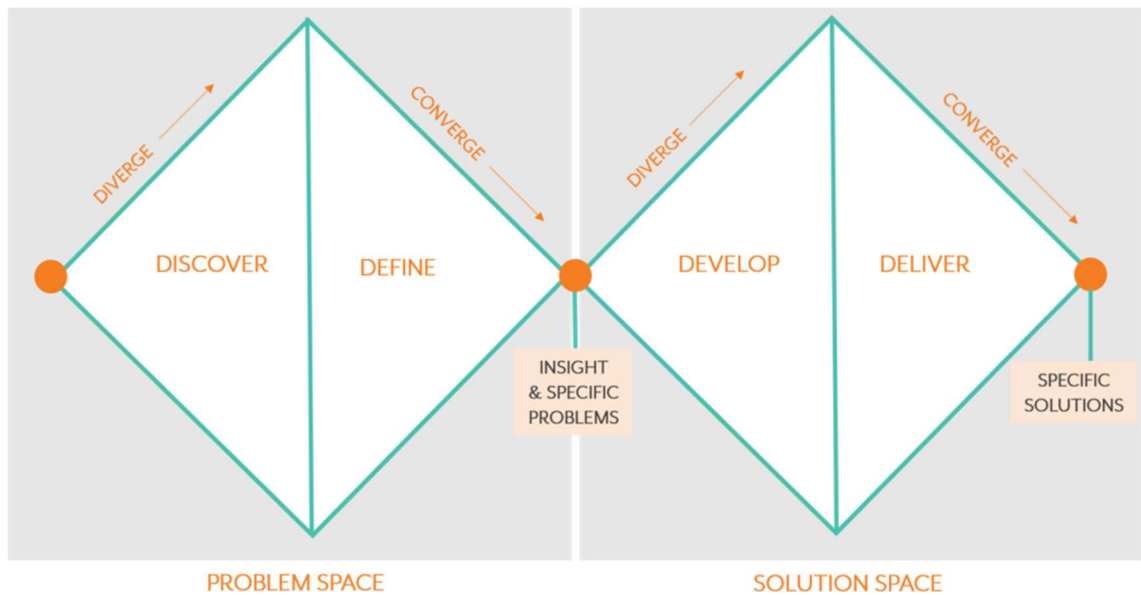


FIGURE 3. The double diamond process (Palvelumuotoilu Palo 2018).

The double diamond divides the design process into four steps: discover, define, develop, and deliver. These form two pairs, and each pair forms a diamond. Working on the first diamond helps in developing a better understanding of the design problem and the second diamond focuses on developing a targeted solution to this problem. (Palvelumuotoilu Palo 2018.) An important aspect of the service design process is its ability to build on itself. The process is never linear, but rather, each phase of the process can be revisited as necessary. (Stickdorn et al. 2018, 89.)

Stickdorn et al. (2018, 90) present the service design process in four steps as well: research, ideation, prototyping, and implementation. Although multiple design processes have been developed for service design, they are very similar at the core. The names and number of steps or activities may differ, but the processes share the same principles. (Stickdorn et al. 2018, 87.) Even if the process is approached from the perspective Stickdorn et al. (2018) present, the double diamond offers a good visualization of the process structure itself and how the different steps work together and build on each other, as well as how divergent and convergent thinking are included in the process.

Divergent and convergent thinking are at the core of service design. Divergent thinking is all about being open, ideating, and collecting information. Convergent thinking, in turn, analyses the information and is used to make decisions on whether or not something is useful and sensible. (Palvelumuotoilu Palo 2018; Stickdorn et al. 2018, 84-85.)

The first two phases of the process presented by Stickdorn et al. (2018), research and ideation, are most closely connected to the contents of this thesis. The other phases will be relevant if the core group decides to go forward with the business, and should be studied in more detail at that point.

### **3.2.1 Research**

Research allows for understanding people's motivations and behavior. Although the main focus of research in service design is often on the consumers and their interaction with a product or service, it can also be beneficial to do research on other stakeholders, such as employees. (Stickdorn et al. 2018, 96-97.)

Research is often the starting point in a service design project, but it can also be revisited later on if the other steps of the process call for it. Its role in service design is crucial as it helps confirm or disprove assumptions that deliver valuable information. (Stickdorn et al. 2018, 96-97.) The research step is similar to the discover and define steps in the diamond model, as it helps understand and specify the problem that needs solving.

### **3.2.2 Ideation**

Ideation is the next step of the process, although it is important to note that ideation should be present throughout the whole process, not limited to just a single step. Ideation is often built on the preceding step of the process, whether that

means proceeding onto it from research or coming back from prototyping to continue ideation. Ideation is heavily connected to both divergent and convergent thinking. (Stickdorn et al. 2018, 157.)

Creating ideas can be easy; they might already pop up in the research, or specific ideation workshops are used. After idea generation, the ideas need to go through idea selection to better understand where they fit and how feasible they are. Many of the ideas need to be abandoned to make decisions and this is where convergent thinking is involved. (Stickdorn et al. 2018, 157-158.)

## 4 MARKET RESEARCH

Market research is just as important for new, emerging companies as it is for established, existing companies. It is done to gain an understanding of a specific market. The goal of market research is to gather accurate information about the market, as the name suggests. This includes, for example, information about the customers or competitors of a business. (Schmidt 2022.)

Market research is an essential tool for businesses to make informed decisions in a competitive landscape. It can help mitigate risks with a new market entry as there is vital information gathered about the interest in the product or service. (Schmidt 2022.) Both quantitative and qualitative research methods can be used in market research depending on what type of information is needed.

Callingham (2004, 18) urges the use of a market research system, where the market, research franchise, and research stakeholders are defined to better understand and conduct market research. For commercial research, this is usually quite straightforward, as these three areas are generally easy to define and do not overlap. (Callingham 2004, 6.) For the context of this thesis, these groups are quite easily defined as the research focuses on the energy consumption optimization market, the potential customers – defined better in a later part of the thesis – form the research franchise, and the core group form the research stakeholders.

Companies have a value that can derive from their different assets, such as customers, employees, and brands. However, all these assets stem from knowledge which makes it the most important asset for a company. Market research is one of the ways a company can broaden its knowledge. (Callingham 2004, 23-27.)

Goncalves et al. (2014, 7) establish that understanding the emerging market as a whole is an important part of entering the said market. It needs to be looked at

from multiple points of view, from competition to the financial side to local culture and politics to consumers themselves.

Hair et al. (2023) present a business research model that forms an adaptable base for any business research process. It can be seen visualized below in Figure 4.

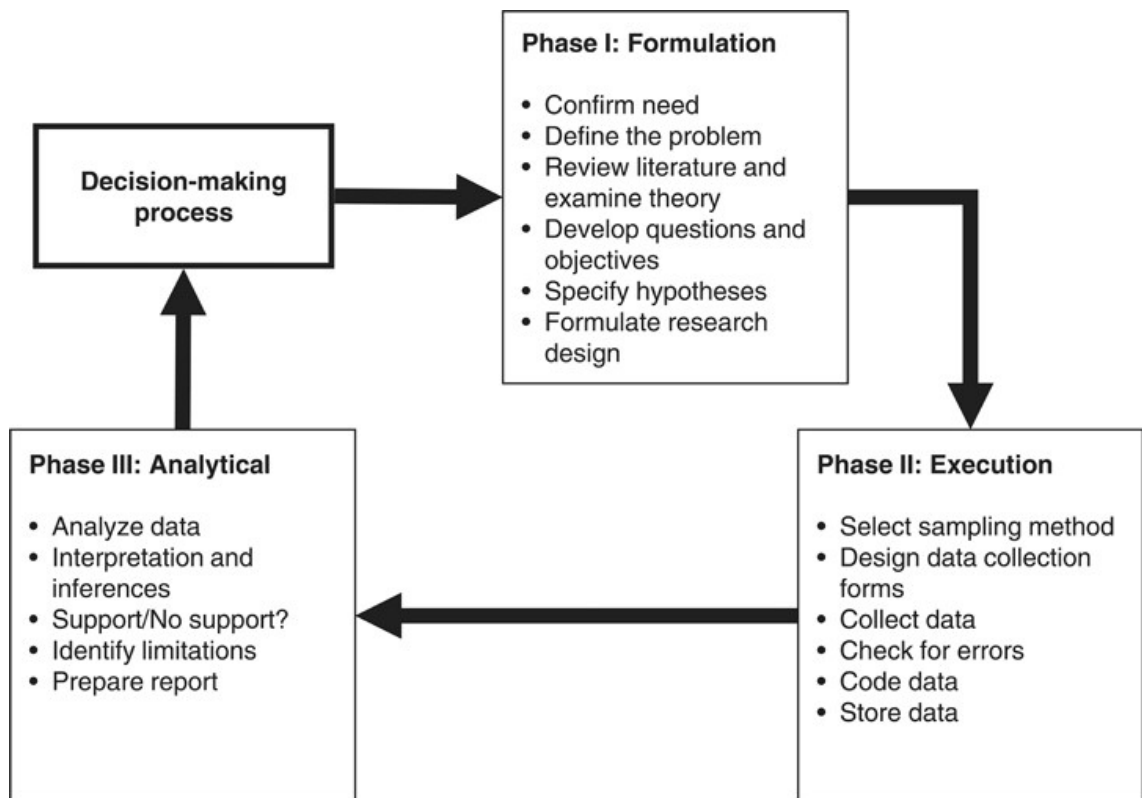


FIGURE 4 The three basic steps of any business research process (Hair et al 2023).

Hair et al. (2023) defined business research to comprise of three phases: formulation, execution, and analytical. However, they highlight that these steps are not set in stone as sometimes certain areas are not necessary, or researchers need to go back to an earlier stage to make changes for the study to work. These phases still form the basis to start from and are studied in the following sub-chapters in the context of market research.

## **4.1 Formulation**

The formulation phase focuses on defining the research problem, objectives, and research design. It also includes familiarizing oneself with the relevant literature and theories. (Hair et al 2023.)

### **4.1.1 Research problem, scope, and objectives**

According to Hair et al. (2023), conducting successful research starts with a clearly defined research problem. They continue to state that inadequately defined research problems can lead to an inefficient study that fails to deliver the needed data. Before one even begins to define the research questions, it is important to consider whether the subject needs market research, as not every decision requires it (Hague et al. 2013, 25). The research problems should be kept clear but stated as specifically as possible (Clow & James 2013).

Once the research problem has been defined, it is important to define the scope of the research, in other words, what are the limiting factors of the research and what or who exactly is being researched. This can include, for example, geographical limitations and customer segment limitations. (Hague 2013, 38.)

The objectives of the research go hand in hand with the research problems and scope, as these two areas are used to define the objectives. Having clear research problems and scope makes it easier to properly define the overall objectives of the research process. (Hair et al. 2023.)

### **4.1.2 Research plan**

Once the objectives of the research have been defined, a research plan can be made to form the tactics for reaching these goals. A research plan goes deeper into what the research is about and why it is being done. It can explain the background for the research, such as prior research and supporting theories, what

data is used, how it is being researched, and what sources are utilized. (Hair et al. 2023.)

The research plan is based on theoretical frameworks that help tie the research to prior studies and concepts. The theoretical framework provides relevant theories and definitions to the research as well as deciphers the key concepts. (Johnson 2024.)

## **4.2 Execution**

The execution phase includes the practical part of creating the data collection methods, defining the sample, and actually collecting the data needed for the research. An initial check for clear errors in the data can be made and the data is stored for analysis. (Hair et al. 2023.)

### **4.2.1 Collection of data**

The relevant data can be collected through various means, depending on what is being researched. In some cases, data is readily available, for example, in the form of documents. And sometimes the researchers need to collect it themselves by constructing appropriate methods, such as surveys, interviews, and experiments. Choosing the method also depends on the type of data that is needed. (Clow & James 2013.)

Different data collection methods can be combined to reach a larger assortment of data. The number of methods used may vary depending on how extensive the research should be and how complex the subject is. The researchers need to consider what the appropriate methods are to gather the information they need. (Hair et al. 2023.)

#### 4.2.2 Qualitative and quantitative research

Both quantitative and qualitative research methods can be used in market research depending on what type of information is needed. Businesses tend to focus on quantitative research for the numerical data it provides, but qualitative research should be viewed as equal to it (Callingham 2004, 2). The best results can often be reached by combining both methods.

Qualitative research is designed to explore complex, subjective phenomena through non-numerical data. It focuses on understanding the why's and how's behind things that can be difficult to measure with numbers, such as behaviors, emotions, and social interactions. (National University n.d.) Techniques like interviews, case studies, and observations are commonly used to capture rich, detailed narratives. Qualitative research prioritizes depth over numbers and aims to generate theories and insights rather than test hypotheses. (Bisht 2024.)

Quantitative research, by contrast, focuses on the collection and analysis of numerical data to test hypotheses and identify patterns or relationships in data. It is best suited for research that aims to measure or quantify aspects of a problem. (Bisht 2024) Common tools used in this research are surveys, experiments, and statistical analysis tools. Quantitative research usually allows for the production of results that are generalizable across larger populations. (National University n.d.)

These two methods are not mutually exclusive but rather can be complementary. For example, a study might utilize qualitative methods to explore a topic in-depth and then use quantitative methods to test the findings on a larger scale. This mixed-methods approach can provide a fuller, more nuanced understanding of research questions by combining the depth of qualitative insights with the rigor of quantitative analysis. (National University n.d.)

### **4.2.3 Semi-structured interviews**

Semi-structured interviews are a qualitative research method that utilizes an interview guide of some sort, for example, questions and topics that can be explored during the interview. The guide is there to provide structure to the interview, but the interview can be flexible: the interviewer can deviate from the set questions to follow up on interesting or relevant responses the interviewee gives. This flexibility of the semi-structured interview allows the collection of richer and more valuable information. (Cohen & Crabtree 2006.)

As the discussions in semi-structured interviews can diverge from the guide, it is wise to record them in some manner to ensure accurate transcription. The form of recording can depend on how the interview is conducted, some examples of recording are audio recording and note-taking. (Cohen & Crabtree 2006.)

### **4.2.4 Surveys**

Surveys are a common method of collecting data and they can be used for both quantitative and qualitative research. Surveys can be used in various fields, including market research. Online surveys are a great tool due to their low cost and flexibility. Online surveys allow quick access to large samples and the data collected from them is easy to process and analyze. However, this accessibility can also lead to less control over participants, which can cause biases in the research. (McCombes 2023.)

A persisting problem with the use of surveys is the respondent's subjectivity and the variability of question types and answers. Some questions may have answers that depend on memory or an individual's judgment, whereas some questions have objective answers. Answers to questions can be misleading as humans forget and lie. (Smith 2023, 21.)

The use of interval data can be more useful than asking for exact answers, as people tend to answer them more truthfully. This interval data can be converted into categories in the analytical stage to better utilize it. (Smith 2023, 39.)

#### **4.2.5 Sample**

When collecting data, it is important to consider the sample size and composition. The sample needs to be representative of the population that is being researched to provide accurate results. This can depend on how the sample is gathered; for example, is it hand-selected, or do the respondents self-select to take part in the research. The latter represents a nonprobability sampling method. (Clow & James 2013.)

Even if the sample is randomly selected from the base group, there are methods to make sure they fit the limitations of the research. For example, limiting questions can be used as a way to sieve answers from individuals who do not belong to the group that is being researched. However, with nonprobability sampling, a lot of potential people fitting the sample can be left out – and therefore, their input to the research is also left out (Clow & James 2013).

Compared to non-probability sampling, probability sampling uses a sampling frame with more criteria. The participants are randomly selected, but the group from which they are collected is well-defined to ensure the generalizability of the gathered data. Results from non-probability sampling cannot usually be generalized in the same manner as results from probability sampling. Non-probability sampling is more common in qualitative research. (Stickdorn et al. 2018, 102-103.)

A few examples of non-probability sampling are convenience sampling, self-selective sampling, and snowball sampling. Convenience sampling, as the name suggests, utilizes the people that are convenient to reach. Self-selective sampling does not define specific criteria or quotas but rather allows participants to choose

to participate themselves. For example, a link to a survey can be shared online. Snowball sampling relies on a few chosen participants spreading the word to others that suit the research purpose. (Stickdorn et al. 2018, 102.)

The size of the sample varies based on the method used. Quantitative research generally requires larger amounts of data, and the exact amount is dependent on the size of the studied population. In qualitative research, the sample size is usually smaller, and the research relies on identifying patterns and reaching theoretical saturation – the point where new participants no longer provide new insights. (Stickdorn et al. 2018, 104.)

In usability tests, as few as five test users can identify most of the problems. Although service experiences are more complex, a similarly small set of participants can be utilized as long as they are diverse. (Stickdorn et al. 2018, 104.)

Mooi and Sarstedt (2011, 42-43) suggest that the gains in precision from a larger sample size become marginal when the sample size is increased above 100-250 observations. They claim that relatively small sample sizes can offer precise knowledge, and the importance lies in accurately selecting the sample.

### **4.3 Analytical**

The analytical phase consists of analyzing the data through appropriate methods, interpreting the results, and providing information based on those interpretations. The information collected here can then be used in the decision-making process. (Hair et al. 2023.)

#### **4.3.1 Analysis of data**

After the data has been collected, it needs to be analyzed, as raw data rarely provides useful information on its own. The method used for the analysis depends on the type of data; qualitative and quantitative data are handled differently due to their differing natures. The analysis of data is grounded in formed theories, and

there is a risk of bias, which makes it important to choose the appropriate analysis methods reasonably. (Bensoussan & Fleisher 2012.)

Qualitative analysis involves the organization of data into categories and themes to understand underlying patterns in the data. The used categories can emerge from the data itself, existing theoretical frameworks, or, for example, the language the participants use. The categories can be refined as the analysis progresses. (Barclay 2018.)

The analysis process starts with reading the data and grouping the responses into key themes. Similar statements can then be combined, but it is important to note the frequency of similar responses. This grouping starts to visualize the spectrum of responses and the frequency of their recurrence, helping to indicate the most popular themes. When reporting this data, it is important to consider the majority and minority views, deviations from themes, and whether the data suggests a need for additional research. (Barclay 2018.)

Quantitative analysis, on the other hand, relies on analyzing number-based data. It aims to recognize patterns and averages in the data and to form results that can be generalized from a sample to the greater population. The collected data may sometimes need to be first transformed from words to numbers for it to be analyzed. The numbers are treated with statistical analysis to find answers to the research questions. (Bhandari 2023.)

Descriptive statistics help organize the data and provide a summary of it. This method usually utilizes tools such as the mode, median and mean values, and variance. The data is generally easier to inspect through tables and graphs. After descriptive statistics, inferential statistics can be used to test hypotheses and make predictions or estimates of a larger population. (Bhandari 2023.)

### **4.3.2 Results**

The results are obtained from the analyzed data and are reported in a concise and easy-to-understand manner. The results are presented differently, again, depending on whether they are qualitative or quantitative. Quantitative results can often be presented through graphs and key figures to make the numerical data more readable. Qualitative data, on the other hand, is often best presented by verbally reviewing how relevant or effective it is. (Hair et al. 2023.)

It is important to remain objective when reviewing the results to reach accurate and useful conclusions. However, it can prove beneficial to bring in a fresh viewpoint on the results while maintaining objectivity. The goal is to effectively summarize all the relevant findings. (Hague et al. 2013, 196-201.)

### **4.3.3 Conclusions**

Conclusions bring together the main findings of the study and contemplate the results' relevancy and accuracy in depth. This part is meant to provide the final comments on whether the research answered the chosen research problems and how well the set objectives were reached. (Clow & James 2013.)

The conclusions are discussed in connection with the theoretical framework to understand the factors that affected the research and results. This section is used to argue development areas and to offer further study points. The main goal is to provide information for the stakeholders to use in their decision-making process. (Hair et al. 2013, 209.)

## **5 RESEARCH ON ELECTRICITY OPTIMIZATION IN PIRKANMAA**

The following chapter explains the research background, the sample, and the research methods used. The structure of the survey and the interviews are described in the research methods section.

### **5.1 Research background**

The research was carried out based on a commission from a group of private people who were interested in starting a company together. They had expertise in different fields, such as business, entrepreneurship, IT, and technology, and were interested in the electricity usage optimization sector.

The subject of the research was to carry out market research on an electricity usage optimization service to generate information for starting the company. The goal was to find out if there is demand for such a service in the Pirkanmaa region and, if so, what would users expect from the service. It was also of interest to gather base-level information on the potential pricing of the service. The optimization service's focus would be on controlling electric heating, which steered the formulation of the survey and interviews.

### **5.2 Target group and sample**

The text below outlines the target group determination using information found on the internet about the population in the Pirkanmaa region, as well as criteria provided by the core group of the potential company. The core group's primary interest focuses on homeowners in detached houses, semi-detached houses, and row houses, as this specific electricity usage optimization service is designed to work best in these conditions. However, data from apartment renters was also

considered relevant for gauging general interest and desired features. The electricity consumption of households in apartment buildings is typically significantly lower than that of detached houses (Statistics Finland 2024e).

Living arrangements themselves shape the potential customer group. Detached houses are mostly owner-occupied, but there is also a considerable proportion of owner-occupied housing in semi-detached and row houses. In contrast, renting is much more common in apartment living. (Statistics Finland 2024f.) Living arrangements are generally linked to the age of the residents, as ownership properties are more common among older individuals, whose lives are usually more stable than those of younger age groups, often complicated by studies. Older age groups have typically accumulated more wealth, enabling home ownership. However, owning a home is also important to younger individuals, making them a significant target group because, even if they do not yet own a home, many aspire to do so, forming a potential customer group in the future (Viestintätoimisto Manifesto 2023).

The highest numbers of owner-occupied homes are found in households where the oldest person is between 30-60+ years old. In households where the oldest person is under 29, the number of owner-occupied homes relative to rental properties is significantly lower. (Statistics Finland 2024f.)

The final age range for the target group was set at approximately 25-65 years. This decision aimed to consider, for example, the older population's higher threshold for adopting new technology, which may result in perceived benefits from the service being too minimal. At the same time, the age range was slightly lowered, even if home ownership is less common in this age group. However, younger generations are more interested in technology, positioning them as a potential customer group in the near future.

The desired sample for the survey was at least 100, as it was determined in Chapter 4 to be a point where no more notable changes in precision are usually

reached. However, the final sample size was 50, and the sampling unit was households. The interviews had the same sampling unit, and the desired sample size was set at six to eight. This was considered a realistic goal, and as per the information in Chapter 4, it should be suitable for service experience related interviews. The interviews ended up with a sample size of seven.

### **5.3 Research methods**

Both qualitative and quantitative research methods were utilized as this type of mixed-method approach was found in Chapter 4 to help gather comprehensive information. The quantitative method, a survey, was used to gather data on the potential customer groups, their background information, their interest in the service, and their needs and expectations towards the service at the base level. The qualitative method, interviews, was used to dive deeper into those needs and expectations, as well as find potential problem areas and understand pricing concerns.

A structured online survey was administered through Google Forms to gather quantitative data from consumers residing in the Pirkanmaa region. The survey questions can be found in Appendix 1. It included closed-ended questions to assess the consumers' awareness, preferences, and willingness to adopt electricity optimization services. Questions covered topics such as current energy usage, perceived benefits of an electricity optimization service, and factors influencing purchasing decisions. The survey was distributed through two Facebook groups that had members from the Pirkanmaa region: Puskaradio Pirkanmaa and Oma-kotitalossa. The survey was also shared through the authors' networks, such as relatives and acquaintances.

Semi-structured interviews were used to gather qualitative data to further understand what features consumers want from an electricity optimization service, what would hinder their purchase decision, and what they expect to gain from the ser-

vice. Semi-structured interviews were chosen due to the method's suitable qualities, which were identified in Chapter 4. Most importantly, this included allowing engaging conversation with the interviewees and making sure they could express their opinions. The interviews were carried out over the phone as this was the easiest method for the interviewees who lived in different municipalities of Pirkanmaa. The interview basic structure can be found in Appendix 2.

### **5.3.1 Survey structure**

The survey consisted of 22 questions and was divided into three sections: background information, awareness and interest regarding the electricity consumption optimization service, and lastly, the interview-related section. The survey was quick to complete, taking an average of only 2-3 minutes, but the large number of questions may have impacted the quantity of responses received. The survey was tested with two individuals suitable for the selected target group before its release. These results were not used in the research.

Question 1, "Do you live in Pirkanmaa?", served as a screening question, and those who answered negatively were excluded from the dataset, as the study was solely interested in responses from households in Pirkanmaa. The survey was distributed in two different Facebook groups, one of which was not specifically targeted only at residents of Pirkanmaa.

Questions 2-11 focused on gathering background information about the respondents, such as their age, gender, housing and heating methods, living background information, and the type of electricity contract. The aim of this section was to build an understanding of the potential customer group and to confirm or challenge previously defined customer profiles.

Questions 12-18 aimed to gather information about respondents' electricity consumption habits, their interest and desires regarding the electricity consumption optimization service, and whether they had prior knowledge or experience with

similar services. The purpose of this section was to help understand what needs consumers have in relation to the optimization service.

### **5.3.2 Interview Structure**

The interview framework consisted of nine sections, each containing two questions. However, the interviewees were free to elaborate on their answers, and the interviewer was free to ask additional or clarifying questions as the interview progressed. The interview was tested with two individuals suitable for the target group before conducting it with the actual interviewees. The results from these tests were not included in the research.

The first three sections focused on perceived needs for the service, motivating features for using the service, added value, and user experience. The fourth section assessed what price point was considered suitable for the service and what kind of value for money should be expected.

The fifth and sixth sections concentrated on individual features: integration with other smart products and real-time monitoring and automation. These sections aimed to determine how important these features were perceived to be.

Section seven focused on assessing the respondents' doubts about the service and potential barriers to purchasing it. This information is essential for tailoring the service to provide maximum benefit to customers.

In section eight, potential future prospects for the product were assessed based on the current situation. For example, were there any specific trends considered important to take into account for the future, or any usage features based on personal consumption habits?

The final section aimed to influence the purchasing decision through marketing and communication. This part sought to map out how the product's marketing

should be approached, and which method was perceived as the most trustworthy for such a service. This section provides preliminary background information for a potential marketing plan.

#### **5.4 Analysis methods**

The quantitative data from the survey was transferred to a Google Sheets spreadsheet. The data was organized into a table so that necessary data could be compared and calculated, and charts could be compiled of relevant data sets to visualize it. This analysis method falls under descriptive statistics, as was determined in Chapter 4.

The qualitative data was processed through common themes, as was described in Chapter 4. The interview answers were recorded by writing them down so that the answers could be revisited and analyzed after the interview. The results were carefully read through, and similar answers were grouped together. Preliminary common themes were already identified when formulating the interview structure. The grouping of the answers helped confirm these four main categories: expectations and wants, payment and pricing, marketing and communication, and future endeavors. The grouped answers were then put under these categories and discussed in more detail.

The answers were anonymous and confidential in both methods, and individual respondents were not recognizable from the results. Some respondents left their contact information in the survey to be contacted for the interview, and that information was deleted after the interviews were successfully conducted.

## **6 RESULTS**

In this chapter, the results of the research are presented. The results are divided between the survey and interviews: first, the survey results are presented, and then the interview results. The survey results are shown by the type of information that was gathered; the first two sections focus on background information, the third on the electricity usage optimization service, and the final two on feedback and interviewee collection. Similarly, the interview results are observed through the four categories they were divided into in the thematic analysis.

### **6.1 Survey results**

There were 53 responses to the survey in total. Three were discarded because the respondents had answered 'no' to the limiting question, 'Do you live in the Pirkanmaa region?' That left 50 accepted answers, which were used in the data of this thesis.

#### **6.1.1 Basic information of respondents**

There were three questions for collecting the basic information: the first, limiting question, where it was ensured that the respondents lived in the Pirkanmaa area, and the two questions on the age and gender of the respondents.

The gender division was quite even, as 44% of the respondents were male, and 56% were female. This is close to the gender divide in Finland as it is almost even, with women making up a slight majority (Statistics Finland 2024g).

The age distribution was more diverse, but it did have a heavy focus on a singular group, with 46 to 55 year-olds making up 42% of the responses. One answer was from a person under the age of eighteen, and three answers were from people

over 65. The rest of the answers were divided quite evenly between ages 18-44 and 56-65. The detailed age distribution can be seen below in Figure 5.

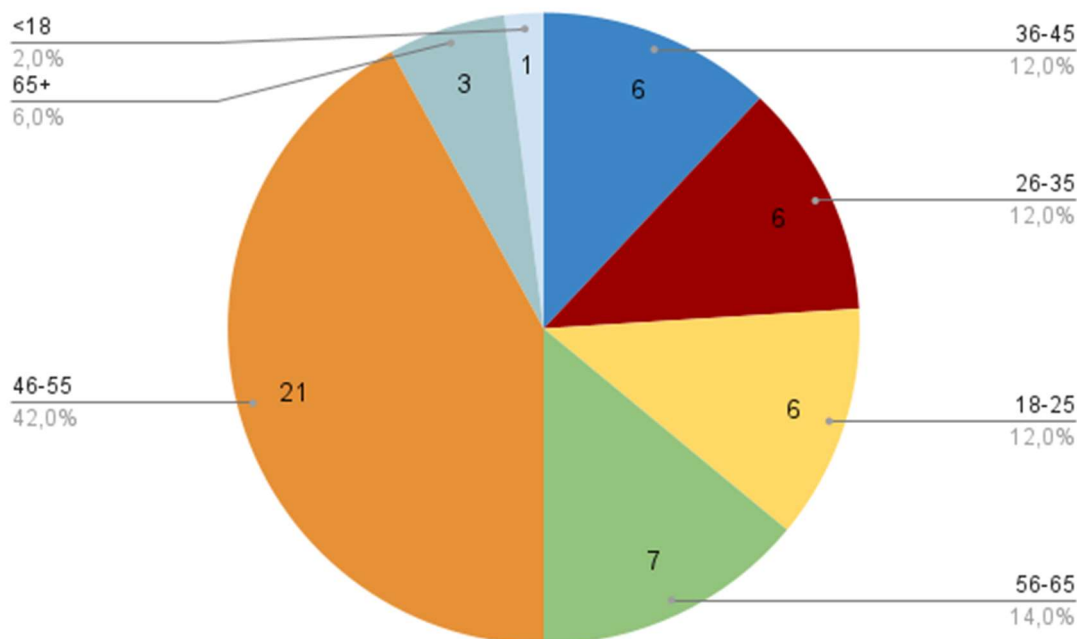


FIGURE 5. Age of respondents.

### 6.1.2 Background information on living situation and heating

Most respondents owned their own apartment or house as only 14% lived in a rental and one respondent in a right-of-occupancy apartment. The majority lived in a detached house, six people in an apartment building, and three in a semi-detached house or row house. People who own their house or apartment are the targeted customer group. Almost half of the households in Pirkanmaa are detached houses, semi-detached houses, or row houses, and over 88% of them are owner-occupied (Statistics Finland 2024f).

The size of the apartments varied; only three respondents' apartments were under 50 square meters, and almost half (22) of the respondents lived in an apartment of 101-150 square meters. Apartments between 51-100, 151-200, and over

200 square meters made up the rest of the answers with relatively even distribution. The sizes of the apartments can be easily seen below in Figure 6. The majority of the apartments occupied 2-3 people, with six having 4-6 people and five having only 1 person.

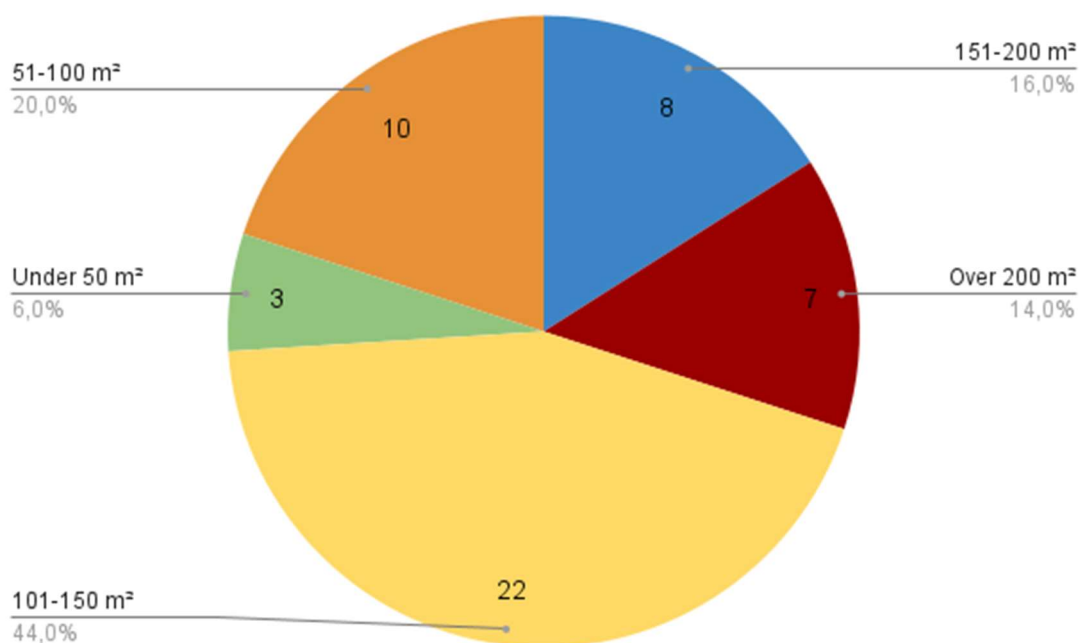


FIGURE 6. Size of apartment.

Electricity was clearly the most prevalent heating source, as half of the living spaces had primary heating from electricity. Biomass and oil were the next options, but electricity was clearly differentiated from all of the other sources. All of the heating options answered can be seen below in Figure 7.

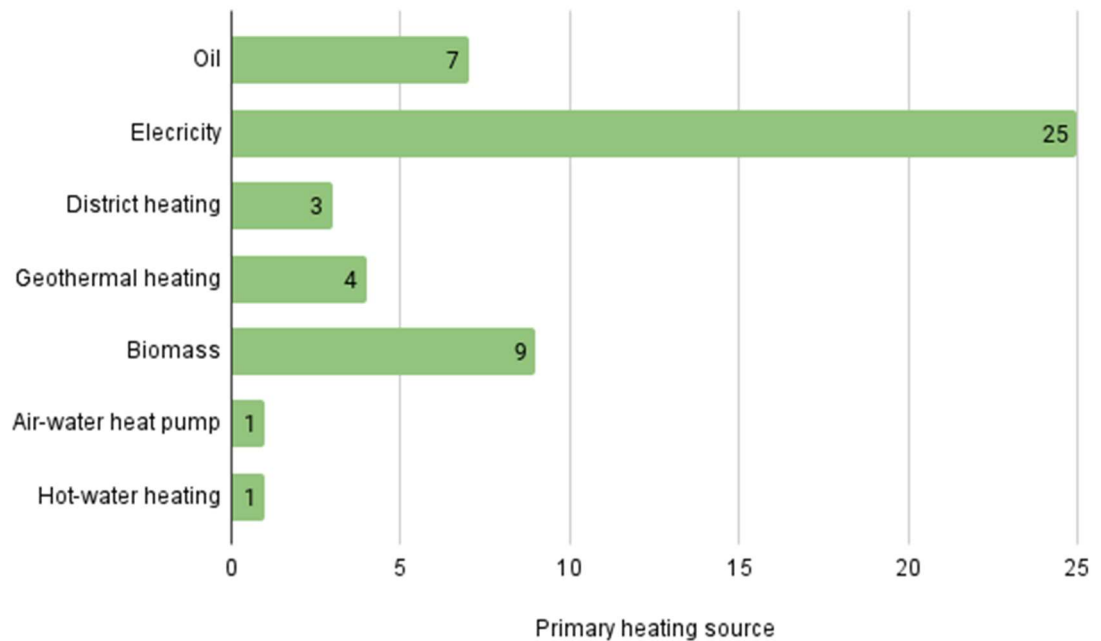


FIGURE 7. Primary heating sources of the respondents.

Around a quarter of respondents did not have a secondary heating source, and the rest of the responses were mostly divided between biomass and electricity. One respondent had both electricity and biomass. The secondary heating sources can be seen below in Figure 8. This again underlines the prevalence of electricity, as now 76% of the respondents utilized electricity in their heating as either the primary or secondary source.

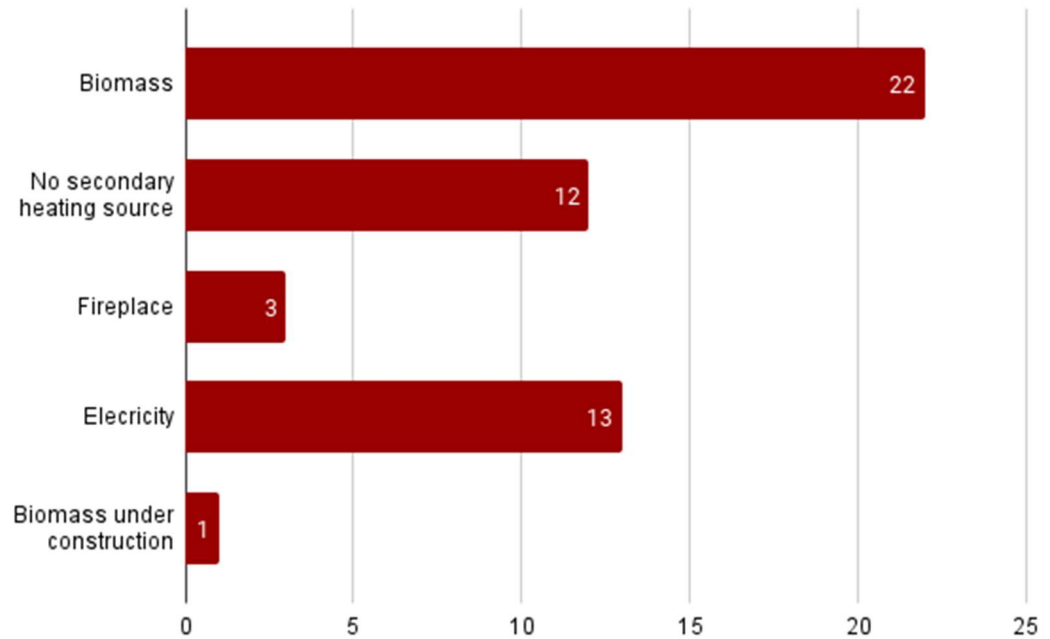


FIGURE 8. Secondary heating sources.

Six people did not have electricity as their primary or secondary heating, and they left the next question about its object of use unanswered as instructed. One person listed electricity as their secondary heating solution but left its object of use unanswered. Radiators, floor heating, and air heat pumps were the most common objects of use, the more detailed distribution can be seen in Figure 9 below.

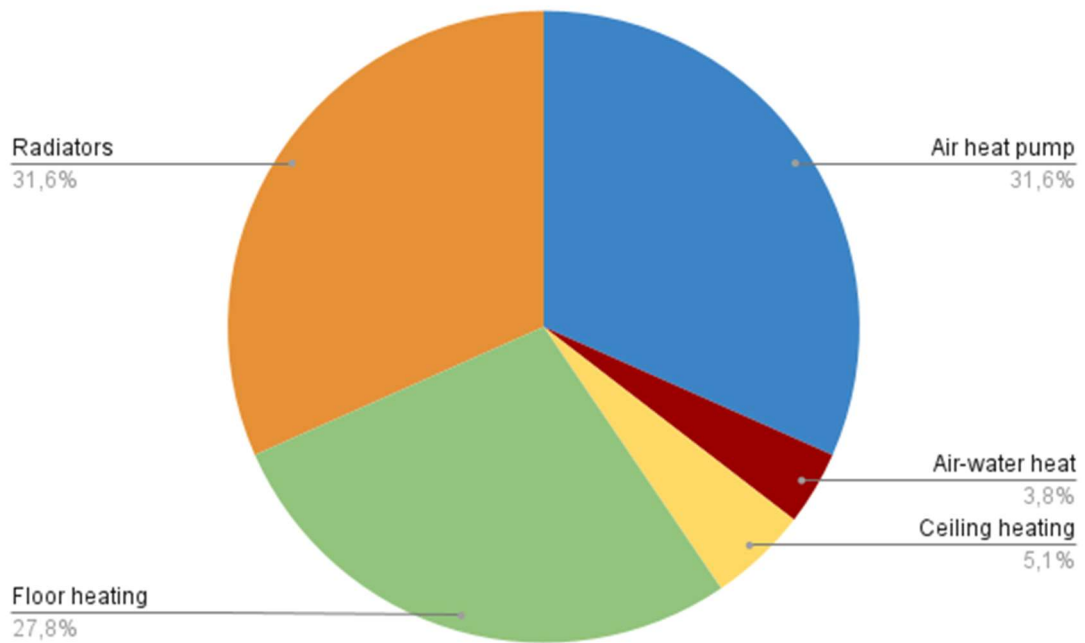


FIGURE 9. Objects of electricity use in heating.

60% of the respondents had spot-priced electricity contracts and 40% had fixed-price electricity contracts.

### 6.1.3 Electricity usage optimization service

The second part of the survey focused on the electricity optimization service. Knowledge of such services was relatively evenly distributed with 46% having heard of such services before and 54% having not.

90% of all respondents monitored their electricity usage – 56% expressed casual monitoring, and 34% did it regularly. A minority of 10% did not monitor their electricity usage at all. The exact numbers are available in Figure 10 below.

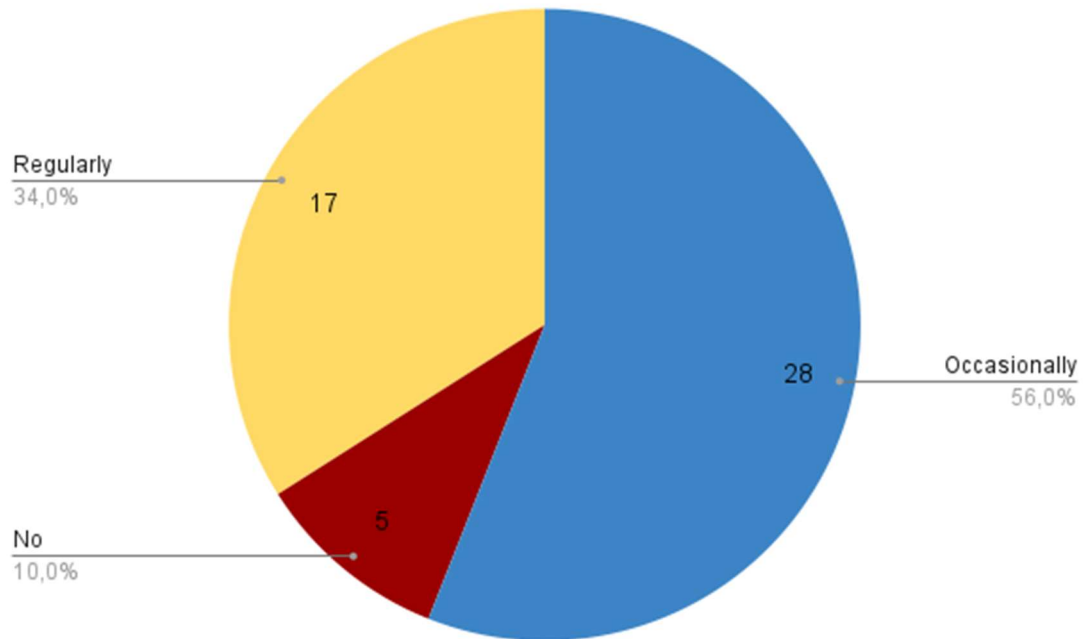


FIGURE 10. Do you monitor your electricity usage?

The next question asked about the method that was used to do this monitoring. Mobile apps and electricity bills were overwhelmingly the most used methods, with nearly 40% of respondents using each of them. The more detailed percentages are available in Figure 11 below.

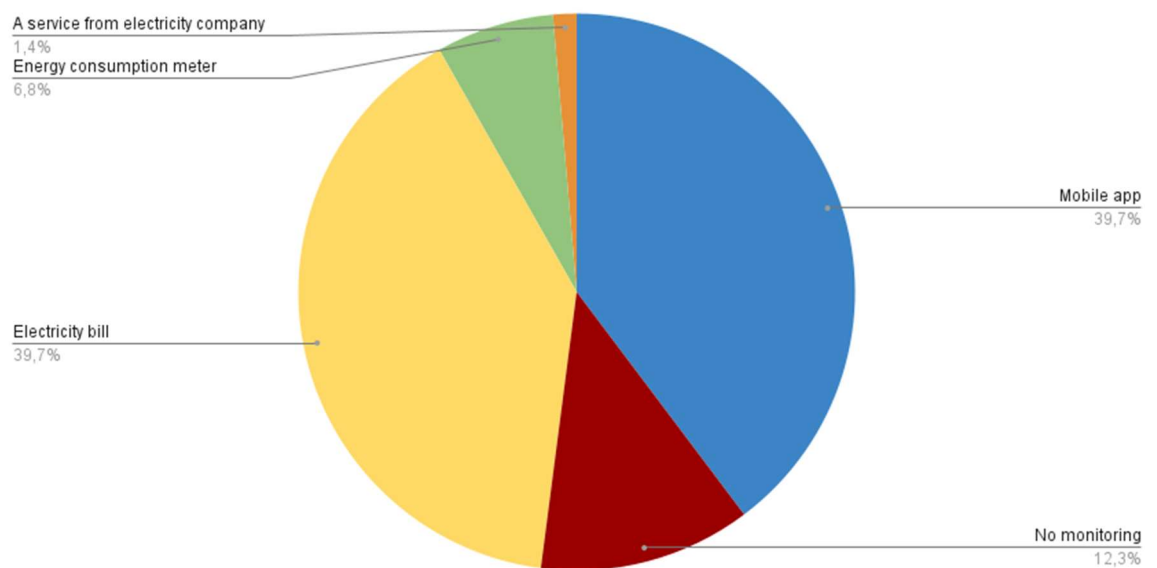


FIGURE 11. What monitoring methods do you use?

This question caused two contradictory answers as one of the respondents that answered the previous question that they do not use monitoring, answered electricity bill to this as their monitoring method. Similarly, one of the respondents who had answered that they do monitor their electricity usage occasionally, said in this question that they do not use monitoring methods. This may have been the result of a mistake or a misunderstanding, but it makes the collected information less reliable on this question.

The most wanted features for the service were real-time electricity usage monitoring, automatic adjustments in usage according to price levels, personal saving suggestions, and information on changes in pricing. Connecting the service to the same controller as other smart home appliances was also noted as a desired quality. The answers to desired features can be seen in full in the Figure 12 below.

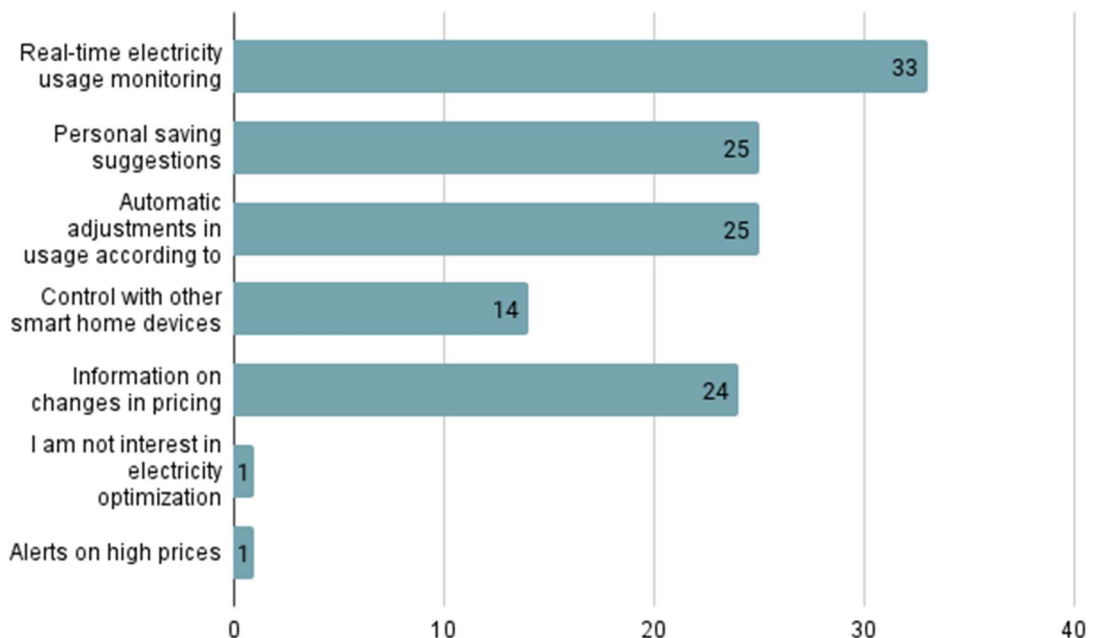


FIGURE 12. Expected qualities of an electricity optimization service.

The clearest motivator for using the service was savings in electricity bills, with 47 of the 50 respondents choosing it. Sustainability, general interest in technology, and heightened living comfort were also noted, with about 30% of respondents choosing each. The exact numbers can be seen below in Figure 13.

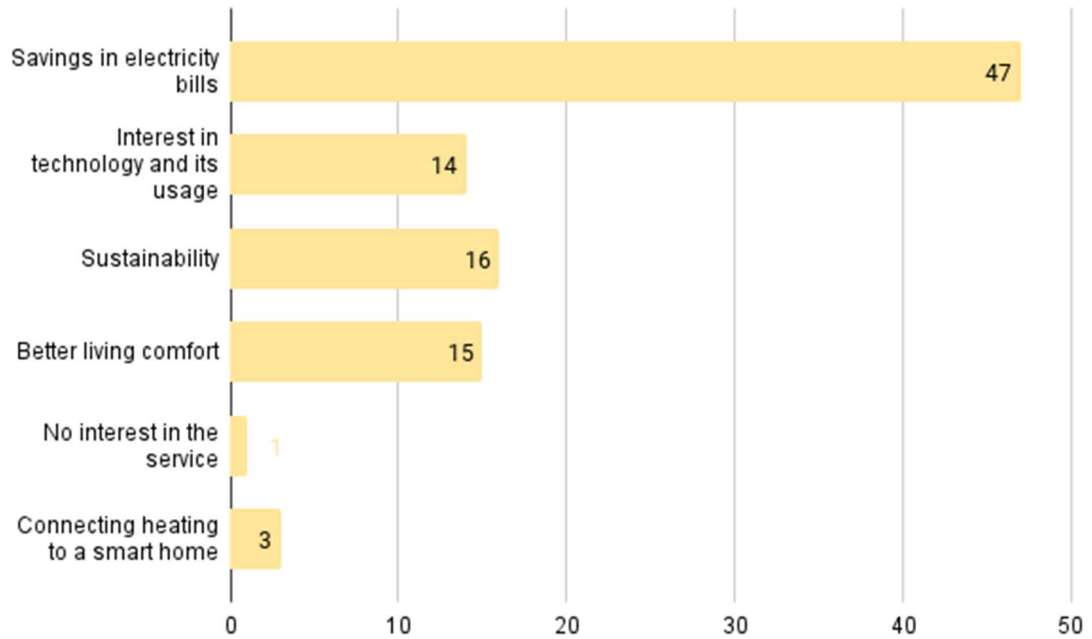


FIGURE 13. The motivation for using an electricity optimization service.

Wrapping up this segment, 64% of respondents expressed interest in an electricity optimization service. There was an interesting difference in the respondents' interest in an electricity optimization service depending on their gender: a clear majority of the female respondents expressed interest, whereas male respondents were divided almost evenly in the matter. The exact numbers can be seen visualized below in Figure 14.

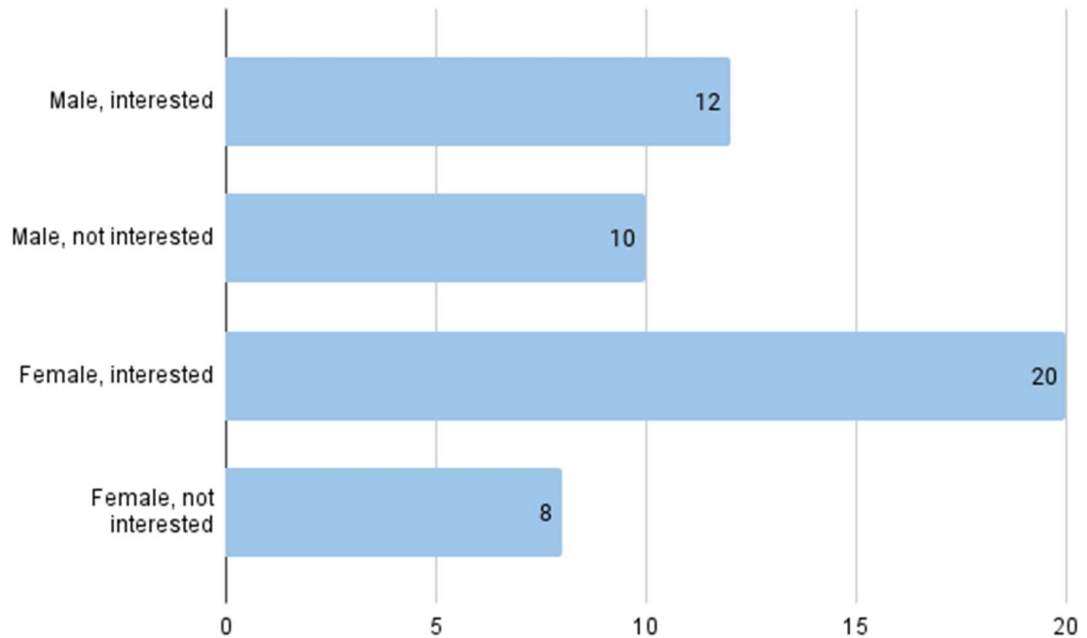


FIGURE 14. Interest in the service based on gender.

#### 6.1.4 Collecting interviewees

The final part of the survey concerned the interviews. Respondents were asked if they would be interested in taking part in an interview regarding the subject, whether they would prefer individual interviews or focus groups, and whether they would like to take part in the interview remotely or in person in Tampere. Finally, they were asked to leave their contact information so they could be contacted for the interview. This information was deleted after the completion of this thesis. The interviewees used were, therefore, mostly collected from the people who also answered the survey.

#### 6.2 Interview results

Interviews were carried out with seven people. Five of them were respondents to the survey as seven people answered that they would like to be interviewed, but

only five left their contact information for it. The other two interviewees were then collected through the authors' networks to collect a larger sample.

All of the interviewees were determined to suit the potential customer segment. The ages of the interviewees were between 25-60 years of age. Gender-wise men had the slight majority with four interviewees compared to the three women.

### **6.2.1 Expectations and wants**

When it came to the desired aspects of the service, savings were clearly the most wanted one. The electricity optimization service needs to deliver clear savings that can be seen concretely in spending levels. It was noted that the savings should be easily visible, for example, through an app for the service. Sustainability was seen as a plus, but it was not enough on its own to result in a purchasing decision.

An easy-to-use and quickly learnable operating system was deemed important. Users do not want to spend much time learning how to use it; installation should be completed efficiently, ideally within a few hours. A preference for a physical control panel at home and the ability to manage and monitor the system through a mobile app were expressed. The app's ease of use was particularly important, its design should be clear and user-friendly. There was no willingness to spend a lot of time learning to operate it.

Monitoring energy consumption was considered important, though it did not need to be done completely in real time. Users were more interested in tracking consumption on a weekly, monthly, and yearly basis.

Integrating the optimization service with other smart home devices was not viewed as particularly valuable. For some, it was a clear plus, but it was not a decisive factor in making a purchasing decision. Respondents either did not have

other smart home devices or had only a few, which explains the low interest in integration.

Automatic adjustments in energy consumption settings were a desired feature. However, there was also the concern that users should be able to override the automation and influence adjustments themselves if necessary.

### **6.2.2 Payment and pricing**

A one-time payment was preferred over monthly payments, with price ranges varying from hundreds to several thousand euros. The most common price was around a couple thousand euros. However, the pricing was seen as dependent on the benefits received and was, therefore, difficult to determine precisely. The payback period was mentioned as a significant feature; the service should pay for itself within less than 5 years from installation on average.

Pricing also arose as a clear barrier to acquiring the service. Consumers expected sufficient value for the price they would pay and there were concerns about whether the service would perform as expected, as well as about a potentially lengthy payback period.

### **6.2.3 Marketing and communication**

When it came to marketing and communication, highlighting tangible benefits, such as savings and positive user experiences, was identified to influence purchase decisions. It was important to hear or see concrete evidence of how the service works.

Reliability was perceived to increase if the product was endorsed by energy companies or if it received praise from trusted individuals, for example, professionals and familiar acquaintances. A skilled and knowledgeable salesperson was also

highlighted as a key influencing factor, but too forceful marketing and selling was seen as off-putting.

#### **6.2.4 Future endeavors**

Considering future needs proved difficult, and the questions related to it did not stir up much conversation among the interviewees. Therefore, there was not too much information gathered from this area.

From the slight data that was captured, potential future advancements were determined to include greater integration of artificial intelligence, connectivity between different systems, and benefits in areas that go beyond heating, which is currently the main focus, such as water heating and electric vehicle charging.

## **7 DISCUSSION AND RECOMMENDATIONS**

This chapter of the thesis discusses the meaning and relevance of the results. Some recommendations are made based on the discussion. First, the survey results are discussed and then the interview results.

### **7.1 Discussion on survey results**

The results of the survey indicate moderate interest in the target customer group in an electricity usage optimization service. Interestingly, women showed more interest in the service, but this may be connected to the small number of answers overall, and it would be interesting to see if the difference would remain the same in a larger-scale study with better-controlled sampling. Similarly, younger participants (<35 years old) showed disproportionately high interest in the service, and older (>65 years old) participants showed disproportionately low interest, and it would be interesting to see if the differences remain similar in another research setting. However, it would make sense for older people to be less interested in technology and, in contrast, for younger people to be more open to adapting to new technologies.

The age group of 46-55 years old had the most answers, with around three times the number of other age groups, excluding one answer from under 18 years old and three from over 65 years old. Therefore, the answers from this age group are heavily represented in the data compared to the other groups. This lowers the generalizability of the results to the other age groups. Also, the overall sample size is quite small, and the methods used to collect it were non-probability sampling methods, further lowering the generalizability of the results. The oversaturation of this age group happened due to the sampling methods used. The age group did not have a notably higher interest in or prior knowledge of the service.

The majority of survey respondents owned their own apartments and lived in detached houses, semi-detached houses, and row houses, making them fit into the target customer group in that aspect. However, interest in the service did not seem to be connected to any specific living situation. Similarly, the size of the apartment did not seem to correlate with interest in the service. This is interesting to note, as larger apartments could have been expected to have more interest in the service as they may experience higher heating costs. All of this would indicate that the service should be targeted evenly to different house types and sizes instead of targeting a very specific group.

Most of the respondents utilized electricity in their heating either as a primary or a secondary heating source. This matches the statistics found on the subject that were examined earlier in the thesis. This would confirm the potential need for the electricity usage optimization service in the Pirkanmaa region, as heating is the main area where this service would first operate and where the most benefits could be collected.

Information on where electricity was used in heating was also collected, and the results seemed reasonable as floor heating, radiators, and air heat pumps were the most common objects of use. This information is useful for understanding what heating solutions the service should be able to operate with and optimized for. However, this information could be deemed common knowledge as there is a limited amount of heating solutions available in the first place, and collecting it may not have been necessary.

A majority of the respondents had spot-priced electricity contracts which coincides with the theory found on the growing popularity of spot-priced electricity contracts. This growth would also suggest a growing market for an electricity usage optimization service, as it would provide the most benefits with such contracts. Of course, fixed-priced electricity users also benefit from the optimization, but higher savings are possible with the shifting of spot-priced electricity prices.

Prior knowledge of electricity usage optimization services was even, with around half of the participants having heard of it before. The ones who had not heard of such services before expressed more interest in them than those who had heard of them before. This indicates that there is room for improvement in the marketing and communication of such services. It was noted earlier in the thesis that similar services are already available in the Pirkanmaa region, so this suggests that their marketing is not reaching all potential customers.

As 90% of the respondents monitored their electricity usage to some degree, it would suggest interest in how much they spend on electricity. Therefore, a service that would not only cut down on electricity usage but also offer an easy way for tracking the usage could be useful. 40% of the respondents already utilized a mobile app for the tracking, and the service would very likely utilize a mobile app for its control, so a tracking feature could be a good addition to it. There was an error in the data when it came to the two questions about tracking electricity usage, with two answers contradicting themselves. However, the data only changes marginally if the contradictions are left out of the analysis, and the drawn conclusions are not affected.

The most desired features of the service included clear tracking of electricity consumption and prices, automatic adjustments, and personalized saving recommendations. There are features clearly connected to savings and information on electricity usage. This indicates that consumers are interested in features that provide not only monetary savings but also make everyday life easier. This information is useful when designing the service and looking for the features that provide the best user experience.

A similar trend was noticed when determining the greatest motivators for utilizing an electricity usage optimization service. The savings in electricity usage costs were distinctly the greatest motivator for using the service. This was an expected outcome, but the research confirmed it. Sustainability, heightened living comfort, and interest in technology also rose as motivators for adopting the service, but

not nearly on the same level as the savings. However, all of this is important knowledge for the future so that the value the service provides can be communicated properly to consumers. It also provides important information for the design of the service.

## **7.2 Discussion on interview results**

The information collected through the interviews offered deeper insight into the needs and wants associated with the electricity usage optimization service. Unsurprisingly, monetary savings were also identified as the most desired benefit of the service from the interviews. This supports the findings from the survey. Accessibility, ease of use, and fast installation were also considered important aspects of the service. Being able to affect how the service operates was also a desired feature. Consumers wanted to be able to override the automatic suggestions and adjustments if they deemed it necessary. This would also be an important aspect of the service being user-friendly.

Overall, the interviews delivered important knowledge that can be utilized in the service design process. Identifying and adding the desired features will help the service provide a better customer experience and greater value. The gathered information steers the development of the service in the right direction and offers insight into consumer needs and wants.

Pricing-related data remained quite shallow, and the results gathered showed great variance. Pricing itself is a complex issue and will demand careful consideration of the costs associated with the service as well as deciding on a markup of some sort. This research focused more on consumers' interest in the service and the desired features of the service; therefore, conducting more in-depth research on pricing and value could be beneficial.

Of course, the price of the service must be reasonable enough for consumers to afford it and show interest. But there is no point in developing the service if the

price does not enable making a profit. The data showed that consumers preferred a one-off payment over monthly payments. However, it is important for the core group to consider whether selling the service on a one-off payment is reasonable. The statistics mentioned earlier in the thesis showed a growing trend in electricity usage. This could mean that the savings and value generated from the service may, in time, become ridiculously high compared to the price that was paid for the service. Different pricing models should be studied, and as stated earlier, more research should be done on pricing in general to reach any conclusions.

When it comes to communication of the service, it was clear that consumers appreciated reliability and showcasing concrete results. This highlights the awareness consumers have of their consumption and the value a service provides. This is, again, an aspect that should be considered when developing the electricity usage optimization service. Although this research was not done for marketing, it did provide relevant information that can be utilized in future marketing research, such as target customer information and perfunctory views on preferred communication styles.

Currently, the most essential aspect regarding the service is its development and then entering the market, but a couple of interview questions also looked somewhat into future perspectives and potential future needs that may not be presently fulfillable. This was not a crucial part of the research and did not yield much usable data as many of the participants were unable to answer the question. Perhaps one of the most significant observations is the expansion of operations and applications in the future to be more in line with people's other needs, as the current version of the optimization service is very focused on heating and reducing its costs. In that sense, a deeper investigation in the future, focusing on these expandable features, is likely essential.

## 8 CONCLUSIONS

The goal of this thesis was to map potential customer segments for the electricity usage optimization service in the Pirkanmaa region, as well as their interest and needs regarding the service. Based on the research results, there appears to be moderate interest in electricity usage optimization services in the Pirkanmaa area. The most promising customer groups fall within the age range of 25-60 years with a balanced gender distribution. The house type did not have an effect on the interest.

Another goal of the thesis was to determine how much potential customers would be willing to pay for the service. The research conducted did not answer this question. It would be suggested that the pricing be researched in more depth with its own research project. This research could also delve into the price–value relationship.

The surface-level competitor analysis revealed a notable amount of existing operators with similar services. Therefore, another development suggestion for the core group is to conduct a proper competitor analysis to determine whether it's sensible to enter the market alongside current competitors. A competitor analysis will also help them understand how they can differentiate themselves in consumers' eyes and meet consumer needs better than competitors.

Another development suggestion is to conduct marketing research and develop a marketing plan based on that, utilizing some of the information from this thesis. Over half of the respondents to this study's survey had not previously heard of electricity usage optimization services, and this, combined with insights gathered during interviews regarding effective communication strategies, provides important information for developing the marketing of the service. However, a deeper understanding is needed to enhance the chances of successful marketing.

The shortcomings of this market research include at least a distorted distribution of respondents, which was particularly biased toward a certain age group in the survey, whereas a more balanced distribution among age groups was observed in the interviews. However, the survey distribution aligns fairly well with the target customer group, as the overrepresented age group does belong to the interval that has a larger share of house owners.

The number of responses to the survey was also very limited, possibly due to the lengthy nature of it. The low responses may also indicate low interest in the subject itself, but this would need to be tested to be certain. Developing another survey that is more concise and targeted might be worth an effort to gather further information on the interest levels. The small sample and the used sampling methods make the generalizability of the survey results low.

The interview results focused on individuals who presumably had an interest in the service, as they offered to take part in the interview. The interviews provided valuable information on what potential customers expect from the service, and the seven varied interviewees ensured the reliability of the information on most of the questions as theoretical saturation was reached.

Overall, this study offered some insights into the current electricity usage optimization market situation in the Pirkanmaa area. And although the results had very low generalizability, they still provided direction and potential next steps to the core group.

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## APPENDICES

### Appendix 1. Questionnaire questions and answer choices 1(2)

**1. Do you live in Pirkanmaa?**

Yes, No

**2. Gender**

Female, Male, Other

**3. Age**

<18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+

**4. Living arrangement**

Rental apartment, Owned apartment, Right-of-occupancy apartment, Other

**5. Type of housing**

Detached house, Terrace/duplex house, Apartment building, Other

**6. How large is your apartment?**

Less than 50 m<sup>2</sup>, 51-100 m<sup>2</sup>, 101-150 m<sup>2</sup>, 151-200 m<sup>2</sup>, Over 200 m<sup>2</sup>

**7. How many people live in your apartment?**

1, 2-3, 4-6, More than 6

**8. Primary heating method of the apartment**

Electricity, Ground heat, District heating, Oil, Biomass (wood, chips, etc.), Other

**9. Secondary heating method of the apartment**

Electricity, Ground heat, District heating, Oil, Biomass (wood, chips, etc.), No secondary heating method, Other

**10. Electricity usage in heating. You can leave this blank if you did not answer either of the previous questions with 'electricity'.**

Radiators, Floor heating, Air heat pump, Water source heat pump, Other

**11. What kind of electricity contract do you have?**

Fixed price, Spot price, Other

**Electricity consumption optimization service**

The service is based on software that monitors the electricity consumption of the apartment and adjusts it based on current data.

2(2)

**12. Have you heard of similar services?**

Yes, No

**13. Do you actively monitor your household's electricity consumption?**

Yes, I monitor regularly, Occasionally, I do not monitor

**14. If you monitor electricity consumption, what tools do you use for tracking? (Select all that apply)**

Smart home system, Mobile app, Energy consumption meter, Electricity bill, I do not monitor my electricity consumption, Other

**15. What kind of functionalities or features do you expect from an electricity consumption optimization service? (Select all that apply)**

Automatic adjustments for high consumption targets based on electricity prices, Real-time electricity consumption monitoring, Personal savings recommendations, Control with other smart home devices, Information about changes in electricity prices, Other

**16. What factors would motivate you to use the electricity consumption optimization service?**

Savings on electricity bills, Sustainable development, Improving living comfort, Interest in technology and its utilization, Integrating home heating with smart home, Other

**17. Are you interested in the electricity consumption optimization service?**

Yes, No

**18. We are also organizing interviews related to this topic to understand the needs and thoughts about the service in more depth. Would you be willing to participate in an interview?**

Yes, No

**19. Would you prefer to participate in an individual or group interview?**

Individual interview, Group interview

**20. Interviews can be conducted remotely via Microsoft Teams or on-site in Tampere. How would you like to participate in the interview?**

In Tampere, Remotely

**21. Here you can leave your name and phone number and/or email address. Contact information will only be used to reach out regarding the interview and will not be published or retained after the thesis process is completed.**

**22. Optional feedback on the questionnaire.**

## Appendix 2. Interview questions

### 1. What is expected of the service?

- What are the important features of an electricity optimization service to you?
- What would inspire you to purchase such a service? What would make it desirable?

### 2. User experience and ease of use

- How important do you consider that the service is easy to use? How much time are you willing to spend on the installation of the required equipment and learning to use it?
- In what way would you like to interact with service in daily use? (e.g. mobile app, automation, alerts)

### 3. Motivations and added value

- What would be the greatest motivator for you to use this type of service? (e.g. savings, sustainability, bettering living comfort)
- Is it important to you that the service improves energy efficiency and/or supports sustainability? How much do you value this aspect in your purchase decision?

### 4. Pricing and value

- What would you be willing to pay for the service? What do you consider to be a reasonable price compared to the savings the service generates?
- How important is it for you that the savings are shown concretely? (e.g. how much you have saved in a month)

### 5. Integration

- Would you like this service to integrate with other smart devices in your home? (e.g. smart thermostats, lighting) How important is this aspect to you?
- Do you currently have other smart devices and if so, what type of integration would be necessary to you?

### 6. Real time tracking and automation

- How important is it to you to track your electricity usage in real time? In what way would you like to implement the tracking? (e.g. mobile app)
- Would you like the service to automatically adjust your electricity usage, or would you rather do it yourself based on the information the service generates?

### 7. Hurdles and challenges

- What would hinder you from buying the service? Is there a specific feature or thing that would make it less appealing?
- Do you have worries or doubts regarding the service? (e.g. data breach, privacy, realization of savings)

### 8. Future needs

- What features would you hope the service has in the future?
- How do you see the service developing in coming years? Is there a specific feature or technology that could be important to you in the future?

### 9. Influencing purchase decision

- What kind of marketing/communication would assure you of the service's usefulness and credibility?
- What should be brought up when launching/displaying the service to invoke your interest and deliver concrete benefits?