Electrifying labels
Environmental quality labelling schemes and the extent of their effect on Icelandic consumers purchasing intention in electricity

Styrmir Már Ólafsson

Leiðbeinandi: Friðrik Larsen

Maí 2019
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Styrmir Már Ólafsson

Lokaverkefnì til MS-gráðu í viðskiptafræði

Leiðbeinandi: Friðrik Larsen

Viðskiptafræðideild

Félagsvísindasvið Háskóla Íslands

Júní 2019
Electrifying labels: environmental quality labeling schemes and the extent of their effect on Icelandic consumers purchasing intentions in electricity

Ritgerð þessi er 30 eininga lokaverkefnin til MS prófs við Viðskiptafræðideild, Félagssvinsindasvið Háskóla Íslands.

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Prentun: Háskólaprent
Reykjavík, 2019
Preface

This degree serves as a final for a M.Sc. degree in marketing and international business from University of Iceland. It has taken its time, but I started writing it in the year 2016, now three years later I’ve finally finished. A lot has changed since I started writing. I’ve moved back to my old town and bought a house. I want to start by thanking my girlfriend, Bessý, none of this would be possible without her, her support and understanding during the late-night writing sessions has been invaluable. Next, I want to thank my children, Hilmir Bjarni and Camilla Kristín who have been considerate with their dad who has been very tired in the last few weeks. Working a full-time job and writing his final essay. I would also like to thank myy parents and In-laws for their support and help. With their assistance they have made it possible for me to finish my essay.

Special thanks to Ingvar Þorsteinsson, for the discussions regarding both the topic and the content of this essay.

I would like to thank my supervisor Dr. Friðrik Larsen for his supervision and discussions regarding the topic of my research.
Abstract

When the electricity markets were liberalized there was made room for differentiation. In the first years, most of the differentiation was in the pricing of electricity and fierce competition. This competition did not lead to a lot of consumers switching electricity providers and since then switch rate has been poor to say the least. Companies have more and more started utilizing branding strategies for them to gain advantage in the electricity markets. Focusing on differentiation there have been identified four different ways for electricity to differentiate themselves, one of which is environmental qualities of the electricity.

Consumers attitude towards renewable electricity has been mostly positive but they have not been taking a step towards more renewable electricity options. This is due to consumers being unable to verify the claims made by the renewable electricity about its environmental qualities. They are faced with information asymmetry in the electricity market, mostly due to the nature of electricity. For manufacturers in other markets with similar asymmetry as the electricity market, they have started utilizing environmental labels. They aim to minimize asymmetry by increasing the products traceability, trustworthiness and credibility. This research aims to find the extent of environmental labeling schemes effect on consumers purchasing method. To start with the literature was reviewed and from that derived nine hypotheses which set the basis for the qualitative research in the form of questionnaire. Results of the questionnaire were then used to map out the effects and identify important aspects which may allow further research to identify how they may make consumers more interested in environmental labeling schemes. Results of the survey shows that environmental labeling schemes can influence consumers towards more environmentally friendly electricity, but consumers are somewhat neutral or lack knowledge for the environmental labeling schemes to have an effect.
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1 Introduction

Information has never been as accessible as it is today. With the arrival of smartphones consumers have access to more information at their fingertips than they have had before. Coinciding with increased access to information is increased interest in matters ethical and environmental (Fraj and Martinez, 2007; Laroche, Bergeron and Barbaro-Forleo, 2001; Llopis-Goig, 2007; Vermeir and Verbeke, 2006; Yu, Han and Hu, 2016). Consumers intending to shift their behavior towards a more ethically and environmentally positive alternatives may be faced with a barrier. Even though they have access to more information it may still provide a daunting task to verify ethical and environmental claims about products or services made by manufacturers or other relevant parties (Gleim, Smith, Andrews and Cronin, 2013; Karstens and Belz, 2006; Rubik and Frankl, 2017). In the last 20 years countries have shown more interest in minimizing damage done by ethical and environmental scandal and in order to avoid further scandals they have started developing strategies whose goal is to prevent them (Aprile, Caputo and Nayga, 2012). As a part of the strategy to counter scandals and moreover to provide assistance consumers by allowing them to make more simple decisions and providing them with the information they seek in a more simple and visual way, quality labeling schemes have been introduced (McEachern and Warnaby, 2004).

Labeling schemes play a similar role to brands as they both aim to provide protection for the consumers from similar, yet inferior products (Aaker, 2009). Brands have been shown to be effective and giving consumers better access to information and informing them of value provided by the branded product or service (Morrison, 2001), therefore, when discussing quality labels it is important to discuss both brands and branding. Brand may provide an identifier to goods, making it possible for consumers to make more knowledgeable choices (Doyle, 1990), similarly quality labels aim provide an identifier to goods and services which allow consumers to make more knowledgeable choices (Krystallis and Fotopoulos, 2003).

When assessing quality labels, it is important to have in mind that they abide by no strict rules or guidelines and there are no regulations on who may establish and maintain a label and the criteria set by a labeling scheme may be very strict or
nonexistent (Grunert, 2005) and they may be used to signal a variety of things, such as efficient usage of electricity or environmental friendliness (Umhverfisstofnun, e.d.-b).

Liberalization of electricity markets of Europe provides an opportunity for consumers to have an effect on how the electricity used by them is made (Wüstenhagen and Bilharz, 2006). By consumers demanding greater focus on renewable electricity they are able to assist in decreasing the environmental impact of electricity manufacturers (Salmela and Varho, 2006), but even though consumers have claimed to be interested in changing to renewable electricity only few have made the switch (Lipp, 2001). The reason being that complexity of the electricity market being daunting and the obscurity of the market translating to consumers ignorance on how to make the switch (Giulietti, Price and Waterson, 2005; Salmela and Varho, 2006; Wilson and Price, 2010). Furthermore, Truffer, Markard and Wüstenhagen (2001) identified four characteristics which differentiation of electricity could be based on: technical features of products, customer segments, additional services provided, such as better customer service, and environmental characteristics. This essay will focus on differentiation based on environmental characteristics.

Iceland has a unique status in the world with about 99,99% of its electricity being manufactured from renewable sources (Samorka, e.d.) but it boasts of variety of electricity manufacturers but differentiation is near enough nonexistent but by price and the price difference being miniscule (Aurbjörg.is, n.d.) which makes it hard for Icelandic consumers to consider switching manufacturers as what they stand to gain is unclear. This study aims to study the possibility of differentiation of Icelandic electricity manufacturers with quality labeling. Therefore, the purpose of this study is to research the extent of environmental label influence one the purchasing decision of consumers in the Icelandic electricity market.

This thesis starts by identifying and defining the concept of branding and its components such as identity signaling, industrial branding and corporate brands. These concepts and their definitions play a role in the research of labeling schemes. Next marketing of renewable electricity will be discussed as renewable electricity is one of the most prominent attributes of electricity. Next green consumers will be discussed and identified and after that product attributes and the information asymmetry
associated with electricity will be discussed. Labelling schemes will be discussed, and their attributes and roles will be identified, the purpose of signal theory in labeling schemes will be expanded upon and labels and their perceived risk and credibility will be studied.
2 Branding Defined

In order to advance the understanding of the concept of labelling schemes and their purpose, the concept of brands must first be discussed. In this chapter we will start by discussing definition of a brand. Next, branding literature will be researched and defined, as long with the benefits it provides.

2.1 Brand

Everyday consumers are exposed to brands as they navigate their daily routine. This is no accident as brands have been shown to be both effective and compelling means for firms to bring information to consumers (Morrison, 2001). Brands are an important part of the world of today and is both useful for consumers and manufacturers. Brands are able to inform consumers about values provided to them by choosing product over a comparable alternative (Morrison, 2001). Additionally, brands may lower the costs associated with the search for a product that is able to satisfy their needs (Biswas, 1992). But what is a brand? Aaker (2009) describes a brand as a use of a name or a logo to differentiate a business/producer/oneself from the/his/its competition. Differentiation not only protects the producer from the competitor, but it also provides protection the consumers from comparable inferior products. According to Doyle (1990) a successful brand is able to deliver to consumers with the ability to recognize the product by the name of the product, a symbol associated with it or a design. It may also be a mix of these things, but they allow consumers to identify the product as better than other comparable products.

Brands also provide consumers with assistance when they are looking for a product that can fulfill their needs. Consumers are inevitably faced with perceived risk when they search for new products the intend to buy, they may fear the product is unable to meet their qualifications (Janiszewski and van Osselaer, 2000). Brands may decrease risk associated with buying said product, and furthermore, lower the chance of the product not meeting consumers quality expectations (Erdem and Swait, 1998). Brands lower perceived risks by signaling qualities of the products to the consumers (Janiszewski and van Osselaer, 2000). Brands can provide assurance to consumers, if they have previously bought a branded product they are faced with lower risks when they are buying products from the same brand (Berger and Heath, 2007).
A key concept of Aaker’s (2009) definition of brand is differentiation. Brands are developed so companies are able to distinguish their products from competition (Kotler and Keller, 2015; Ries and Ries, 2002), companies are able to use differentiation for competitive advantage (Doyle, 1990). Various ways are used to differentiate products but in electricity markets, the differentiation so far has been mostly the price of electricity (Walsh, Groth and Wiedmann, 2005). However, differentiation has no need to be rational and can be based on both on tangible and intangible assets (Ambler and Styles, 1997). Intangible assets are assets which consumers may not directly touch, such as a brands name. The name of a brand is a figure that can denote an assortment of notions and characteristics to consumers, the name may communicate numerous things to consumers through attributes they have over time come to associate with the brands name (Gardner and Levy, 1955).

Another intangible asset of importance is corporate reputation, it appears to increase the value of brands but can be harder to copy than tangible assets, such as packaging (Grant, 1991), and reputation may be signaled to consumers by using brands (Erdem and Swait, 1998). In modern culture consumers are generally aware of brands and the importance of their role in projected desiring identities (Simões and Dibb, 2001), consumers may therefore, look to brands which assets align with their own in order to assist in defining what consumers seek to be and help define what they want others to perceive about them (Elliott and Wattanasuwan, 1998; Simões and Dibb, 2001).

The knowledge of the brand plays a part in making brands successful, Keller (1993) discussed the concept of brand knowledge and how it was built from two other concepts, brand image and brand awareness. Brand image is the sum of attributes, good or bad, connected to a brand (Weiss, Anderson and MacInnis, 1999) and has been shown to play an important part in consumers purchasing behavior (Gardner and Levy, 1955). Brand awareness relates to how likely the brand is to be remembered by the customers and how easily they recall the brand (Keller, 1993). The concept of brand reputation and brand image may easily be confused together as they both relate to the perception of a brand (Weiss et al., 1999). Brand can have both an image and a reputation and the two can be fully independent of one another, brand reputation can
be defined as a reflection of consumers’ positive or negative perceptions of the company and what differs reputation from image is that companies can change their image but their reputation may still stay the same (Weiss et al., 1999).

Brand resides in the mind of consumers, it is the sum of attributes, both good and bad, that consumers connect to the brand. It provides manufacturers with basis for differentiation which companies can use to gain advantage on their competitors. Brands are made up of intangible attributes such as reputation and consumers seek attributes that correspond to their beliefs. Brands can provide assurance to consumers about quality of products. Additionally, brands may lead to lower search costs by giving consumers access to information about a product’s intangible attributes.

Branding is the process of utilizing a brand to gain a competitive advantage and when brands are discussed so must branding. The next chapter discusses branding and how consumers and manufacturers stand to gain from its use.

2.2 Branding

Expanding upon the concept of brand is branding. These two concepts are interconnected but by using branding the marketer utilizes brand in order to establish a connection of sorts between it and consumers (Barwise, Dunham and Ritson, 2000). For brands to be successful they need to be able to attract consumers and influence them to buy certain products over the competitors’ products. This is done by generating images that consumers perceive as positive and attractive which they are able to connect to their own desires (Strandvik, Rindell and Wilén, 2013). Marketers are able to utilize certain factors in order to influence consumers’ perceptions and feelings, such as packaging, quality, performance, familiarity and imagery connected to the product (Batra, Ahuvia and Bagozzi, 2012). Furthermore, branding has been defined as the sum of consumers’ feelings towards product and/or service as well as the perception of that product/service which consumers can recognize by the name or image of the brand (Batra et al., 2012). It has been used for a long time and is considered a vital part of modern business (Aaker and Shansby, 1982; Ambler et al., 2002; Gardner and Levy, 1955; Keller, 1993).

Branding strategies have been shown to be an vital part of industry (Blombäck and Axelsson, 2007; Mudambi, 2002; Mudambi, Doyle and Wong, 1997) and can reduce
financial risk associated with the industrial market and increase efficiency of the companies trade process (Kotler and Pfoertsch, 2007) and a successful branding strategy can increase manufacturer’s product’s assurance of quality. This can, in turn influence the market to be more acceptable towards the brand and may increase the company’s profit margin, providing it with a better position to acquire more profitable deals with retail shops and distributors (Lazer and Culley, 1983). Additionally, a successful branding strategy may be able to use a brand to protect a manufacturer from its competition by increasing the ease of trade, making the trade process more efficient (Park, Jaworski and MacInnis, 1986). Furthermore, organizations that have found success with brands and branding may be able to demand a price premium for their goods, while the extension of brands can be easier for them, the communication with consumers may be more efficient and the protection from competitors may be greater (Hague and Jackson, 1994; Wood, 2000). However, the process of branding is consists of more than sticking a name on a product, it is the result of many factors, such as market segmentation, strategy and product distinction, the brand resides in the perception of consumers and is created with communication and maintained in the same way (Kapferer, 1994).

As mentioned earlier in this chapter branding is the process of utilizing a brand to form a connection the consumers by connecting the brand to what certain segment of consumers see as an attractive attribute. It may provide consumers with an assurance of quality and therefore, lower risks associated with products.

Next chapter discusses the benefits that come with marketing of renewable electricity and the barriers consumers may encounter when they are trying to gather information about electricity. Branding is an important aspect which may lead to lowering risks and barriers standing in the way of consumers making more enlightened choices in the electricity market.
3 Marketing Renewable Electricity

This chapter will focus on defining green products and how marketing of renewable electricity and its biggest barriers are. First green products will be defined, then renewable electricity and its attributes will be outlined, then greenwashing will be defined and discussed. After then biggest barriers of renewable electricity will be defined and discussed and then signal theory as a possible solution will be outlined.

3.1 Green products

To emphasize the benefits associated with environmental labels, green products must be discussed as they provide products in which further differentiation based on environmentally friendliness is possible. Additionally, Branding and green products are inevitably linked as green products state their claims of environmentally friendliness and consumers. Green products base their branding strategies on claims that they are friendlier than the competition towards the environment.

Green products are defined as products that provide both positive social and environmental impacts towards the. They are manufactured in a way that decreases the negative effects on human and natural resources (Shrum, McCarty and Lowrey, 1995; Székely and Knirsch, 2005). Green products have a complex nature and may therefore, increase complexity when consumers are making their decisions, which may stem from consumers lack of knowledge or the difficulty of verifying claims made by the product (Gleim et al., 2013; Rubik and Frankl, 2017). Which leads us to three hypothesis this thesis aims to answer:

- **H₁** Knowledge of electricity production influences attitude towards renewable electricity.

- **H₂** Knowledge of electricity production influences the credibility of environmental labels.

- **H₃** Knowledge of electricity production influences the purchase intention of renewable electricity.

The emergence of green products can be linked with consumers increasing interest in a more sustainable way of life. Consumers concerns about ethical, social, health and safety related to what they consumer (Fraj and Martinez, 2007; Llopis-Goig, 2007), yet their concerns have not fully been translated into purchasing behavior (Auger, Burke,
Devinney and Louviere, 2003). Additionally, as the access to sustainable products is getting better, consumers have not been buying those products and in some cases the sales have dropped (Clifford and Martin, 2011). It stands to reason that something stands in the way of interest being transformed into purchase behavior. In order to counter these barriers, they first must be recognized. Previous research on purchase behavior relating to sustainable products has identified a number of barriers which prevent consumers to fully dedicate themselves to a more sustainable lifestyle (Auger et al., 2003; Gleim et al., 2013; Gupta and Ogden, 2009; Johnstone and Tan, 2015; Papaoikonomou, Ryan and Ginieis, 2011; Pickett-Baker and Ozaki, 2008; Shaw and Clarke, 1999). From these research, five main barriers have emerged. According to Gleim et al. (2013) these barriers can be identified as a perception of higher fee, perception of poorer quality, the lack of knowledge of the subject, absence of trust towards the product and low availability. These barriers identified may play a role in decreasing the motivation of consumers basing their purchasing decision on sustainability (Brach, Walsh and Shaw, 2018).

For consumers, green products may be an uncertainty (Källander, 2007) and they may be tentative about when the claims of sustainability are made by manufacturers, as they may be concerned that these claims are only made to demand price premiums on sustainable goods (Wagner, Lutz and Weitz, 2009). Trusting the claims of manufactures may be difficult for consumers, that is mostly to blame on the fact that claims of sustainability can be hard to verify (Gleim et al., 2013; Rubik and Frankl, 2017). Consumers have been faced with a reality where companies are not always telling all the truth, as in the case when Volkswagen claimed the cars they manufacture were environmentally friendlier than they really were and their engineers were falsifying the results of emission tests (Martin and Chasan, 2018). It is not surprising that consumers are wary when companies have been shown to lie about their environmental impact. Which in turn may result in diminished trust towards claims of sustainability.

For the potential of green products to be fully realized the barriers preventing consumers to make a transition to a more sustainable lifestyle must be overcome. Consumers are way of companies making untrue claims and have a difficult time of verifying them (Gleim et al., 2013; Rubik and Frankl, 2017) which may result in
diminished trust of green products. Issues of trust are not the only thing preventing consumers to make more sustainable choice regarding their consumption. Consumers need to be able to verify claims, without their lack of knowledge preventing it.

3.2 Renewable electricity

In the world of today electricity is all around us, we use it to power our home and it allows us to use everyday tools such as, microwave ovens, cooking ovens and many other products that make our daily lives easier. Furthermore, electricity allows us to communicate instantly through our phones as well as powering a great part of Iceland’s domestic industry, such as aluminum manufacturing plants. Considering that electricity is a huge part of our everyday life and we are unable to go through a whole day without encountering a tool that is powered by electricity. For markets such as the United States where fossil fuels make up 63.5% of all energy production (U.S. Energy Information Administration, e.d.), therefore, importance of increasing preference of consumers for renewable electricity is high. Which leads to the theory that:

- \( H_4 \) Preference for environmental labels influences purchase intention of renewable electricity

By increasing the focus of renewable energy productions manufacturers can assist in fighting back against climate change (Salmela and Varho, 2006) but environmental, ethical and social benefits are not the only benefits that renewable electricity can provide. With legislation changes and rapid technological advancements room has been created for differentiation based on environmental quality of electricity (Amundsen and Bergman, 2007; Giulietti et al., 2005; Johnsen and Olsen, 2011). Even though marketing of electricity is something that has been around for a while the concept is still quite new and differentiation has not been a vital part of the electricity markets (Wüstenhagen and Bilharz, 2006).

Marketing of electricity as it is discussed today is a result of liberalization of electricity markets, which permitted new players into the electricity market. Directives by the EU committed partner countries to open up their electricity market to new players and took away all previous limitations on the trading of electricity (Fuchs and Arentsen, 2002), with this the EU hoped to make one big shared market that included all electricity being manufactured in Europe (Jamasb and Pollitt, 2005). In Germany’s
case electricity market liberalization was followed by an intense competition which led to a price war, resulting in an increase in mergers and acquisitions (Wüstenhagen and Bilharz, 2006). The only apparent differentiation between products following the liberalization was the price of the electricity (Wüstenhagen and Bilharz, 2006), but research by Wiedmann, Hennigs, Pankalla, Kassubek and Seegebarth (2011) has shown that companies are able to avoid the price war by implementing branding strategies. These results are further supported by research focusing on other commodity markets as they show branded products perform better compared to similar non-branded products in the same market (Tokarczyk and Hansen, 2006). When dealing with commodity products, consumers may perceive no difference when they are compared to similar products from competitors (McQuiston, 2004; Michell, King and Reast, 2001) and these products are easily substitutable (Bendixen, Bukasa and Abratt, 2004; McQuiston, 2004; Michell et al., 2001; Rust and Lemon, 2001). Pure commodity is a product that is in its simplest form a raw good (McQuiston, 2004; Michell et al., 2001), such as electricity. Additionally, in the modern electricity market uncertainty regarding origins of conventional electricity may be high, which may result in consumers unable to properly compare conventional electricity to renewable electricity (Salmela and Varho, 2006).

Growth of environmentally friendly goods market share has been reported (Rex and Baumann, 2007), however, renewable electricity hasn’t gone through a similar growth (Hanimann, Vinterback and Mark-Herbert, 2015). Even though consumers’ willingness to buy renewable electricity is high (Farhar, 1999) and attitudes towards renewable electricity is generally positive (Batley, Colbourne, Fleming and Urwin, 2001; Ek, 2005; Roe, Teisl, Levy and Russell, 2001) it has not translated into consumers making the switch towards renewable electricity (Bauknecht and Bürger, 2003; Bird, Wüstenhagen and Aabakken, 2002; Lipp, 2001). This leads us to two of the hypotheses for this essay:

- \( H_5 \) Attitude towards environment influences purchase intention of electricity
- \( H_6 \) Attitude towards renewable electricity influences the credibility of Environmental labels.
- \( H_7 \) Attitude towards renewable electricity influences preference for environmental labels.
According to Salmela and Varho (2006) what prevents consumers from switching is the obscurity of the electricity market, the abstract nature of electricity and general ignorance on how to make the switch. Since the electricity market is obscure consumers will need to spend time searching for available alternatives to their current electricity providers (Giulietti et al., 2005; Wilson and Price, 2010), which may be a daunting task to the average consumers. In addition, claims made by electricity manufacturer’s about the sustainability of their product can be quite hard to verify (Gleim et al., 2013; Rubik and Frankl, 2017; Truffer et al., 2001), putting another barrier in the way of making the switch. Consumers may not believe the environmental claims credible enough for them to start the switching process. Therefore, the company making the claim needs to either be very credible or have someone that is credible to verify their claim (Truffer et al., 2001).

Renewable electricity is acting in an obscure market, characterized by its abstract nature, where consumers mostly think about electricity when it is not around. This may be a direct result of the electricity market still being somewhat recent, with the liberalization being just about 20 years old. Most of the differentiation in the electricity market up until this point has been on price basis, with consumers generally having a positive attitude towards renewable electricity there may be a possibility of a further differentiation, but consumers are not making a switch to renewable electricity. For renewable electricity to be successful there are barriers relating to its nature which need to be overcome. Especially since claims about its attributes can be hard to verify by the consumers. They are therefore, at the risk of being victims of greenwashing.

3.3 Greenwashing

The pressure to make environmental impact associated with production more visible has increased. Stakeholders, such as major shareholders are putting pressure on companies to more visible with their effect on environment and society (Jira and Toffel, 2013). According to Dye (2001) companies have motivations to disclose only positive information. They may do so in order to positively impact the attitudes of consumers and stakeholders as the company can financially benefit from the publishing of positive environmental information while publishing negative information has the opposite effect. Although it has been suggested that more impact that companies have on the
environment, the more they are under pressure to disclose information regarding the environment, no matter if the information is positive for the company or negative, they are pressured to publish both (Cho and Roberts, 2010; Short and Toffel, 2007). This coincides with other research where it has shown that larger the company, the greater the visibility and are, therefore, more likely to receive attention and pressure from consumers and other stakeholder and as a result comply with environmental standards (Bansal and Roth, 2000; King, 2008).

Increased pressure to publish positive environmental information may not only have positive effect. Companies may be guilty of greenwashing when they selectively disclosing only positive information and concealing the negative environmental impact of the company (Lyon and Maxwell, 2011) and companies have also been known to inflate the environmental qualities associated with their goods in order to increase the sales (Delmas and Burbano, 2011). This is further incentivized by the lack of consequences for greenwashing (Vos, 2009). It is not unusual to see statements from manufacturers on products packaging that the product beneficial for the environment, these statements are hard to define and nearly impossible to argue for. These declarations can, therefore, be categorized as greenwashing (Umhverfisstofnun, e.d.-b).

**Figure 1 Examples of labels where greenwashing is a possibility (Umhverfisstofnun, e.d.-b)**

![Examples of labels where greenwashing is a possibility](image)

The labels inn figure 1 are not environmental labels at all, their design and use can often be misleading. For example, labels which have arrows pointing in a circle are usually referring to recyclable, but even though the product may be recycled can have damaging effect on the environment (Umhverfisstofnun, e.d.-b). The labels are a product of information asymmetry, where consumers have some information but lack the knowledge to properly verify, the claims. This may make labels which are intended to be good, such as the WWF panda as seen on figure 1, to be unwilling participant in greenwashing as knowledge of these labels may be lacking. When companies make one sided declaration about products environmental attributes, which are impossible for
consumers to verify they may be participant to greenwashing. Greenwashing can therefore, be partly due to lack of knowledge or inability to verify claims made by manufacturers due the information being all in the hands of the manufacturers.

3.4 Information asymmetry

When information and claims made by manufacturers about products are hard to verify, such as with green products (Gleim et al., 2013; Rubik and Frankl, 2017), the risk of greenwashing is high (Delmas and Burbano, 2011). In these cases, when the information is in the hands of manufactures it is called information asymmetry (Arrow, 1963; Karstens and Belz, 2006; Kirmani and Rao, 2000). The concept is part of the theory of information economics which derives from Nelson (1970) where he proposed that all products can be separated into two groups, which he named: search goods and experience goods. Furthermore, he defined search goods as a product where consumers can confirm the quality of the product before it is bought and he defined experience goods as products where consumers are unable to verify the quality until they have experienced the product after purchase. The theory was further expanded upon by Darby and Karni (1973) and they changed the focus from differentiation to distinction between products based on the attributes associated with them. Additionally, they added a third category which they named credence products and defined it as products that consumers can evaluate with a search before purchasing and may not be fully experienced after the purchase is completed.

When products have credence attributes, it can be hard for consumers to confirm as these attributes are mostly intangible qualities that they are unable experience, even when they use the product (Aprile et al., 2012; Darby and Karni, 1973; Grunert, 2005; Jahn, Schramm and Spiller, 2005). Attributes such as social and ethical may be impossible for consumers to fully experience, even though they buy the product; as such a products social and ethical qualities can be identified as credence attributes (Aprile et al., 2012; Darby and Karni, 1973; Grunert, 2005; Jahn et al., 2005). This is the case when consumers are dealing with renewable electricity as the environmental and ethical attributes of electricity may be hard for them to verify (Gleim et al., 2013; Rubik and Frankl, 2017; Truffer et al., 2001). The nature of renewable electricity, as a credence product, may have negative effect on purchasing decisions made by consumers
(Pennings, Wansink and Meulenberg, 2002; Rao and Bergen, 1992) since consumers may experience increased risks associated with them (Mitra, Reiss and Capella, 1999; Ostrom and Iacobucci, 1995) as they are unable to fully experience electricity unless it is the absence of it.

Information asymmetry is apparent in markets where most of products qualities are intangible and can therefore, be hard for consumers to verify. In markets characterized by information symmetry most of the information resides with the manufacturers and it may be hard for consumers to access that same information. Manufacturers have resorted to looking for a way to bring nonvisible qualities of products into the light and provide more visibility to the consumers. One of the ways they do that is with signaling.

### 3.5 Signal Theory

In market segments characterized by information asymmetry, such as renewable electricity, companies have been searching for a way to make the qualities products more visible to consumers. Companies in these markets have started using signals to transfer the information about credence attributes to consumers (Mishra, Heide and Cort, 1998). Transferring the information in this way is called signaling (Spence, 1973) and can be defined as malleable attributes that transport the information of other attributes and characteristics of product to consumers or firms (Spence, 1973). Furthermore, it has been implied by signaling theory that nutritional labels and brands offer signals that indicate certain qualities about the intangible attributes of products (Bauer, Heinrich and Schäfer, 2013; Erdem and Swait, 1998; Montgomery and Wernerfelt, 1992).

The goal of these signals is to affect the credence qualities of products, making them more visible and, therefore, lowering the perceived risk associated with the product (Drichoutis, Lazaridis and Nayga Jr, 2006; Kirmani and Rao, 2000). Stone and Grønhaug (1993) define risk as the expectance of loss, bear in mind that when we discuss risk associated with a product, we are discussing perceived risk.

The effectiveness of these signals are affected by the credibility of the signal (Moussa and Touzani, 2008). Companies have seen these signals as a possibility to make attributes that increase trust in their product more visible (Brach et al., 2018) as they
can provide assistance to consumers and may make them more inclined toward green products (Thøgersen, Haugaard and Olesen, 2010).

Diverse plethora of signals can be found in the marketing literature, the most commonly researched signal is brand names (Erdem, Swait and Valenzuela, 2006), the price of a product or service (Rao, 2005), warranties given by the producer or seller (Soberman, 2003), money-back guarantees made about the product (Moorthy and Srinivasan, 1995), reputation of the retailer selling the product (Purohit and Srivastava, 2001), certification of qualities of the product (Mishra, 2006) and environmental labels attached to the product (Jahn et al., 2005; Karstens and Belz, 2006; Krystallis and Fotopoulos, 2003).

Similarly, third-party certified labels may provide signals that can change intangible credence qualities into searchable qualities (Erdem and Swait, 2004; Spence, 1976). Research has found that when labels is certified by a third party certification scheme the label becomes more trustworthy (Janssen and Hamm, 2012) and can become a powerful signal that helps decrease information asymmetry (Thøgersen et al., 2010; van Amstel, Driessen and Glasbergen, 2008) by allowing credence qualities to be changed into searchable qualities (Erdem and Swait, 2004; Spence, 1976).

In market segments brands, labels, brand names and more can act as signals to provide consumers with information about intangible attributes associated with the product. Signaling is used to counter information asymmetry and allow consumers to access information in a more simplified manner. Signaling highlights the credence qualities of products and makes it more visible, such as in the case of electricity a signal might highlight the renewable attribute which otherwise consumers might have a hard time verifying.
4 Environmental Labels

Environmental labeling schemes are based on signaling theory as defined by Spence (1973). They seek inspiration from brands and often brands can be considered signals, such as with their name (Erdem et al., 2006). In this chapter the focus will be on labeling schemes, to start with the role and definition will be examined. Next perceived credibility will be discussed, but as previously mentioned in chapter 2.5 credibility is important for signals to work, then perceived risks associated with labeling schemes will be examined.

4.1 Labeling schemes

As previously mentioned, when products have attributes that are mostly experience or credence, they may be harder to sell to consumers as most of the information resides with the manufacturers. In these markets asymmetric information is prevalent consumers may experience a feeling of overwhelm by the information a product carries and they may be unable to verify the claims of sustainability made by the products manufacturers (Horne, 2009). Previous research by Aprile et al. (2012) has found that labelling schemes can assist in decreasing the information asymmetry associated with credence goods by transferring more information into the hands of consumers, so they may utilize this information and base their purchasing decisions on better information. Additionally, quality labels can also provide other benefits. Apart from enhancing the transparency of a product, they can also allow companies to differentiate based on credence qualities (Truffer et al., 2001).

Environmental labels are a well-established concept, with the first label having been introduced in 1977 in Germany, and with the use of these labels growing daily (Smith and Stancu, 2006). These labels were conceived with the purpose of informing consumers about how a certain product affects the environment throughout its life cycle (Gallastegui, 2002) and the need for environmental labels derives from the consumers’ need to influence of goods are produced (Anderson, 1990; Durning, 1992; Elkington and Burke, 1987). Even though labels are mostly considered voluntary, there are few exceptions, such as energy and water efficiency labels, but in some cases the competitive environment and requirements set by countries on imported products may make some labels mandatory (Smith and Stancu, 2006). Additionally, labels that
increase the visibility of consumers’ choices in electricity contracts can be important for those consumers who make their decisions based on environmental impact (Hanimann et al., 2015).

In its most simple definition a labeling scheme can be defined as a symbol (Moussa and Touzani, 2008) that signifies certain qualities the product contains and aims to provide vital information about that quality to consumers with a glance at the packaging of a product (McEachern and Warnaby, 2004). Labeling schemes may therefore, reduce the information asymmetry in a specific product market (Krystallis and Fotopoulos, 2003) by providing consumers with information previously only held by the manufactures. Additionally, by making certain intangible qualities visible labeling schemes provides a way for low-involvement consumers to search and investigate credence or experience attributes of a product (Jahn et al., 2005; Karstens and Belz, 2006). If labeling schemes want to be successful, they need to project assurance to consumers and create a connection between the label itself and the information it conveys (Moussa and Touzani, 2008; Smith and Stancu, 2006). However, if the label associated with the product in question is not recognized by consumers and the competition it won’t matter if they are both relevant and trustworthy (Truffer et al., 2001).

The labels serve as guarantees for specific conditions in the production, and they allow for increased visibility of sustainable attributes (Unnevehr et al., 2010) and may also allow consumers to make a connection between a product’s overall quality and its origin (Aprile et al., 2012). Labelling schemes are not all certifying the same thing, they can be quite varied with some referring to specific qualities of the product, such as an organic product, while some are more universal in nature and inform consumers of the overall quality of the product (Grunert, 2005), an example of which can be seen on figure 2. All the labels on figure 2 can be defined as environmental labels but what they aim to certify is different. They may certify that the product is a good fit for those who have asthma or allergies like the blue label from Denmark (Asthma-Allergy Denmark, e.d.) or be more general like the Nordic Swan label which environmentally certifies a product whole lifecycle (Umhverfisstofnun, e.d.-a)
Even though the explicit purpose of labels is to make information more accessible, the knowledge regarding them is limited and they are only able to affect a small group of consumers (Velčovská, Janáčková and Larsen, 2012). With the success of labeling scheme dependent on consumers being able to experience increased value by using labeled products (Hemmelskamp and Brockmann, 1997) the absence of knowledge may be an impediment for their success. According to Truffer et al. (2001) labeling schemes need to minimize the effort of consumers while being simple and visible.

**Figure 2 Examples of different environmental labels**

<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Label" /></td>
<td>The blue label from Denmark offers a way for consumers who have asthma or allergies to access information about the product. The label works as a guide to those who allergies so they can see what products are suitable for them (Asthma-Allergy Denmark, e.d.)</td>
</tr>
<tr>
<td><img src="image2.png" alt="Label" /></td>
<td>Túni provides certification to farmers, herbal collectors and processing plants that are working to produce organic products in accordance with international standards (Vottunarstofan Túni, e.d.).</td>
</tr>
<tr>
<td><img src="image3.png" alt="Label" /></td>
<td>Fairtrade certifies that products are able to meet the social, economic and environmental criteria the organization sets. By buying Fairtrade products consumers can be sure that they are assisting farmers and other producers from developing countries (Fairtrade International, e.d.).</td>
</tr>
<tr>
<td><img src="image4.png" alt="Label" /></td>
<td>Skráargatíð represents that food products are able to fulfill certain requirements about nutritional composition. Its goal is to allow consumers to choose healthier products in an easier way (Embætti landlaeknis, e.d.).</td>
</tr>
<tr>
<td><img src="image5.png" alt="Label" /></td>
<td>The Swan is official label of the Nordic countries. If a product bears this logo the product has fulfilled strict qualifications about its ingredients and production. In the case of the Swan all parts of a product's life cycle are examined (Umhverfisstofnun, e.d.-a).</td>
</tr>
<tr>
<td><img src="image6.png" alt="Label" /></td>
<td>This black triangle is not an environmental label. Its design and use can often be misleading, it in fact provides consumers with the information that products bearing this mark are made from a specific type of plastic (Umhverfisstofnun, e.d.-b).</td>
</tr>
</tbody>
</table>

Gallastegui (2002) identified two main objectives for environmental labels to fulfill. One is that they need to provide consumers with deeper information on how their consumption affects the environment, and to push consumers towards a more environmentally friendly behavior. The other objective is to encourage producers, the government and other organizations to make their products or services more environmentally friendly. Labelling schemes have been shown effective at decreasing risk and to have a positive effect on consumers, and can therefore be effective in countering information asymmetries (Brach et al., 2018). As trustworthiness and credibility has positive result on consumers purchase behavior (Brach et al., 2018), consumers shy away from risk by their nature (Shimp and Bearden, 1982).
In the instance of environmentally friendly goods few types of perceived risks have been identified (Mitchell, 1992), risks such as functionality, financial, physical and social risk (Janiszewski and van Osselaer, 2000). These perceived risks may provide barriers for consumers intending to alter their behavior towards a more sustainable alternative (Gleim et al., 2013; Gupta and Ogden, 2009; Johnstone and Tan, 2015; Luchs, Naylor, Irwin and Raghunathan, 2010; Papaoikonomou et al., 2011; Pickett-Baker and Ozaki, 2008; Shaw and Clarke, 1999). Furthermore, these barriers have been narrowed down to three principle barriers; financial, performance and time barriers (Brach et al., 2018).

In order to understand what these barriers are they must be first defined. Financial risk may be defined as the possibility of financial loss, if consumers pays for a product that is incapable of fulfilling their needs or expectations, performance risk has been defined as risk the of a product being unable to meet what is expected of it in regards to its performance and time risk is the time consumers are losing when they buy a wrong product (Stone and Grønhaug, 1993).

4.2 Perceived credibility

As mentioned previously, in order for labeling schemes to effective the quality claims need to be made by a trustworthy and credible company (Truffer et al., 2001). Therefore, credibility is an important part of labeling schemes which must be discussed further. Credibility can be defined as consumers’ perception of the truth (Eisend, 2002) and can be described as a quality that does not reside in an object, piece of information or even a person (Moussa and Touzani, 2008). Credibility is referring to the degree to which a product or a brand is seen as credible, in other words whether the expertise behind the claims made by a brand or a product can be trusted (Erdem and Swait, 2004). When discussing credibility of a quality label, it must be kept in mind that this discussion inherently also involves the perceived quality of that very same label (Moussa and Touzani, 2008). Credibility and perceived quality of a product are interconnected, as they directly relate to each other, causing the credibility of a labelling scheme’s claims to be directly connected to its quality.

Previous research has shown that consumers perceive third-party labels more trustworthy compared to labels issued by the manufacturers (D'Souza, Taghian, Lamb and Peretiatko, 2007; Janssen and Hamm, 2012). However, it has been claimed that
third-party certifications only offer a solution in part, consumers will still continue to rely on intermediaries such as news networks and word of mouth (Balineau and Dufeu, 2010). That is because consumers generally do not have the time, expertise or the accessibility to the information they require for them to be able to identify differences between green electricity and conventional electricity when they are making their decision. Therefore, they have very little choice but to trust the labelling schemes to assist them in the decision making if they want to buy environmentally friendlier products (Richards, 1994). If companies want to be seen as more credible and trustworthy they need to put time and effort into their image, and make it more attractive to consumers (Truffer et al., 2001).

If consumers do not think a labeling scheme is credible, the claim is unable to lower the uncertainty regarding that product and its intangible characteristics (Balasubramanian and Cole, 2002; Erdem and Swait, 1998). This tells us that signals that are not credible do not have a positive impact on purchasing decisions made by consumers, and that consumers attitude regarding sustainable products is impacted by the products credibility (Erdem and Swait, 1998).

Perceived quality is an important factor in the establishment of environmental labels for them to find success and lower perceived risks associated with renewable electricity. Furthermore, consumers may experience higher credibility when the labeling scheme is established by a third-party (i.e. someone other than the manufacturer) but credibility is not an easy thing for companies to acquire and they need to strategically put in effort for them to acquire it.

Therefore, two hypotheses this thesis aims to answer are:

- $H_8$ Credibility of environmental labels influence preference for environmental labels.
- $H_9$ Credibility of environmental labels influence purchase intention of renewable electricity.

In the following chapter the methodology of the study will be discussed, the questionnaire and how the questions were formed will be discussed. The choice of methods for this research will be argued. The questions were chosen as they were intended to measure credibility of quality labels, preference for environmental labels,
attitudes towards renewable electricity, knowledge of electricity, purchasing intentions of renewable electricity. The purpose of the questionnaire was to measure if these factors identified by the literature influenced consumers purchasing intention in electricity.

5 Methodology

This chapter will be focused on discussing methodology of the research. The research questions were inspired by previous research by Gonçalves and Viegas (2015) where they identified attributes associated with renewable electricity consumption, knowledge, willingness to buy, attitude, purchase intention. This was further expanded upon by the author with attributes identified from the literature credibility, purchase behavior and willingness to pay a price premium.

5.1 Method

For this study a quantitative research was done, in the form of an online questionnaire which was shared through the social media network Facebook. The language of the questionnaire was Icelandic since the target group of the questionnaire was male and female, ages 18+ living in Iceland.

Research by Hunter (2012) found that online questionnaires can provide a fast and low cost method to collect data. Further, her study showed that by sharing a questionnaire online, researchers are more likely to get replies as the questionnaire is shared by a person trusted by the potential respondent. It is also important to note that online questionnaires provide a more flexible platform for those intending to reply, as they may not be able to reply when the first come across the questionnaire but can instead set it aside in order to return to later, once they’ve finished their current task.

Before the questionnaire was shared through social media it was pilot tested by three persons in order to make sure it was clear, and no further explanation of
questions was needed. In conclusion of the pilot-test, further improvements were made, such as providing mobile users a clear understanding of the scale being used. Once the questionnaire had been tested and approved it was shared through the social media network Facebook, both on the authors private page and through two groups, the first being a group solely intended for promoting such questionnaires and through a local group which the author has been a part of called Borgarnes, a discussion group for both people currently or previously living in Borgarnes. Friends and family of the author were asked to share the questionnaire on their personal pages, and a few others shared the questionnaire without being asked.

Participants were informed that the questionnaire was a part of the authors MSc. thesis and the object of research were electricity and labelling schemes. The author urged participants to reply to the questionnaire to the best of their abilities. Data collection took place from the 9th of April through the 17th of April.

In preparation of the questionnaire, previous research was examined and a similar measurement tool by Gonçalves and Viegas (2015), where they build upon previous research by Straughan and Roberts (1999), Bang, Ellinger, Hadjimarcou and Traichal (2000) and (Chan, 2001). The items and scales adapted by Gonçalves and Viegas (2015) were then further adapted to fit the research topic.

5.2 Theoretical model

From the literature, the author has identified nine hypotheses:

- $H_1$ Knowledge of electricity production influences attitude towards renewable electricity.
- $H_2$ Knowledge of electricity production influences the credibility of environmental labels.
- $H_3$ Knowledge of electricity production influences the purchase intention of renewable electricity.
- $H_4$ Preference for environmental labels influences purchase intention of renewable electricity.
- $H_5$ Attitude towards environment influences purchase intention of electricity.
- $H_6$ Attitude towards renewable electricity influences the credibility of Environmental labels.
- **H2** Attitude towards renewable electricity influences preference for environmental labels.

- **H3** Credibility of environmental labels influence preference for environmental labels.

- **H4** Credibility of environmental labels influence purchase intention of renewable electricity.

When laid out they form the theoretical model as seen on figure 3 which shows the dimensions identified by the author from the theory. Putting them into perspective.

**Figure 3 Theoretical model based on the literature according to the author**

**5.3 Measurement**

The study consisted of a total of 40 questions, which were separated into 10 subcategories. To start the questionnaire, participants were asked to check who their electricity provider was.

- Which electricity provider do you buy electricity from?

The question offered nine answer choices, including “don’t know” and an open ended “other” answer choice where participants were asked to write down their electricity provider. A list of providers was accessed from the website Aurbjörg (Aurbjörg.is, n.d.), which provides a price comparison tool for electricity providers in Iceland.

The second question was aimed to measure how aware of the possibility of changing electricity providers consumer were. The question was:
➢ “Have you researched the possibility of changing electricity providers?”
Participants were given the option to answer either “yes” or “no”.
Next question was:

➢ “Do you know these environmental labels?”

The question consisted of 29 items that showed the logos of quality label schemes used in Iceland and asked participants to choose the logos they were familiar with. The quality labels in question were collected from the website of the Environment Agency of Iceland (Umhverfisstofnun, e.d.-b), as these labels were the most prominent in Iceland and, therefore, most likely for participants to recognize.

The next question was set up as an eight-item, seven-point scale which was anchored by “strongly disagree” (1) and “strongly agree” (7). The items were custom made by the author and represented items intended to measure the trust and credibility of the environmental labels in Iceland. Inspiration for the items can be found throughout the literature. The questions were worded as follows:

➢ I know the environmental labels being used in Iceland
➢ I trust the environmental labels being used in Iceland
➢ Information that environmental labels provide are clear
➢ Information about environmental labels are accessible
➢ I trust environmental labels in the care of third-party
➢ I trust environmental labels in the care of the Icelandic government
➢ I am interested in environmental labels and what they stand for
➢ I am interested in further learning about further learning about environmental labels

The next four questions were intended to examine consumers’ knowledge of electricity production in Iceland. The questions were:

➢ I know how energy is manufactured in Iceland
➢ I know how renewable electricity is manufactured in Iceland
➢ I am aware of renewable energy and its benefits
I have researched what effects the manufacturing of electricity has on the environment.

These questions were posed on a seven-point Likert scale anchored by “strongly disagree” (1) and “strongly agree” (7). The measurement was adapted from Gonçalves and Viegas (2015).

Next questions were four items, posed on a seven-point Likert scale. They were:

- I prefer a product with environmental labels over comparable product without environmental label
- Product with environmental labels are higher quality than products without environmental labels
- I prefer services with environmental labels over a comparable service without environmental labels

The questions were anchored by “strongly disagree” (1) and “strongly agree” (7). The items were custom made by the author and were intended to measure whether consumers preferred labeled products over non-labeled products.

The next question contained seven-items, posed on a seven-point Likert scale and consisted of the following:

- I am willing to pay more for renewable electricity
- I am willing to pay more for electricity I can confirm is renewable
- I am willing to pay more for electricity with an environmental label in the care of third-party
- I am willing to pay more for electricity with an environmental label in care of the Icelandic government
- I am willing to pay more for electricity manufactured from hydropower
- I am willing to pay more for electricity manufactured from wind power
- I am willing to pay more for electricity if I knew exactly where it was manufactured in Iceland

The questions were anchored by “strongly disagree” (1) and “strongly agree” (7), and the items were custom made by the author to measure consumers’ willingness to pay a price premium for products, depending on their traceability and environmental qualities.
The next three items were intended to measure the attitude of consumers towards renewable energy. Participants were asked to rate their attitude towards specific items on a seven-point Likert scale, where (1) signified positive attitude and (7) signified a negative attitude. The questions were:

- My attitude towards renewable energy is
- My attitude towards the use of renewable electricity is
- My attitude towards environmental labels that indicate the origin of electricity is

The measurement was adapted from Gonçalves and Viegas (2015).

The following six items were intended to measure consumers’ purchase intentions. The questions were:

- I am likely to use environmentally friendly electricity because it pollutes less
- I am likely to switch to environmentally friendly electricity
- I am likely to switch to electricity solely manufactured with wind power
- I am likely to switch to electricity solely manufactured with hydropower
- I am likely to switch to electricity certified by an environmental label
- I am likely to switch electricity supplier if the environmental attributes of the electricity were more visible

The questions were anchored by “strongly disagree” (1) and “strongly agree” (7). Participants were also asked about their gender, education, age, household income and region of residence in Iceland (with the country being divided into six regions and including an answer choice for those living “abroad”).

5.4 Participants

The research was conducted through a quantitative study in the form of an online questionnaire, which was shared through the social media network Facebook. The language of the questionnaire was Icelandic, since the target sample of the questionnaire was male and female, ages 18 and over, living in Iceland.

A total of 576 persons viewed the survey and of those 428 started. After starting a total of 218 persons dropped out and 210 completed the survey, resulting in a
completion rate of 49,07%. The average time to complete the survey was four minutes. For sample collection, a snowball convenience sample was used.

As shown on Table 1, participants in the online questionnaire were predominantly female.

Table 1 Participants divided by gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>62</td>
<td>29.5</td>
</tr>
<tr>
<td>Female</td>
<td>144</td>
<td>68.6</td>
</tr>
<tr>
<td>I do not define myself as male or female</td>
<td>4</td>
<td>1.90</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2 shows the age distribution of participants. No participant younger than 20 years old finished the questionnaire. Age distribution of participants is quite evenly spread out with 45,24% of participants being younger than 40 years old and 54,76% being 40 years old or older.

Table 2 Participants divided by age

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger than 20 year old</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20 - 29 year old</td>
<td>46</td>
<td>21.9</td>
</tr>
<tr>
<td>30 - 39 year old</td>
<td>49</td>
<td>23.3</td>
</tr>
<tr>
<td>40 - 49 year old</td>
<td>31</td>
<td>14.8</td>
</tr>
<tr>
<td>50 - 59 year old</td>
<td>48</td>
<td>22.9</td>
</tr>
<tr>
<td>60 years or older</td>
<td>36</td>
<td>17.1</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3 shows the education level of participants, which is quite evenly spread out between high school, college and vocational school. The number of participants who had accomplished a bachelor’s degree as their highest education level was about the same as the amount who had finished a master’s degree. Only 0,5% of participants had finished a doctoral degree.

Table 3 Participants’ education levels
As shown in table 4, the monthly household income before taxes for 46.2% of the participants was over 700 thousand ISK per month, and less than 700 thousand ISK per month for 41% of participants. A total of 12.9% of participants either didn’t want to answer the question or claimed to be unsure of the total monthly income of the household.

Table 4 Participants household monthly income before taxes

<table>
<thead>
<tr>
<th>Monthly income</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower than 300 thousand ISK</td>
<td>11</td>
<td>5.2</td>
</tr>
<tr>
<td>300 - 499 thousand ISK</td>
<td>27</td>
<td>12.9</td>
</tr>
<tr>
<td>500 - 699 thousand ISK</td>
<td>48</td>
<td>22.9</td>
</tr>
<tr>
<td>700 - 899 thousand ISK</td>
<td>35</td>
<td>16.7</td>
</tr>
<tr>
<td>900 - 1099 thousand ISK</td>
<td>19</td>
<td>9.0</td>
</tr>
<tr>
<td>1,1 m.ISK or more</td>
<td>43</td>
<td>20.5</td>
</tr>
<tr>
<td>Don’t know</td>
<td>4</td>
<td>1.9</td>
</tr>
<tr>
<td>I don’t want to answer</td>
<td>23</td>
<td>11.0</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 5 shows how participants in the online survey were divided between regions in Iceland. A total of 91% of participants lived in either the metropolitan area or West Iceland, with 7.6% of participants living either in East, North or South Iceland or the Westfjords. A further 1.4% of participants claimed to be living abroad.
Table 5 Participants divided by living area

<table>
<thead>
<tr>
<th>Location</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan area</td>
<td>98</td>
<td>46.7</td>
</tr>
<tr>
<td>West Iceland</td>
<td>93</td>
<td>44.3</td>
</tr>
<tr>
<td>East Iceland</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>North Iceland</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>Westfjords</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>South Iceland</td>
<td>9</td>
<td>4.3</td>
</tr>
<tr>
<td>Abroad</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

Total sample size of 210 works for the analysis of this research.
6 Conclusions

This chapter will focus on the results from the questionnaire, beginning with descriptive analysis and results from reliability tests. Next, correlation between the factors will be discussed and with that we will look at the results in alignment with the research question, which is to evaluate to what extent environmental labelling schemes influence Icelandic consumers’ choice of electricity suppliers.

6.1 Descriptive analysis

Participants were asked to select multiple labels they recognized. Total of 29 options were available (see appendix 2 for the whole questionnaire). Total of 2632 responses were gathered, where the maximum for single label recognized was 280 and minimum was 0. Figure 4 shows total frequencies for most recognized labeling schemes. The most recognized label as seen on figure 3 was recyclable packaging label.

![Figure 4 Three top recognized labeling schemes (Umhverfisstofnun, e.d.-b)](image)

![Figure 5 Known labeling schemes and frequency](image)
With a total of 250 responses the Nordic swan as seen on figure 3 was the second most recognizable labeling scheme, and the Keyhole being the third most recognized with a total of 246 responses. The least known labeling scheme was KRAV, as seen on figure 5, with zero responses.

![KRAV logo](image)

**Figure 6 KRAV labeling scheme (Umhverfisstofnun, e.d.-b).**

Participants were asked which electricity provider they bought their electricity from. Total of 298 responses were gathered. Total spread of responses can be seen on figure 6.

![Electricity provider chart](image)

**Figure 7 Figure 8 Which electricity provider do you buy electricity from?**

Majority of participants (N = 298) buy their electricity from Orkusalan (39%) and the next two are Orka Náttúrunnar (18%) and “I don’t know” (18%). Total of 6% of participants listed other options to this question which can be seen on table 6.
As seen on figure 9, only small part of consumers \( (N = 295) \) has researched the possibility of switching electricity providers. With 236 respondents saying they haven’t and 59 looking into the possibility.

Table 6 shows descriptive analysis from the first half of questions in the online survey. They were divided into two groups in order to make the tables clearer as one table would not be able to fit into a whole page. The table shows standard deviations, mean scores and frequencies. Questions are listed in the order they appear in the questionnaire.

Table 7 shows the second half of questions from the online questionnaire. It also shows the standard deviations, mean scores and frequencies, and questions appear in the same way as they appear in the questionnaire. The questions are translated for context of the thesis.
As mentioned earlier, the seven-point Likert scale for the three questions relating to attitude was reversed. In order to make the data clearer, these questions were computed into new variables where the scale was fixed so it would be same as for other questions shown in table 7.

Table 7 Descriptive analysis of the first half of questions from the questionnaire

<table>
<thead>
<tr>
<th>Description</th>
<th>N</th>
<th>Mean</th>
<th>Std.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know the environmental labels being used in Iceland</td>
<td>228</td>
<td>4.18</td>
<td>1.31</td>
</tr>
<tr>
<td>I trust the environmental labels being used in Iceland</td>
<td>224</td>
<td>4.78</td>
<td>1.58</td>
</tr>
<tr>
<td>Information that environmental labels provide are clear</td>
<td>216</td>
<td>3.79</td>
<td>1.57</td>
</tr>
<tr>
<td>Information about environmental labels are accessible</td>
<td>216</td>
<td>3.69</td>
<td>1.55</td>
</tr>
<tr>
<td>I trust environmental labels in the care of third-party</td>
<td>216</td>
<td>3.60</td>
<td>1.59</td>
</tr>
<tr>
<td>I trust environmental labels in the care of the Icelandic government</td>
<td>220</td>
<td>4.70</td>
<td>1.50</td>
</tr>
<tr>
<td>I am interested in environmental labels and what they stand for</td>
<td>220</td>
<td>4.44</td>
<td>2.00</td>
</tr>
<tr>
<td>I am interested in further learning about environmental labels</td>
<td>218</td>
<td>4.80</td>
<td>2.03</td>
</tr>
<tr>
<td>I know how electricity is manufactured in Iceland</td>
<td>225</td>
<td>4.94</td>
<td>1.81</td>
</tr>
<tr>
<td>I know how renewable electricity is manufactured in Iceland</td>
<td>225</td>
<td>4.21</td>
<td>1.88</td>
</tr>
<tr>
<td>I am aware of renewable energy and its benefits</td>
<td>225</td>
<td>4.65</td>
<td>1.73</td>
</tr>
<tr>
<td>I have researched what effects the manufacturing of electricity has on the environment</td>
<td>224</td>
<td>4.28</td>
<td>1.87</td>
</tr>
<tr>
<td>I prefer a product with environmental labels over comparable product without environmental label</td>
<td>223</td>
<td>4.40</td>
<td>1.82</td>
</tr>
<tr>
<td>I trust products with environmental labels</td>
<td>223</td>
<td>4.70</td>
<td>1.47</td>
</tr>
<tr>
<td>Product with environmental labels are higher quality than without environmental labels</td>
<td>223</td>
<td>4.46</td>
<td>1.58</td>
</tr>
<tr>
<td>I prefer services with environmental labels over a comparable service without environmental labels</td>
<td>223</td>
<td>4.36</td>
<td>1.73</td>
</tr>
<tr>
<td>Table 8 Second half of questions from the questionnaire</td>
<td>N</td>
<td>Mean</td>
<td>Std.</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td>-----</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>I am willing to pay more for renewable electricity</td>
<td>217</td>
<td>4.08</td>
<td>1.66</td>
</tr>
<tr>
<td>I am willing to pay more for electricity I can confirm is renewable</td>
<td>217</td>
<td>4.26</td>
<td>1.68</td>
</tr>
<tr>
<td>I am willing to pay more for electricity with an environmental label in the care of third-party</td>
<td>216</td>
<td>3.78</td>
<td>1.63</td>
</tr>
<tr>
<td>I am willing to pay more for electricity with an environmental label in care of the Icelandic government</td>
<td>216</td>
<td>4.10</td>
<td>1.72</td>
</tr>
<tr>
<td>I am willing to pay more for electricity manufactured from hydropower</td>
<td>216</td>
<td>4.20</td>
<td>1.67</td>
</tr>
<tr>
<td>I am willing to pay more for electricity manufactured from wind power</td>
<td>216</td>
<td>4.28</td>
<td>1.75</td>
</tr>
<tr>
<td>I am willing to pay more for electricity if I knew exactly where it was manufactured in Iceland</td>
<td>216</td>
<td>3.57</td>
<td>1.77</td>
</tr>
<tr>
<td>My attitude towards renewable energy is (1 = positive; 7 = negative)</td>
<td>212</td>
<td>5.72</td>
<td>1.59</td>
</tr>
<tr>
<td>My attitude towards the use of renewable electricity is (1 = positive; 7 = negative)</td>
<td>213</td>
<td>5.68</td>
<td>1.57</td>
</tr>
<tr>
<td>My attitude towards environmental labels that indicate the origin of electricity is (1 = positive; 7 = negative)</td>
<td>213</td>
<td>5.37</td>
<td>1.60</td>
</tr>
<tr>
<td>I am likely to use environmentally friendly electricity because it pollutes less</td>
<td>203</td>
<td>5.05</td>
<td>1.55</td>
</tr>
<tr>
<td>I am likely to switch to environmentally friendly electricity</td>
<td>203</td>
<td>4.77</td>
<td>1.63</td>
</tr>
<tr>
<td>I am likely to switch to electricity solely manufactured with wind power</td>
<td>204</td>
<td>4.18</td>
<td>1.62</td>
</tr>
<tr>
<td>I am likely to switch to electricity solely manufactured with hydropower</td>
<td>204</td>
<td>4.22</td>
<td>1.55</td>
</tr>
<tr>
<td>I am likely to switch to electricity certified by an environmental label</td>
<td>204</td>
<td>4.32</td>
<td>1.69</td>
</tr>
<tr>
<td>I am likely to switch electricity supplier if the environmental attributes of the electricity were more visible</td>
<td>204</td>
<td>4.47</td>
<td>1.74</td>
</tr>
</tbody>
</table>

As seen in tables 6 and 7, the means for all items excluding three items measuring attitude are near the median (4). This can be interpreted in two ways: Consumers are neutral towards electricity, except for positive attitudes towards renewable electricity and are likely to use renewable electricity, or that there is apparent lack of knowledge of electricity as the literature has suggested.
6.2 Component Analysis and Reliability

Principal Component Analysis was used to identify components in the data. The correlation output showed a major correlation between four variables (higher than 0.82), which indicated that these four variables were measuring the same thing, so they were merged together into one variable. Four other correlations were found with a correlation higher than 0.8. A total of 12 items were merged together into five items. Each item had a correlation higher than 0.3 to at least one other item and therefore none were removed from data, with the highest correlation being 0.98. The following questions were merged as they were correlating at a high rate (0.812):

- “I know how electricity is manufactured in Iceland”
- “I know how renewable electricity is manufactured in Iceland”

They became: “I know how electricity is manufactured in Iceland”, which describes the main theme of the previous two questions.

Four items were merged together into one as they all had a high correlation (>0.820) between the four of them. These items were:

- “I am willing to pay more for electricity I can confirm is renewable”
- “I am willing to pay more for renewable electricity”
- “I am willing to pay more for electricity with an environmental label in the care of third-party”
- “I am willing to pay more for electricity with an environmental label in care of the Icelandic government”

These questions became: “I am willing to pay more for renewable electricity”. This new item describes the main theme of the four items.

Other items were found correlating at a high level (0.805), they were:

- “I am likely to switch to environmentally friendly electricity”
- “I am likely to use environmentally friendly electricity because it pollutes less”

These two items were combined into “I am likely to use environmentally friendly energy” as it fit the main theme of these questions and thought to cover the theme of the two questions.
More questions were found correlating (0.834):

- “I am likely to switch to electricity certified by an environmental label”
- “I am likely to switch electricity supplier if the environmental attributes of the electricity were more visible”

These two items were merged into the item: “I am more likely to switch to environmentally friendly electricity if its qualities were more visible”, as it described the main theme of these two items.

The two subsequent items measuring attitude towards electricity and its use were found to be correlating at a extremely high level (0.983) and were merged into one. These two items were:

- “My attitude towards renewable energy is (1 = positive; 7 = negative)”
- “My attitude towards the use of renewable electricity is (1 = positive; 7 = negative)”

The new name for these two items as they merged became: “My attitude towards renewable electricity and its use is (7 = positive; 1 = negative)”. The last two items found to correlating at a high rate (0.806) were:

- “I am interested in further learning about environmental labels”
- “I am interested in environmental labels and what they stand for”

They were merged into the item: “I am interested in environmental labels” and this item found to cover the main theme of the other two items well.

Once all correlating items were merged into their respective items, a component analysis was conducted. A KMO test showed a score of 0.831 and a Bartlett’s test of sphericity was significant (p < 0.01), and therefore a component analysis could be performed. Five components were identified through the component analysis. Each component was then analyzed in search of a recurring theme of items belonging to the component, in order to give a descriptive name for each component. Names of items can be seen in table 8. For each component identified, a reliability analysis was run to identify each component’s inner reliability, the results of which are shown in table 8.
As seen on table 8, all components had significant inner reliability. These five components can be used to explain 68,66% of all variance in the data set. Once inner reliability was confirmed for each component, they were merged into one variable. Tables 9 and 10 show descriptive analysis for the merged items from each component, as well as descriptive analysis of the items which were merged to make up the components.

<table>
<thead>
<tr>
<th>Purchase intention of renewable electricity</th>
<th>N</th>
<th>Mean</th>
<th>St. d.</th>
<th>Cronbach α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility of environmental labels</td>
<td>199</td>
<td>4.21</td>
<td>1.28</td>
<td>0.91</td>
</tr>
<tr>
<td>Preference for Environmental labels</td>
<td>202</td>
<td>4.17</td>
<td>1.06</td>
<td>0.79</td>
</tr>
<tr>
<td>Knowledge of electricity production</td>
<td>209</td>
<td>4.51</td>
<td>1.38</td>
<td>0.87</td>
</tr>
<tr>
<td>Attitude towards renewable energy</td>
<td>224</td>
<td>4.50</td>
<td>1.61</td>
<td>0.89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>St. d.</th>
<th>Cronbach α</th>
</tr>
</thead>
</table>

As seen on table 8, all components had significant inner reliability. These five components can be used to explain 68,66% of all variance in the data set. Once inner reliability was confirmed for each component, they were merged into one variable. Tables 9 and 10 show descriptive analysis for the merged items from each component, as well as descriptive analysis of the items which were merged to make up the components.
Table 10 Results from component analysis showing two of the five components

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>St. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purchase intention of renewable electricity</strong></td>
<td>199</td>
<td>4.21</td>
<td>1.28</td>
</tr>
<tr>
<td>I am willing to pay more for electricity manufactured from wind power</td>
<td>216</td>
<td>4.28</td>
<td>1.75</td>
</tr>
<tr>
<td>I am willing to pay more for electricity manufactured from hydropower</td>
<td>216</td>
<td>4.20</td>
<td>1.67</td>
</tr>
<tr>
<td>I am more likely to switch to environmentally friendly electricity if its qualities were more visible</td>
<td>204</td>
<td>4.40</td>
<td>1.64</td>
</tr>
<tr>
<td>I am likely to switch to electricity solely manufactured with windpower</td>
<td>204</td>
<td>4.18</td>
<td>1.62</td>
</tr>
<tr>
<td>I am likely to switch to electricity solely manufactured with hydropower</td>
<td>204</td>
<td>4.22</td>
<td>1.55</td>
</tr>
<tr>
<td>I am willing to pay more for electricity if I knew exactly where it was manufactured in Iceland</td>
<td>216</td>
<td>3.57</td>
<td>1.77</td>
</tr>
<tr>
<td>I am likely to use environmentally friendly energy</td>
<td>202</td>
<td>4.92</td>
<td>1.50</td>
</tr>
<tr>
<td>I trust environmental labels in the care of third-party</td>
<td>216</td>
<td>3.60</td>
<td>1.59</td>
</tr>
<tr>
<td>I trust the environmental labels being used in Iceland</td>
<td>220</td>
<td>4.70</td>
<td>1.50</td>
</tr>
<tr>
<td>I trust environmental labels in the care of the Icelandic government</td>
<td>224</td>
<td>4.78</td>
<td>1.58</td>
</tr>
<tr>
<td>I know the environmental labels being used in Iceland</td>
<td>228</td>
<td>4.18</td>
<td>1.31</td>
</tr>
</tbody>
</table>
Table 11 Results from component analysis showing three of five components.

<table>
<thead>
<tr>
<th>Preference for Environmental labels</th>
<th>N</th>
<th>Mean</th>
<th>St. d.</th>
<th>Cronbach α</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer a product with environmental labels over comparable product</td>
<td>223</td>
<td>4.40</td>
<td>1.82</td>
<td></td>
</tr>
<tr>
<td>I trust products with environmental labels</td>
<td>223</td>
<td>4.70</td>
<td>1.47</td>
<td></td>
</tr>
<tr>
<td>I prefer services with environmental labels over a comparable service without environmental labels</td>
<td>223</td>
<td>4.36</td>
<td>1.73</td>
<td></td>
</tr>
<tr>
<td>I am interested in environmental labels</td>
<td>216</td>
<td>4.62</td>
<td>1.91</td>
<td></td>
</tr>
<tr>
<td>Product with environmental labels are higher quality than products without environmental labels</td>
<td>223</td>
<td>4.46</td>
<td>1.58</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge of electricity production</th>
<th>N</th>
<th>Mean</th>
<th>St. d.</th>
<th>Cronbach α</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know how electricity is manufactured in Iceland</td>
<td>225</td>
<td>4.58</td>
<td>1.75</td>
<td></td>
</tr>
<tr>
<td>I have researched what effects the manufacturing of electricity has on the environment</td>
<td>224</td>
<td>4.28</td>
<td>1.87</td>
<td></td>
</tr>
<tr>
<td>I am aware of renewable energy and its benefits</td>
<td>225</td>
<td>4.65</td>
<td>1.73</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attitude towards renewable energy</th>
<th>N</th>
<th>Mean</th>
<th>St. d.</th>
<th>Cronbach α</th>
</tr>
</thead>
<tbody>
<tr>
<td>My attitude towards renewable electricity and its use is (7 = positive; 1 = negative)</td>
<td>212</td>
<td>5.70</td>
<td>1.57</td>
<td></td>
</tr>
<tr>
<td>My attitude towards environmental labels that indicate the origin of electricity is (7 = positive; 1 = negative)</td>
<td>213</td>
<td>5.37</td>
<td>1.60</td>
<td></td>
</tr>
</tbody>
</table>

6.3 Correlation

The correlation between the components that was identified through the component analysis was examined. Figure 1 shows the correlation between credibility of environmental labels, knowledge of electricity production, attitude towards renewable electricity and preference for environmental labels with purchase intention of renewable electricity.

Table 12 Correlation of four components with purchasing intention of renewable electricity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility of environmental labels</td>
<td>ρ(178) = 0.33; p &lt; 0.001</td>
</tr>
<tr>
<td>Knowledge of electricity production</td>
<td>ρ(197) = 0.18; p &lt; 0.05</td>
</tr>
<tr>
<td>Attitude towards renewable electricity</td>
<td>ρ(198) = 0.35; p &lt; 0.001</td>
</tr>
<tr>
<td>Preference for Environmental labels</td>
<td>ρ(199) = 0.57; p &lt; 0.001</td>
</tr>
<tr>
<td>Merged preference and credibility</td>
<td>ρ(178) = 0.47; p &lt; 0.001</td>
</tr>
</tbody>
</table>
In addition, the correlation between merged components, credibility of environmental labels and preference for environmental labels, was examined. The merged variable was named “environmental labels”.

Cohen (1988) has set the criteria for correlation; correlation (ρ) is considered non-apparent when the it is between ± 0,0 – 0,09, weak when it is ± 0,1 – 0,29, mediocre when the correlation is between ± 0,3 – 0,49 and strong when it is ± 0,5 – 1,00.

With regards to this classification, there is a significant strong and positive correlation between preference for environmental labels and purchase intention of renewable electricity, the correlation for knowledge of electricity production has a weak positive correlation with purchase intention of renewable electricity, and for credibility of environmental labels and attitude towards renewable electricity there is a mediocre positive correlation. With the merged item of preference and credibility of environmental labels, there is also a mediocre positive correlation.

6.4 Mapping the effects
The effects on components between each other was measured with regression analysis and beta (β) used to evaluate the effect the components had on each other.

As shown on figure 3, knowledge of electricity production (KEP) had a non-significant effect on attitude towards renewable electricity (ATRE), explaining (R²) 0,5% of ATRE, therefore, H₁ is not supported. KEP had a significant (p < 0,001) effect on the credibility of environmental labels (CEL) and explained 8,6% (R²) of CEL, meaning that H₂ is supported. KEP had a non-significant (p < 0,05) effect on purchase intention of renewable electricity (PIRE) and explained 3,9% (R²) of PIRE, H₃ is not supported.

ATRE had a significant positive effect on CEL (p < 0,05) and explained 3,5% (R²) of CEL. H₆ is supported. ATRE also had a significant effect on PIRE (p < 0,05) and explained 5,9% (R²) of PIRE, H₅ is supported. ATRE had a significant positive effect on the preference for environmental labels (PEL) as p < 0,05 and explained 2,2% of PEL. H₇ is supported.

CEL had a significant positive effect on PEL (p < 0,001) and explained 32,5% of PEL (R²), H₈ is supported. CEL also had a significant positive effect on PIRE (p < 0,001) and explained 13,9% of the variance of PIRE, H₉ is supported.
PEL had a significant positive effect on PIRE (p < 0.001) and can explain 36.9% the variance of PIRE, H₄ is supported.

Figure 9 The effects of environmental labels on purchasing intention

* p < 0.05; ** p < 0.001; n.s. - non significant
7 Discussions

This study’s purpose was to measure the extent of the effect of environmental labels on Icelandic consumers and whether they positively influence the choice of renewable electricity for Icelandic consumers.

When this is studied one must bear in mind that it is relatively short time since the electricity markets were liberalized (Bauknecht and Bürger, 2003) and the nature of electricity is abstract to the consumer (Salmela and Varho, 2006). This is further supported by the results of the questionnaire, which shows that consumers are either unaware of the ability to switch electricity supplier and have therefore not considered other options or are not motivated enough to look up the benefits of switching. It also shows that they are either very neutral towards labeling schemes or unaware of them.

Even though consumers experience information provided by environmental labels hard to access and unclear, they have shown some preference for environmentally labeled products, see them as higher quality and are somewhat trusting of them. Additionally, consumers expressed higher trust in labels established by the Icelandic government compared to third-party certification. This contradicts previous research (D'Souza et al., 2007; Janssen and Hamm, 2012) where consumers expressed higher trust towards labeling schemes established by third-party. Some limitations may apply to this result as participants were not asked to compare third-party labeling schemes to labeling schemes or one-sided declarations made by the manufacturer.

Furthermore, findings of this study agree with previous research about consumers attitudes towards renewable electricity being generally high (Batley et al., 2001; Ek, 2005; Roe et al., 2001). Additionally, participants were positive towards labeling schemes which indicate the origin of the electricity they use, and consumers were somewhat likely switch to environmentally friendly electricity, and they were more likely to switch to electricity were the environmental attributes were more visible. In the literature, commodities have been shown to perform better when utilizing a branding strategy when they are compared to non-branded products (Tokarczyk and Hansen, 2006). Part of this branding strategy may be environmental labels, since
according to the results of the survey participants were likelier to be willing to pay more electricity if they were able to confirm that it is renewable. This tells us that consumers care for the ability to verify attributes of the product. Additionally, consumers were more likely to be willing to pay more for electricity that was certified by environmental labels established by the Icelandic government compared to a third-party established labeling scheme. This gives us a clue that in order to gain credibility labeling schemes may utilize a connection to the government and make this cooperation more visible so consumers can see the connection.

In the electricity market where information asymmetry is apparent labeling schemes may play a role in lowering such asymmetry. According to literature they may provide signals (Drichoutis et al., 2006; Kirmani and Rao, 2000) which are dependent on credibility of the signal (Moussa and Touzani, 2008). Results indicate that credibility and preference for environmental labels affect consumers purchase intention of renewable electricity, but only 20% of respondents had even considered changing electricity provider. This provides us with some clues, that indicate that lack of knowledge or credibility may have an effect why Icelandic consumers have not considered switching electricity providers in favor of a provider more environmentally friendly. Similarly, consumers have shown some preference environmentally labeled products, yet they have expressed that the information they provide is unclear and they have a hard time accessing said information. This tells us that even though consumers have interest in environmental labels they may not be fully countering the information asymmetry. Additionally, even though preference and credibility do influence consumers purchase intention, as seen in the results of the survey, consumers are either too lacking in knowledge or too neutral towards electricity for it to have an effect. Consumers do not feel strongly enough towards electricity and environmental labels for it to have a real effect, this can be seen in the results of this research.

Since consumers do not feel strongly enough about environmental labels, even though they have expressed some preference for them, this may lead to environmental labels unable to fulfill their purpose of lowering information asymmetry. According to the results the labeling schemes need to address their visibility and the access to information for them to start having effect on mainstream consumers.
To summarize, environmental labels can influence consumer purchasing decision, but the influence is minimal due to consumers lack of knowledge or neutral attitude towards labeling schemes. Consumers may experience more credibility of a label when it is established by the government.

This research is affected by certain limitations regarding the knowledge of the electricity market. Consumers may experience a lack of knowledge or something of a neutrality towards it. Additionally, Icelandic electricity market is quite unique as most of its electricity is manufactured by renewable sources (Samorka, e.d.) which may further affect consumers inability to use environmental characteristics to differentiate electricity providers.

Further research may be done in this field, in topics such as how manufacturers are able to make environmental labeling schemes more informative or increase its ease of access to consumers. Additionally, other environmental characteristic other than renewability may be researched for manufacturers to see if they can highlight other characteristics in addition to the renewability.
References


Asthma-Allergy Denmark. (e.d.). Retrieved from https://www.thebluelabel.eu/why-look-for-the-blue-label-


Appendix

Appendix 1 – Post shared on Facebook

Styrmir Már Ólafsson
9. apríl kl. 22:24

Kærnu vinir,
nú er komið að því að ég reyni að ljúka meistaranámi mínu við HÍ. Því bló ég
ykkur að aðstoða mig með því að svara meðfylgjandi spurningakönnun.
Huën er vegna meistaritgerðar minnar og tekur um 3 - 5 minútur að klára.
Fyrirfram þakkir.

QUESTIONPRO.COM
Quality labels | Survey Tools

12
16 ummæli 10 deilingar

Likar þetta Skrifa ummæli Deila

Styrmir Már Ólafsson
12. apríl kl. 19:00

Ef þú eft ekki búinn að svara, væri eg svakalega glaður ef þú ættir 4 minútur til
að fara í gegnum þessa könnun fyrir mig.

QUESTIONPRO.COM
Quality labels | Survey Tools

og 3 aðrir
5 ummæli 2 deilingar

Likar þetta Skrifa ummæli Deila
Appendix 2 – Online questionnaire

Kærl þátttakandi,

Þessi könnun er hluti af lokaverkefni minu í M$ námi í markóðsfraðum og alþjóðavíðskiptum við Háskóla Íslands.
Verkefnið fjallar um upprunamerkir og viðhorf islenskra nýyenda til þeirra og er gert undir leiðsögn Dr. Fríðriks Larsen.
Áður en þú byrjar að svara spurningunum þá við ég biðja þig um að svara þeim eftir þinni bestu samvísku en það er ekki rétt svar og ekki rangt svar.
Könnunin er nafnlaus og verða svör ekki rakin til þátttakenda.

Takk fyrir,
Styrmir Már Ólafsson (smo17@hi.is)
M$ nemandi í Viðskiptafraðideild Háskóla Íslands.
Til að geta svarað eftirfarandi spurningu þarf þú að vita hvar þú kaupir raforku.
Ef vafi liggur á er hægt að skoða slóasta rafmagnsrekning (t.d. í netbankinum) þar
getur þú séð af hvaða fyrrirtækí þú kaupir rafmagn.
Á rafmagnsrekning kemur fram hvaða fyrrirtækí sér um raforkusöluna og hvaða
fyrrirtækí sér um raforkudreifingu.
Þú ræður af hverjum þau kaupir raforku en þu getur ekki vailið af hverjum þu greiðir
fyrr dreifingu.

Gott er að athuga að í einhverjum tilfellum stendur Orkuveita Reykjavíkur á seðli getur
raforkusali verið Orka Náttúrunnar sem er dötturfélag Orkuveitu Reykjavíkur.

Hvaða raforkusala skiptir þú við?

- Orka helmslægan
- Orkubú Vestfjörða
- Ráðveita Reykjavíkarsfélaga
- Fallfjörður
- Orkuskóli
- Orka náttúrunnar
- HS Orka
- Vott ekki
- Annað

Eg hef kynnt mér þann möguleika sem þeg haf til að skipta um raforkusala

- Já
- Nei
Eftirfarandi spurningar fjalla um umhverfismerki.
Í stuttu máli eru Umhverfismerki merki sem gefa til kynna að vörur eða þjónusta uppfylla ákveðna staðla.

Hvaða umhverfismerki þekkir þú? Veldu út sem þú þekkir.

Green Seal  
Blaði engilinn  
Evrópu plemdur

Bra Mjóvol  
Svarurinn  
Endurvinnaðar umbúðir

Endurvinnaðar umbúðir  
Programme for the Endorsement of Forest Certification  
Skrjóargatö

Marine Stewardship Council  
KRAV  
ISO 14001
Vinsamlegast svaraðu hversu sammálá/ösammálá þú eftirfarandi fullyrðingum. (1 = Mjög ösammála, 7 = Mjög sammála).

<table>
<thead>
<tr>
<th>Mjög ösammála</th>
<th>Mjög sammála</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>6 7</td>
</tr>
</tbody>
</table>

- Eg þelði umhverfismerkin sem notuð er á Íslandi.
- Eg tresi umhverfismerkurum sem notuð eru á Íslandi.
- Upplysningar sem umhverfismerki veita eru skýr.
- Upplysningar um umhverfismerki eru aðgangilegar.
- Eg tresi umhverfismerkurum í umsjón þróða aðila.
- Eg tresi umhverfismerkurum sem er í umsjón íslenska ríkjanins.
- Eg er áhugasamur/ósom um umhverfismerki og hvað þau staða fyrir.
- Eg hef áhuga á að kynna mér umhverfismerkin frekar.
Næstu spurningar kanna þekkingu þina á raforkuframleiðslu á Íslandi.

Vinsamlegast svaraðu hversu sammála/ósammála þu át eftirfarandi fullyrðingum. (1 = Mjög ósammála, 7 = Mjög sammála).

<table>
<thead>
<tr>
<th>Mjög ósammála</th>
<th>Mjög sammála</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ekki hvernig framleiðsla á raforku fyrir fram á Íslandi</td>
<td>○</td>
</tr>
<tr>
<td>Ekki hvernig framleiðsla á endurnýjadegi raforku er á Íslandi</td>
<td>○</td>
</tr>
<tr>
<td>Ég er meðvilaður um endurnýjadegi orku og kosti hennar.</td>
<td>○</td>
</tr>
<tr>
<td>Í nýjum át hafa það að tiltaframleiðsla raforku hofur á umhverfisfélag</td>
<td>○</td>
</tr>
</tbody>
</table>

Vinsamlegast svaraðu hversu sammála/ósammála þu át eftirfarandi fullyrðingum. (1 = Mjög ósammála, 7 = Mjög sammála).

<table>
<thead>
<tr>
<th>Mjög ósammála</th>
<th>Mjög sammála</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Í nýum át hafa það að tiltaframleiðsla raforku hofur á umhverfisfélig</td>
<td>○</td>
</tr>
<tr>
<td>Í nýum át hafa það að tiltaframleiðsla raforku hofur á umhverfisfélig</td>
<td>○</td>
</tr>
<tr>
<td>Í nýum át hafa það að tiltaframleiðsla raforku hofur á umhverfisfélig</td>
<td>○</td>
</tr>
<tr>
<td>Í nýum át hafa það að tiltaframleiðsla raforku hofur á umhverfisfélig</td>
<td>○</td>
</tr>
</tbody>
</table>
### Vinsamlegast svaraðu hversu sammála/ósammla þú eftirfarandi fullyrðingum. (1 = Mjög ósammla, 7 = Mjög sammla)

<table>
<thead>
<tr>
<th>Mjög ósammla</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ég er tibúinn að borga meira fyrir endurnýjanlega raflorku</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ég er tibúinn að borga meira fyrir raflorku sem ég get staðfest að sé endurnýjanleg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ég er tibúinn að borga meira fyrir raflorku sem er votuð með umhversismerki útgefnu af þaða aðla</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ég er tibúinn að borga meira fyrir raflorku sem er votuð með umhversismerki útgefnu af íslenskaðri</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ég er tibúinn að borga meira fyrir raflorku sem unnin er úr valumini?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ég er tibúinn að borga meira fyrir raflorku sem unnin er úr viðalinni?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ég er tibúinn að borga meira fyrir raflorku ef ég vissi nokkrumlega áhrár í landi hún er framleiða</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Vinsamlegast svaraðu eftirfarandi spurningum um viðhorf þitt til endurnýjanlegrar raflorku. (1 = Jákvætt, 7 = Neikvætt)

<table>
<thead>
<tr>
<th>Jákvætt</th>
<th>Neikvætt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Viðhorf mitt til endurnýjanlegrar raflorku er</td>
<td></td>
</tr>
<tr>
<td>Viðhorf mitt til notkunar á endurnýjanlegri raflorku er</td>
<td></td>
</tr>
<tr>
<td>Viðhorf mitt gagnvart umhversismerkið sem gafa til kynna uppruna á raflorku er</td>
<td></td>
</tr>
</tbody>
</table>
Vinsamlegast svaraðu hversu sammála/össammála þú ért ef þífarándi fullyrðingum. (1 = Mjög ósammála, 7 = Mjög sammála).

<table>
<thead>
<tr>
<th>Mjög ósammála</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ég líklegt til þess að nota umhverfisvæna raforku þar sem hún morgar minna.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Ég er líklegt til þess að skipta yfir í umhverfisvæna raforku.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Ég er líklegt til þess að skipta yfir í raforku sem er bök til eingöngu með vindorku</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Ég er líklegt til þess að skipta yfir í raforku sem er bök til eingöngu með vatniraki</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Ég er líklegt til þess að skipta yfir í raforku sem er bök til eingöngu með umhverfismerki</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Ég er líklegt til þess að skipta um raforkusaf greina umhverfismerkið í raforkunars væru sýnlegi</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Hvad a kyn ert þú?**
- Karl
- Kona
- Ég skilgreini mig hvorki sem karl nè konu

**Hver er menntun þín? (Merkutu við hæsta menntunarstig sem þú hefur loklø.)**
- Grunnskólapróf
- Stúdentspróf
- Íðnám
- Grunntmaðurvís
- Framhaldsmaðurvís
- Doktorspróf
* Hver er aldur þínn?
- Ýngri en 20 ára
- 20 til 29 ára
- 30 til 39 ára
- 40 til 49 ára
- 50 til 59 ára
- 60 ára eða aldri

* Hverjar eru heildar tekjur heimilis þíns fyrir skatt á manudí?
- Lægri en 300 þöskund.
- 300 - 499 þöskund
- 500 til 699 þöskund
- 700 til 899 þöskund
- 900 til 1099 þöskund
- 1,1 m.kr. eða hárr
- Vet ekki
- Vili ekki svara

* Hvar býrð þú?
- Húfuborgarsveitar
- Vesturlandi
- Austurlandi
- Norðurlandi
- Vestfjarðum
- Suðurlandi
- Erlends

Done