

# **CARBON NEUTRAL FURNITURE COMPANY**

Lundia Oy



Master's thesis

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## TIIVISTELMÄ

Tämän opinnäytetyön tarkoituksena oli tuottaa toimeksiantajana toimivalle yritykselle yrityksen hiilijalanjälki ja sen kompensointi. Työn toimeksiantajana oli Lundia Oy, joka on Suomessa toimiva pieniin ja keskisuuriin yrityksiin lukeutuva huonekalualalla toimiva firma. Toimeksiantajan toiveena oli saada tietää milloin ja millä keinoilla se voi olla hiilineutraali.

Projekti toteutettiin toiminnallisena opinnäytetyönä. Projektin päävastuullinen kirjoitti tämän opinnäytetyön projektiin johtavista taustoista, projektin kulusta ja lopputuloksista. Tämän opinnäytetyön teoria koostuu ympäristövastuullisesta yritystoiminnasta sekä siitä, miksi tämän työn projektin sisältö on yhteiskunnallisesti merkittävää. Ympäristövastuullisuus yritystoiminnassa on otettu huomioon erityisesti yrityksen johdon, tuotteiden, raportoinnin, EU:n, ympäristövaikutusten ja ympäristöllisesti kestävästä yritystoiminnan käytännön näkökulmista.

Yhteiskunnallisen merkittävyyden teorian osuus koostuu erityisesti Suomen omista tavoitteista ilmastopolitiikassa, ja kansainvälisistä sopimuksista, mitkä ohjaavat Suomen toimia maana. Sekä siitä, miten yritys voi tulla hiilineutraaliksi ja voiko yritys tehdä itsenäisiä ilmastotekoja ilman maiden hallitusten pakotteita.

Opinnäytetyö on toteutettu toiminnallisena opinnäytteenä. Sen sisältöön kuuluu asiantuntijahaastatteluita sekä toimeksiantajana toimineen yrityksen ylimmän johdon haastatteluita.

**Avainsanat** Hiilijalanjälki, kompensatio, ympäristöystävällisyys yritystoiminnassa, huonekalu

**Sivut** 55 sivua sisältäen liitteitä 1 sivun

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ABSTRACT

The purpose of this thesis was to find out the carbon footprint and its compensation abilities for the commissioned company. This thesis was commissioned by Lundia Oy which is a furniture company located in Finland. The company wanted to know when and by what means they could be carbon neutral. The company is sized of small and medium enterprises.

The project was executed as a practice-based master thesis. The chief of the project wrote this thesis consisted of the background of the project, its progression, and its conclusions. The theory of this thesis consists of environmentally responsible business and the facts, why the topic of this thesis is a socially significant matter. The environmentally responsible business considers especially the management of a company, products, reporting, EU, the impacts for the environment, and the actions for an environmentally sustainable business model.

The theory of socially significant matter considers especially Finland's targets on climate policy and the international agreements guiding Finland's actions. Also, it handles how a company can become carbon neutral and can one company do individual decisions on climate actions even the government of a country is not guiding to do so.

This master thesis was carried out as a practice-based thesis. Its content includes expert interviews and interviews made for the management group of the commissioned company.

**Keywords** Carbon footprint, compensation, environmentally friendly business, furniture

**Pages** 55 pages including appendices 1 page

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## 1 INTRODUCTION

In the 1600s buying a new piece of clothing was a big decision as buying a new car nowadays. This can describe to us how much we do consumption in the year 2020, especially when we put that into the scale that there are more than 7 billion people on the globe now. And the population is growing all the time. (Isomäki 2019).

It is important to realize the fact: what one company can do to prevent global warming? One popular way for companies is to figure out their carbon footprint. This way they can intensify their actions and make the footprint smaller when they know where the biggest greenhouse gas emissions come from. This way they can also compensate their emissions in different ways. Isomäki emphasizes that in the future it would be even better if the companies would also take into account their carbon handprint. By this, he means what companies and people working in these companies, we all, so to say, can do globally to make the emissions smaller. (Isomäki 2019).

Isomäki (2019) speaks about company responsibility as it was an individual decision. And that it is when people are doing all the decision making in the companies, globally. When people are talking about emissions and how companies could prevent them, or how their core business can be more responsible in the future, we talk about a very complex set of things. Even the oil company can be seen as responsible if their main aim is to make other options for regular oil. Neste Oyj has been chosen as one of the most responsible companies in the world in 2018 and 2019. The most important thing for winning this prize was the biodiesel that Neste produces from waste and residues. In this way, they have been able to decrease carbon dioxide emissions for 6,4 million tons. This means as much as the whole fleet of cars in Finland would be emission-free. (Neste Oyj 2018)

This thesis will be placed into the furniture business and it will figure out how one small and medium-sized furniture company can be carbon neutral in Finland. In the furniture business, too, as well as in the clothing business, have been a big change with the pace of changing the decoration. There can be seen as many reasons for that. People are having more money; they want to use it to have a change in their homes. Ever since IKEA came to markets the pace has accelerated the consumption. Buying furniture must be easy and cheap and the product life cycle can be very short. This may not support the idea of being a responsible company when we look at this from an environmental responsible point of view. This thesis is a practice-based master's thesis where a traditional Finnish furniture company figures out its options to be a carbon-neutral company.

## 1.1 Case company introduction

This thesis is made for Lundia Oy. Lundia is a traditional Finnish furniture company that has been operating since 1948. Lundia has a strong brand in Finland and one can find Lundia's shelves in more than 600.000 homes in Finland. It all comes down to the fact of being a Finnish company with Finnish production and more than 95% of the material Lundia uses for their furniture comes from Finland. (von Wendt interview 10.10.2019)

Lundia has five different product families that are all labeled under the "Lundia" brand. These five product families are Lundia Classic, Lundia Fuuga, Lundia Lofty, Lundia Lightning, and Lundia System. This thesis is going to consider more about the company itself as a corporation and its carbon footprint, but the aim is still to figure out the carbon footprint for one single piece of Lundia's furniture too. That product is a Lundia Classic shelf which is one of the most selling pieces in the company's product range. (von Wendt interview 10.10.2019)

Lundia's shelf system was born in the 1940s when the Swedish carpenter Harald Lundqvist invented a revolutionary way to build up a shelf. He invented a light shelf that takes a huge load on it without breaking, and the structure is so simple it can be built up and take down every day if necessary. The furniture is not incurring any kind of damage by dissolution. This was an invention that became one of the most popular shelving systems over the decades in Finland. Lundia has sold it more than 100.000.000 meters over the past 70 years. This shelf is labeled under the name Lundia Classis. (von Wendt interview 10.10.2019)

The carpenter Harald Lundqvist sold the patent to two Finnish families called Rosenlew and Fabritius and they established the company in 1948. That is how Lundia Oy was born in Finland. Lundia is still a family-owned company and the ownership on in Fabritius family branch. Lundia Oy os part of SINI Group which consists of other companies from the same family too. For example, Sinituote and Junttan. (von Wendt interview 10.10.2019)

Lundia's glory days were in the 1980s. Shelves were relatively inexpensive and the production in Finland was providing several possibilities. Lundia was even a sponsor in Formula 1 at that time. In the 1990s Lundia fell into bankruptcy but it raised again and now it is one of the oldest furniture companies in Finland. Nowadays it has a good brand value and awareness in Finland. The helped notoriety has been tested to be as high as 96%. It can be said people know the product and brand very well, but the spontaneous notoriety was calculated to be 5%. Not every company has such a gap between the helped and spontaneous notoriety. Michaela Von Wendt, the CEO of Lundia Oy, opine it can be due to many reasons, but one thing may be the fact Lundia is a quite small company. (von Wendt interview 10.10.2019) By the time this thesis is written the number of employees decreased from approximately 20 to about 12 as a result of a

new company strategy. This thesis is dealing with small and medium-sized enterprises (later SME) which Lundia represents.

## 1.2 Lundia's strategy and responsible business

This thesis is a practice-based master's thesis made for Lundia Oy. This project aims to figure out Lundia's carbon footprint and then, what are Lundia's main emitters for the greenhouse gas emissions. That way Lundia can intensify their behavior and actions and find the best way to compensate their emissions which they will not be able to eliminate. The project will also cover how Lundia could compensate their carbon footprint caused by the Logistic Department and Head Quarter (later HQ).

Lundia has three main values: open, high quality, flexible. These values formed in 2014 as a result of the management group's deep discussions on what the company feels they are and what they want to keep in the future. (von Wendt interview 10.10.2019)

For this thesis researcher arranged a group interview for the current management group to understand how the project supports company values. Sitra (2019) talks about the business advantage of carbon neutralism cause for the companies now. Those companies who understand this value for the core business will be the future winners. The innovations, products, and services from those companies will be part of building a carbon-neutral society. They see those companies will have better competitiveness too.

When the researcher interviewed the Lundia management group they started to tie their values together around the given subject. From the company's values, they see the openness is one of the most important things in this nature. Lundia wants to tell their customers and other stakeholders they are already acting even there is not a must. The management group was discussing the sanctions the Finnish government is not doing now for the companies so much. The CEO of Lundia was at least very willing to see more sanctions from the government very shortly. CEO was comparing the Finnish governments rewarding or sanctions to Norway's suchlike actions. She would like to see something like that in Finland too where the government is guiding companies to the greener future faster. Whether talked about leasing cars or energy use the guiding should come from the government. (Hollo et al. interview 23.3.2020)

Openness was also discussed widely from the marketing point of view. As one of the main targets of this thesis is to end the project in Habitare fair 2020, it was discussed how to prevent misleading communication or greenwashing in company marketing. Management group went through the ideas of what it could mean for them as they would like to hold on the environmentally responsible value too. Lundia faced remarkable challenges in spring 2019 when their long-term supplier for the main



product, Lundia Classic, informed the company they were going to shut down the whole factory. Lundia needed to find a new partner to be able to continue manufacturing. The research started directly after the notice. Lundia was searching the manufacturer mainly in Finland but after several dead ends, they started to evaluate how they could produce their main product somewhere else than Finland. (Hollo et al. interview 23.3.2020)

The CEO of Lundia met summer 2019 some suppliers in Europe but luckily one Finnish company was found from northeast Finland who was able to produce the needed quality for Lundia. Good quality in products, as in customer service and other actions to all the stakeholders seems to be important for the management group. This led to discussions of the importance of short transportation distances. Discussions showed also that this aspect is tied to flexibility too. The company emphasizes Finnish suppliers are more flexible than foreign suppliers. Also, the higher quality is guaranteed, and the negotiations are easier with the domestic suppliers. (Hollo et al. interview 23.3.2020)

This discussion led the interview with environmentally responsible questions. The more the management sees their actions to be environmentally responsible they see their actions to be socially responsible. Even the company has not had good years in economic terms, they could continue the business as being a part of larger Group. Especially the CEO was emphasizing the importance of taking social responsibility in the tough and competed for the field as the furniture business is now. Environmental matters came up in such as wood use and the emissions from the clear-cut forests. Researchers' task is to study this matter more closely too. From the company values, the management group sees all of them be somehow tied to this development project. Lundia wants to be open with the results and show what they can compensate and how it is done using the information in their marketing widely. High-quality comes from domestic manufacturing, so the transportations distances will be shorter, used lacquer will be water-dilutable and the used raw material, the wood, will be from Finnish forests where the responsible growth and afforesting are guaranteed. (Hollo et al. interview 23.3.2020)

Management group talks about the Groups policy where all the signed contract is always going through competitive bidding. Transportation companies, hotels, energy, internet, phones, other IT-systems e.g. help-desk, and many other services are going through competitive bidding to get a greater impact on the prices. The management group says they cannot influence them now. On the other hand, it saves significant costs when competitive bidding is made at the Group level. For example, transportations are not as high in Lundia as it is the whole Group so Lundia can benefit from it. (Hollo et al. interview 23.3.2020)

Lundia made a big strategical change in the year 2019. They decided to combine their forces with a larger player who they had a re-selling contract

already. The company decided to shut down its shops and put up a few shop-in-shops inside the retailers' shops. This way they could save the emissions caused by their shops as they were very close to the retailer's shops. The other aim was to combine the forces to get more customers to both parties' shop. In this phase, the company took also the carbon footprint into the management discussions and decided to the year 2020 to figure it out and compensate it. (Hollo et al. interview 23.3.2020) This thesis aims to interview some other companies too from the same Group to get a better overview is there other companies in the same Group that are dealing with the same issues too.

### 1.3 Key Concepts for this thesis

To understand the topic, climate change, and carbon neutralism, it is best to write open some of the key concepts, keywords, in that nature. Since this thesis is not made for natural sciences but to the business field. Here are some words that are commonly used in this thesis.

Carbon dioxide:

- Carbon dioxide, CO<sub>2</sub>, is the predominant greenhouse gas humans emit to the atmosphere. The vast majority of the carbon dioxide emissions released are from fossil fuels like oil, natural gas, and coal. Some other remarkable carbon dioxide emission causes when human is demolishing rain forests and when the land using is not environmentally friendly. This can mean for example polluting actions. (SVT 2019)

Greenhouse gas

- Greenhouse gases are all the compounds that cause global warming. Carbon dioxide is one of them. In spoken language, carbon is mostly taking into consideration. Carbon dioxide is a lethal subject for the growing nature. When speaking about greenhouse gases and measuring the carbon footprint it is commonly used GHG methodology. The methodology considers the six most important greenhouse gases: carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF<sub>6</sub>). These are converted into CO<sub>2</sub> equivalents based on their global warming potential. Greenhouse gases are necessary for the natural cycle and essential for oxygen formation. (Aalto et al. 2019, 8.) These gases are causing global warming. They prevent and block the heat to get back to out of space. The warmth stays in the atmosphere and heats the globe. The human with own actions causes this phenomenon to be stronger. (SVT 2019.)

Carbon dioxide equivalent

- Shortened CO<sub>2</sub>eqv. It means the number of emissions one company causes when taking into consideration all the greenhouse

gases, not just the most common one, carbon dioxide. The other five most important greenhouse gases are mentioned above. The climate heating potential of those compounds is changed to the common method/form, carbon dioxide as CO<sub>2</sub>. When all the greenhouse gases are changed to CO<sub>2</sub> it is commonly informed with weight measure. For example, how many tons or kilograms of CO<sub>2</sub>eqv the actions are causing. By the end of this thesis, the result of the case company's foot carbon footprint will be announced in this form. (Alhola, Judl, Norris & Seppälä, 2015. 9, 11, 15.)

#### Carbon neutral:

- Carbon neutrality is a word that is commonly used on a daily bases. Basically, it means that the caused carbon emissions are lower level as the atmosphere can bind. In other words, the atmosphere should be able to bind the carbon as much as it is released to the atmosphere. Companies use the term very often in different settings to describe their green action. It is a common way to communicate with their stakeholders the actions that consist of sustainable issues. It does not cover all the important aspects of sustainability, for example, the impact on biodiversity. The carbon neutralization should be implemented most of all by reducing the emissions. The aim should be the carbon negativism in the end. It means that the emissions should be lower than the atmosphere can bind them. Normally for companies, it means the timeframe to calculate them is one year. (Alhola et al. 8-9).

#### Carbon sink:

- The carbon sink removes the carbon from the atmosphere by binding it to the carbon storages. The sink can be whatever mechanism, process, or action that binds the carbon and moves it to the carbon storage. (EASEC 2018, 4-5, 13 & 27).

#### Carbon storage:

- Carbon storage means water systems, ground, or plants that bind the carbon from the atmosphere as a part of its natural life cycle. The whole carbon storage means all the carbon which is in all the underground and above the ground, living or dead biomass that binds the carbon. Carbon sinks are growing the carbon storages bigger. There are long-lasting storages, which are in the ground, and short-lived storages normally do not last over one hundred years, like forests and other plants. (Suomen Ilmastopaneeli 2019, 17.)

#### Compensation:

- Compensation means the Emission Reduction Unit, which one company can buy from outside of its territory to remit the greenhouse gas emissions caused by their actions. It is a general idea that companies should first and for the most, intensify their

actions and lower the emissions as much as possible and after that compensate for the inevitable rest emissions. Emission compensations are part of the mechanisms that were determined in Kyoto's Agreement. It consists of some governmental mechanisms like how much wood is missing every year, how much afforesting is happening, and how much these causes emissions. There have come many individual service providers to the field too, and this thesis is going to focus on that. (Suomen Ilmastopaneeli 2019, 8.)

#### Emission

- When talking about the climate, emissions means the greenhouse gases human is releasing to the atmosphere with different actions. The most affecting for globes warming is carbon dioxide which comes mainly from burning fossil fuel such as oil, coal, and natural gas usage. The other emissions warming the climate were mentioned under the concept of greenhouse gas. (SVT 2019.)

Antov and Pancheva (2017, 3) argue that the carbon footprint in furniture companies combines of two main forms:

- Organizational carbon footprint, which means emissions from all the activities company put in the action. For example, buildings, energy consumption, transportation, industrial processes, etc.
- Product/Process footprint, which includes the emissions from the whole product lifecycle. It considers the emissions all the way extraction of raw materials, manufacturing the product, and its use. It also covers the disposability, reuse or recycling possibilities too

When dealing with the second of these two main forms, the starting point for the calculation is always to take into consideration the whole lifecycle of the product. Often called Cradle to Grave perspective. Antov and Pancheva (2017, 3, 5) emphasize that carbon footprint assessment is a relatively well-known and used tool, but in their study of furniture carbon footprint, they covered only one side of the product's emitter. It did not include the information about furniture toxicity, or the durability of the materials used in furniture. At least it does not cover them in the production phase in the product life span. It also did not cover the reusability, recyclability, availability of sustainable raw materials, biodegradability, etc. This way the study they did for furniture carbon footprint did not give a whole picture of the product's real emissions in its life span.

#### 1.4 Research question

Climate change and global warming were introduced already in the 1980s. Kyoto agreement was the first agreement in which industrialized countries were forced by law to reduce their emissions. By yet, there have not been

so many sanctions for companies to help in this work to prevent climate heating uncontrollably. This thesis is trying to figure out how a company can do its part by discovering its carbon footprint and compensating for the inevitable emissions. There are many ways for companies to prevent and decrease emissions and how to compensate them. These options are evaluated along with the project and the commissioned company will choose an option appropriate to their values.

The main issue in this thesis is to find out the carbon footprint. For this, the company, Lundia, needs to evaluate the service providers, provide them the needed information and investigate the abilities to intensify their actions in such a way the carbon footprint would get smaller, but to compensate the emissions caused by the previous year, the base year. The research is going to be practice-based where the researcher will be in charge of the project from start to an end. The intensifying actions will be left out from the thesis, but they will be handled after the project is over.

This thesis is not going to include surveys or formal interviews. Though, it is going to include a few semi-structured interviews from the company management group, its CEO, service providers interview, and one specialist interview from The Finnish Association for Nature Conservation. With these interviews' researcher hopes to get an overview, what are Lundia's aims and needs, the chosen service providers options for Lundia, and what an independent party is thinking about the company actions for greener future.

## **2 ENVIRONMENTALLY RESPONSIBLE BUSINESS**

To integrate the permanent environmentally responsible business concept to companies, the top-level management, and the owners must commit to the environmental goals and take them as part of the management. Environmental management aims to intensify corporates actions, reduce the adverse environmental effects, and increase environmental awareness. Environmental management can be seen improving the image of the company and it also brings credibility to the company's actions. When one is intensifying their actions, it can be cost-efficient and save resources. For example, waste reduction is a win-win situation for companies. It saves the environment and releases money resources to other actions of the company. (Kippo-Edlund 2006, 119)

### **2.1 Responsible business and reporting**

There is not just one simple indicator to measure how responsible one company is. In some indicators, Neste Oyj seems one of the most irresponsible company and in the other one, it seems to be one of the most

responsible companies in the world. There are many discrepancies in this kind of result. Indicators make processes vivid and show the development of one or several processes. That is why it is difficult to compare companies. There are too many different aspects that can be measured. (Versus Lehti 2018)

There are many standards for how companies report their responsibility and how they are developing them. One very typical one is a responsibility report that is made by the company itself. They are normally published on the web where everyone can go to check them. Those reports normally consist of three different perspectives: governance, environmental and social responsibilities. That can be seen as a transparency tool for the company and it helps with marketing too. (Vastuullisuusraportti.fi 2016)

A research made in North America was trying to find out how the public owned and private sector companies differ from each other when speaking social and environmental reporting strategies. (Cormier & Gordon 2000, 1) Research is quite old for this matter but it still can give some guidelines about how the attitudes have been towards this matter. The paper aimed to search two public-owned companies and one private company and how their strategies of reporting differ. The paper offers evidence of two different things:

- Public enterprises disclose more social and environmental information than private corporations
- In this research, the size of the corporation affected the results. The biggest corporation was providing the most and the smallest company the least of information (Cormier & Gordon 2000, 21)

This study showed a link between social and environmental reporting strategies to the size of the company. Publicly owned companies, in this case, were owned mostly by the government. They are politically supported enterprises and large. They are forced then to disclose such things due to reasons of accountability and visibility. The conclusions of this study emphasize also that this case did not cover the efficiency of these companies when doing the reporting and disclosing them. They suggested someone study that more closely in order to find out if the smaller privately-owned companies do the social and environmental actions more efficient way when not using the time to report. (Cormier & Gordon 2000, 22)

It is claimed, that if the communities are becoming more interested in companies' environmental impacts, it is more likely corporation's top management and senior managers will be called to explain the company's activities affecting the environment. In many cases, the solution to inform these impacts is through an annual report which includes the environmental report. The government, board of the corporation, as an elected body of a firm can be expected to be attentive and community concern responsive to the community. It is also expected that the

government would be receptive to the concerns arise in the community about environmental issues. Growth of the legal requirements and regulations includes taxation, licensing requirements, and zoning restrictions are also applying to companies and that can be seen as guiding gesture to boards. (Frost & Wilmshurt, 1999, 3-4)

The financial impact on companies on environmental issues is a double-edged sword. The actions one company does for intensifying its processes, whether it is manufacturing, energy solutions, etc., can at the same time save money and cause costs. At the same time, it can be seen as a long-term investment for the company's future affecting to company's financial position and its long-term financial health. Frost & Wilmshurt's research (1999, 4, 13) found out that the environmental disclosure within the corporation's annual report identified positive associations with financial institutions' concerns. As well as, with shareholders' right to information, supplier concerns, customer concerns, community concerns, and the provision of a true and fair view of the operations of the firm.

## **2.2 Successful management of business sustainability: environmental point of view**

Climate change is a difficult topic at the global political level. The facts of exhaustion the natural resources, natural environments as such, and the recognition of global warming has still become one very important topic in industries worldwide. Therefore the importance of understanding the content of the sustainable business has increased. It not only consists of the carbon footprint or greenhouse gas emissions as simple as it would be, but it consists of product design, manufacturing, deliveries, distribution, and disposal throughout the product life cycle. There can be seen a growing need of consumers to companies to be more environmentally aware, the emergence of new sustainable business models. (Högevold & Svensson 2012, 143)

To achieve sustainability in the business, the company must take into consideration the environmental and social responsibilities. This requires a network of companies to achieve it extended beyond the organizational boundaries. This can be seen in everyday actions for example as a corporate policy that drives the companies to use only suppliers who will take care of their actions and emissions to secure the environmental and social responsibilities. This value-adding process directs the company to concentrate on the purchases (e.g. raw materials) and this phase should make evident if the company is sustainable or non-sustainable. For example, what kind of sources are used: are they recyclable or not, are they made of natural resources or not and are they renewable or not. (Högevold & Svensson 2012, 143)

Also, the short-term and long-term impact on the environment is a very important aspect. To become sustainable and have the value-adding process, forces companies to change their practices in production

including design, operations, and engineering. As a matter of fact, all the matters that focus on environmental protection. This gives an opportunity to corporates that are manufacturing a physical product. Also, it brings challenges alongside too. It forces the companies to innovate while the company needs to improve business efficiency and performance. Högevold and Svensson's (2012, 143) article emphasizes this is not only in one company's shoulders but the whole network of companies that are related to one company. This will support the business and the environment better.

In this network, supply chain, there are many important aspects of sustainability: reducing raw material, energy use, water pollutions, greenhouse gas emissions, erosion, reducing packaging, improve transportation, and that way causing fewer emissions. In Högevold's and Svensson's article (2012, 143-144) UK's grocery multiples are highlighted as a good example of the environmentally sustainable network where the supply chain is practicing sustainable business to achieve fewer emissions. The best of them have their programs where are considered energy efficiency, packaging waste, recycling, carbon dioxide emissions, the emissions coming from the vehicles, and water consumption. They have started to benchmark their actions to others and trying to improve their actions to be more environmentally responsible.

### 2.3 Environmental impact

A relatively new trend in furnishing is the aspect of spaces to support the cultural and physical well-being. It started first from the experts, designers end, of the furniture business with the harmony of the natural environment. Then it spreads to wider, to the consumer field too. It might say the furniture combines an individual's lifestyle, aesthetics, buildings, and the natural, ecological environment. Furniture gives satisfaction for one to fulfill a certain need when the furniture has a function, a task to do. Furniture also creates an atmosphere where a person wants to spend time. (Brain et al. 2015, 1-2)

Brain (et al. 2015, 2) presents in their paper, based on scientific research made by others, that the starting point for furniture design should be the efficiency of the natural resource and energy use. If the furniture in all price categories would put effort into these two matters the result of being an environmentally friendly industry would be at its best. For example, if everyone would buy only expensive and opulent furniture, the rare natural resources would be under the threat. On the other hand, if everyone is buying only cheap furniture, quality, individual well-being, and safety would be challenged.

The importance of company strategy is emphasized while speaking about environmentally responsible furniture business. Furniture supply chain and socio-economic factors are linked. For example, if a company has a



clear and good strategy, the company is most likely taking into concern the social and environmental aspects. If the strategy is misaligned these mentioned matters, may be excluded. Paris agreement put the pressure on the consumers to demand more from the manufacturers. From that way, the real pressure directed to the industries, such as the furniture industry too. (Brain et al. 2015, 2-3)

Paper made by Brain et al. (2015, 6) represents an Australian company called Living Edge which is an SME company operating only in Australia. They have launched a service called LivingOn. It enables the furniture's handed down from generation to generation. Living Edge has started the change process of the new business model from the engagement of the employees. First, they hired a person to be in charge and oversee the aspects of the ecological environment. The job description covers all the ecological aspects and all the participants of the organization, stakeholders, of the corporate. This task also covers the responsibility to arrange continuous training for the whole staff. This way they try to guarantee that the person has the updated knowledge and they would understand the impact of their actions. (Brain et al. 2015, 9)

The importance of the management groups' communication with the whole company should not be underestimated. The management group's responsibility is that everyone in their company knows what is LivingOn service and how it should be used. Everyone needs to understand why the program is important for the corporation and that is on the management team's responsibility to communicate it clearly. Everyone had to take part in workshops where everyone had the possibility to tell what would be important for the new service. After these sessions, the company created a LivingOn-team. Their task was to help different stakeholders to implement the new business model in their everyday actions. (Brain et al. 2015, 9)

Paper from Brain et al. (2015, 10) also presents examples from remarkable north European companies that have released sustainability reports. These are not SME's but still important as they are so big manufacturers. One of the companies is Ekornes ASA. It is the biggest furniture manufacturer in Norway, and it may be familiar to Finnish people over its Stressless armchairs. They have released a sustainability report and one of their long-term objectives is to create a competitive advantage over the environmental initiatives.

The other important European furniture company in the paper (Brain et al. 2015, 10) is IKEA. IKEA Group has indeed a global impact on nature and the environment. Even IKEA is blamed for the short product life cycle and short fashion life cycle, they have made sustainability a central topic of their corporate strategy. They have listed five different matters of how sustainability is involved in their actions. They are:

- The aim to have all the furniture products disposable/recyclable

- When establishing new stores, monitoring the potential energy efficiency improvements, like heating with renewable energy
- Analyzing the carbon footprint to get a better view and understanding what the most emitters are
- Working with global conservation organizations such as WWF for Nature forestry, cotton use, and climate change projects
- Focus on water consumption in manufacturing

As mentioned, IKEA has been under the allegations to be the opposite of being environmentally sustainable and responsible. Even these topics have been raised to be a part of their corporate strategy it still can be seen as greenwashing if the words and actions do not meet. (Brain et al. 2015, 11) The paper emphasizes that even the SME's can be seen smaller emitter than the large international corporates, the majority of the companies still consists of SME's and they can be seen as a backbone of the most countries economy. The change must happen in SMEs too, not just in big corporates. (Brain et al. 2015, 14)

#### 2.4 The sustainable business model in action

Högevold (2010, 2) has done the research for Norwegian furniture company about sustainability. His findings are based on the researched information that many of the companies see the sustainability necessary when looking to the future. And not just from the environmental aspect but from the branding and differentiation aspects too. Branding includes green values too which means sustainable thinking throughout the supply chain.

Högevold's study was made for a Norwegian furniture company called HÅG. The company has started its sustainable strategy in the early '90s already and nowadays it is a big part of their branding. Interestingly, HÅG did not do any market analysis before starting the sustainable path but soon they realized the opportunity to differentiate from the competitors by being the such aware of the impacts of their business actions on the environment. HÅG did not even ask from their customers' opinion weather they wanted to buy environmentally sustainable furniture's which makes them even more different. The fact company started its sustainable strategy already in the 1990s tells that HÅG has been a trendsetter in the field. (Högevold 2010, 4)

HÅG manufacturing their products in one of the world's high-costing countries, Norway, they need to provide something that is seen as added value for purchasing their furniture. Sustainability has become a strong part of their branding strategy. When HÅG is building its environmental profile and implementing environmental actions into their furniture along with the positioning by the company strategy, it has proven to be very successful. (Högevold 2010, 4)

To do so, HÅG has set the placed demands for their suppliers. The company has a purchasing policy which is guiding the purchasing process and makes sure the supply chain, all their suppliers, will be environmentally aware too. It helps other companies too to prevent greenhouse gas emissions and make their carbon footprint smaller. The suppliers must comply with the very strict demands of HÅG and they must do a constant development to contribute to better environmental solutions. HÅG has set a list for their suppliers of the chemicals and substances that are not allowed to use in their production. This list is quite the same as athletes have in their doping list. Like manufacturing, certain substances are not allowed to use in the production, and HÅG is always evaluating the suppliers by their carbon footprint and how the single company concerns it. (Högevold 2010, 4)

In the time the article of Högevold's was written (2010, 6) they did not use afforesting as part of their sustainable strategy. HÅG had been thinking of buying the climate quotas to compensate for their emissions. The company had decided not to do so. They argued three reasons not to do so:

- The management believed the focus from reducing the carbon footprint could be lost if the concertation moves from emission-reducing to compensating
- Management suspects the price of climate quotas goes up in the future and when that happens the company is no longer able to buy them, and they would lose the carbon neutrality
- Managers also felt uncertain how the market mechanism works in climate quotas

Since HÅG has come out with the sustainability strategy, now its customers require the transparency and knowledge of their actions too. Concentrating on environmental issues is a continuous process that will not end. It requires continuous enhancement and transparency and that is why HÅG has decided to release an environment report annually. It consists of five different aspects: Environmental Policy, Goals, Aspects, Account, and material consumption. HÅG's CEO argues in Högevold's article, that to be an environmentally friendly company one needs to build up a system and to document what is being done. He emphasizes that is not a communication activity but a requirement and challenge for the whole value chain. (Högevold 2010, 6)

HÅG's carbon footprint according to the greenhouse gas protocol identifies the biggest emitter to be transportations and other work-related traveling. Their production plant is located in the area where there are no other delivery options than using trucks. The ocean is too far away to use ships; the railway is also too far so they have no other options for product transportation. Also, the raw materials from suppliers are delivered by trucks. HÅG has optimized its truck traffic. The purchased raw materials are coming to their plant only fully loaded and the same truck will take the

deliveries for their customers at the same time. So, there are no empty or half-loaded trucks. (Högevold 2010, 7)

Later in this thesis, there will be explained how the case company for this thesis is settled for HÅG's given example. The project will show if Lundia will face the same kind of matters about ten years later from Högevold's article. From HÅG example can be learned that the effort to sustainability and environmental responsibility can be highly profitable. The article also shows that top-level management and the owners must be anchored and supportive to achieve a long-term commitment. In this way, a genuinely sustainable business model can create. In HÅG the sustainability has been part of the product development and the whole concept of sustainability is not made for communication-related reasons. Focusing not just on their emissions the company requires the actions also from their suppliers and the whole supply chain. As the main emitter is from external causes HÅG wants the external parties to take into consideration their emissions too and that way pull down their carbon footprint effectively. By doing this, HÅG can answer to customers arising need to know how and with what emissions the product is produced. (Högevold 2010, 7-8)

## 2.5 The sustainable furniture business in the EU

The furniture industry in the European Union has a long history. Nowadays the industry is a dynamic, advanced with technology but still labor-intensive sector. It has been estimated that the whole furniture industry in the EU has a remarkable contribution to the EU's economy by providing more than 1,1 million jobs in about 130.000 companies. These companies are mainly SME's where Lundia ranks. The annual turnover for these companies is estimated to be 96 billion euros. In fact, 25% of all the furniture manufacturing in the whole world is produced in the EU and in most of the European countries, the furniture manufacturing represents 2-4% of the production value of the overall manufacturing sector. EU covers 30-35% of all furniture export globally, while the whole export from the EU is estimated to be about 45% of the combined global export. (Antov & Pancheva 2017, 2)

Furniture manufacturers in the EU are highly appreciated and widely known. In terms of product variety, the EU's furniture field can be seen as the best differentiated and the most integrated sector in the world. The furniture industry in European countries can use the newest technologies and innovations and, also, to combine them to the cultural heritage and style. The industry provides work for highly skilled workers who are formally educated. As manufacturing is such a significant by its size, carbon emissions generated from its actions can be seen significant in the EU. (Anton & Pancheva 2017, 2-3)

According to the adopted low-carbon economy roadmap, the EU should cut its greenhouse gas emission up to 80% from the level of the year 1990

by the year 2050. Emission cuts should happen first faster, after the year 2030 the cut should be -40%. Then the next decade will take a bit slower moving cutting the emissions -60% from the starting point. The rest of the cuts will happen in between 2040-2050. All economic sectors should take part in this trend by their capability. It should happen to respect the company's economic situation and capability to invest in new technologies. (Anton & Pancheva 2017, 3)

EU has set legislation of energy production to be more environmentally friendly to help the whole field of industries to reduce their greenhouse gas emissions. Energy can be produced in the EU for instance from wind, solar, biomass, and hydro. There is also the legislation of the carbon captures and storage technologies that are trying to catch the carbon which is emitted from the energy production plants. (Anton & Pancheva 2017, 3)

Corporations that are operating in sectors that are subject to government controls on carbon emission are legally required to calculate their carbon emissions. In the EU this means sectors making heavy use of fossil fuels. They are, for example, power generations, chemicals, steel, and cement. Then again other corporations from very different fields have started to calculate and release the results frankly. (McKinnon 2009, 3)

The Finnish Association for Nature Conservation has not divided its recommendations and alignments by the company size. In their opinion, all the companies should have a plan, how they are going to prevent the emissions, and be able to commit to the global 1,5 Celsius degree heating rate. This can be very challenging for the companies as the supply chains can be very complex and long. But still, the plans should be made based on the information company can discover. (Aho interview 4.5.2020)

Aho (interview 4.5.2020) emphasizes that all the fossil fuel usage should end and there should be a clear plan for each company how they are going to do it and in what timetable. Also, the plan should cover how the company is going to prevent the depletion of carbon storages and how they are going to grow carbon binds. Companies need to understand that to become carbon neutral, it is just an intermediate target. The real goal should be carbon negativity. Though, this concerns the whole globe, not just the companies. But for companies, the carbon storage usage and the carbon sink formation are important to get carbon negative.

For small and medium-size enterprises association recommend changing their electricity contracts so the energy is made from renewable sources. The Finnish Association for Nature Conservation is providing a possibility for the companies who buy renewable energy to be certificated. They provide the certificate if the bought energy meets certain conditions and also the firm needs to fulfill certain sustainable features in their business. Association recommends all the companies to look for actions that could

save energy. This way nature and company can benefit. Also, one very important action for saving the environment is the logistic choices. Association sees this as a significant individual emitter globally. It is also one of the most challenging ones of the emitters. If the company transports big amounts of goods it normally means they are going to be delivered with trucks, ships, airplanes, or trains. The train can be seen as a very environmentally friendly way, but just a few can use it. When the transportation is made with trucks association recommends using trucks that are moving with biogas. (Aho interview 4.5.2020)

## 2.6 Products carbon footprint

As this thesis is going to find out one product's greenhouse gas emissions too, this chapter deals with the topic. McKinnon argues that in the early stage where a company is getting interested in carbon auditing companies are mostly interested in estimating their total carbon footprint, but basically, they are basing their calculations on total energy consumption. As one company's auditing capability improves, they can understand the means of greenhouse gas emission more disaggregated levels. Emissions can be calculated in any part of the supply chain, for some business unit, process, activity, or product. (McKinnon 2009, 4)

Product lifecycle assessment (later LCA) takes into consideration energy and emission data, particularly energy-intensive stages through the supply chain. It must be ensured that all the raw materials, waste, energy, and emissions are accounted for and the carbon footprint of a product supply chain must be in the calculations. Concerns have been expressed to LCA and its accuracy. Products are complex matters that consist of various parts and technologies. Product complexity, supply chain variability, and scalability are problems that are easily associated with LCA. These aspects are not easily disaggregated to product level to measure enough accuracy of the carbon emissions. (McKinnon 2009, 4-5)

When calculating the company's carbon footprint, the emissions are divided into three scopes. These three scopes are presented later in this thesis. Basically, scope 1 is considering the emissions the company causes directly with its actions. Scope 2 consists of the emissions caused by the electricity company purchase for operating and for heating. Scope 3 consists of all the indirect emissions emitted by some third-party, deliveries for instance. At the company level, it has been seen a good practice to take scope 3 into consideration too as they are indirectly responsible for them. In the product level, on the other hand, the scope 3 inclusion to the carbon footprint calculations is much more difficult to do. For all the supply chain partners and their logistics providers will be consisted of multiple counting and will cause artificially inflating for the emissions allocated to a product. To avoid this, there must be a clearly defined scope 3 related emissions, before the product level auditing begins. (McKinnon 2009, 5-6)

Normally the energy and emissions caused by the manual labor of the product or logistic production are excluded from the calculations. This is justified mainly because it is very difficult to measure the emissions from manual labor. The company using a lot of machinery is then causing a bigger carbon footprint to the product compared to those who use a lot of manual work. This causes a smaller carbon footprint in those factories that are for example in developing countries. On the other hand, when delivering the products to markets, for example in the EU, the carbon footprint of the product can be the same, or bigger, than a product made with the help of machines. (McKinnon 2009, 6)

Also, the starting point and ending point to calculate the LCA must be clearly defined. In genuine LCA the carbon emissions would be tracked to raw material sources or if in the recycled materials, the reprocessing point. Defining the endpoint for the calculations can be very problematic. Most of the pilot cases have assumed the ending point to be the point when the product is on the shop's shelf. This can be problematic when shops go online, and the products are delivered to homes or post offices. On the other hand, the emissions caused after the purchase are hardly available. They vary from user to user. Some can use, for example, furniture decades, some will get a new one after one year and not to mention the variability of consumer travel behaviors and moving from apartment to another. (McKinnon 2009, 6)

Product level carbon auditing can help companies manage their carbon emissions more effectively. It also helps consumers to lower their carbon emissions. When corporations are calculating their product's carbon footprint, they can prevent the emissions by intensifying their actions better and they are able to provide lower emission causing products for the consumers. The content of consumers' retail purchases can be lowered this way. The main benefit of LCA's can be the impact on manufacturers when they are looking closely in additional ways to reduce their emissions. (McKinnon 2009, 12, 15-16)

When interviewed a specialist from The Finnish Association for Nature Conservation it turned out that they do not have a position for this matter. The carbon footprint for products goes to the detailed level which is not covered by the association. Personally, Aho (interview 4.5.2020) thinks that it is an important aspect. It is important to understand that there are so many different kinds of products in the markets. For example, it is very difficult to give guidelines for the products that harm the climate at one point, but in the end, it is causing a positive impact on the climate at the end of its life cycle. It can also be the other way around. The most important factor in Aho's opinion is that communication is as transparent as possible for product users.

## 2.7 Carbon handprint

Where carbon footprint measures the negative side of the greenhouse gas emissions, the actual amount of emissions released to the atmosphere, carbon handprint measures the positive changes of actions, and the beneficial impacts. When the company is operating, it inevitably creates some kind of footprint. It can also provide benefits and a positive impact on the surrounding world. The estimate of those positive impacts is called carbon handprint. It sorts of reflects the commitment to positive actions towards sustainability. A carbon handprint is a relatively new concept compared to the footprint. (Behm et al. 2016, 4-5)

One example to describe the carbon handprint can be for instance an application to phones which reduces the food waste in restaurants or hotels. The application helps corporations globally to save costs which food waste is causing, and it has an impact on one corporates' carbon footprint too. This can be seen as a carbon handprint for companies. The other example could be an elevator that consumes very little energy. When the elevator manufacturing company sells this elevator for instance to China the impact for the building is that it lowers its emissions. It can be seen as a carbon handprint for the building and if this behavior is copied to other buildings it can cause a globally significant carbon handprint. (SitraFund, 2016).

A handprint in product level can mean the emissions which were prevented. The negative matters which causes a footprint were able to make smaller or they were completely avoided. It can also mean that the product is creating positive benefits that would have not normally occur. When speaking about the products, it describes the reduction of the environmental footprint. This can be made through a choice of alternative technology, recycling, reduction of resource use, or overall consumption or being more energy-efficient. (Behm et al. 2016, 5)

The handprint of the whole company can mean the actions one does to reduce the emissions, but it can also mean the positive changes the company brings out to impact other companies or individuals. This includes indirect matters the company reduces while producing goods or services. It also includes the changes in the supply chain company does to make their actions to be more environmentally friendly. If a company is beneficent, they are making their product's or service's handprint bigger than its footprint. They can even produce beneficent products that will not grow the company's footprint at all. Handprint helps corporates to broaden their scope of sustainability and positive actions and impact on company operations, but it also promotes a systematic thinking model to employees. (Behm et al. 2016, 6, 14)

When a company is concentrating on its carbon handprint, it can encourage its suppliers to be more environmentally friendly, too, it can



mean the company is causing positive change in the supply chain. It enables the company to impact to a larger scale to the positive climate actions that just to their actions. For example, requiring certain matters from the subcontractors. For big corporates, it can cause international movement and a larger impact than SME's do. (Behm et al. 2016, 7)

When calculating the carbon footprint and carbon handprint, they have some similarities. They both consider the value chain and the assessment of data collecting, tools, and results of the life cycle forms a good base for calculating both. They both can also be calculated in a company, product, service, process, solution, and supply, and value chain levels. The handprint is different mainly because it focuses on the changes in the future. Where footprint gives the company an answer to how much they have been emitting greenhouse gases in the past year, handprint typically involves comparison to the business as usual situation. In other words, what would have happened without the attempted change? Handprint complement the footprint. Where footprint normally tells one product's or one department's emissions, handprint is considering the wider scope of actions. It can be seen as global even. The concept covers also human health, biodiversity, water consumption, climate change, and social performances. Large handprints can also cover the well-being of employees and their families or the planet and cause positive impacts and effects in this field too. (Behm et al. 2016, 8, 14)

### **3 SOCIALLY SIGNIFICANT MATTER**

This thesis's starting point is the fact that the climate is heating rapidly. The reason for that is human and its actions to use fossil substances to produce energy, to produce commodities, to move, to heat, to cool, to build up houses, etc. Burning fossil substances and discharging other greenhouse gases to the atmosphere are causing rapid heating for the globe. It will cause a catastrophe if it is not lowered the greenhouse gas emission as much as 80% to the year 2050. (Sitra, 2019)

Intergovernmental Panel on Climate Change (later IPCC) can be seen as one of the most important sources for reporting of climate change and global warming. Its main task is to analyze scientifically researched information for national and global decision making of climate. IPCC does reports in researcher groups about climate-changing for countries so they would have the best possible and updated knowledge. (Ilmatieteenlaitos 2020)

Global warming can be seen already in all around the world. For example, the water level is rising, and extreme weather conditions have caused many difficulties. In the summer of 2019, Australia and Amazon's rainforests were suffering for historically big fires caused by dry, hot, and

rainless weather. IPCC talks about these heatwaves on their special report of climate change and land. (IPCC 2019) IPCC released a special report on 2018 about the effects if the human cannot stop the heating to 1,5 Celsius degrees by the year 2100. Earlier the level for the handled climate change was calculated to 2 Celsius degrees, but the new studies revealed the level to be 1,5 degrees maximum. (IPCC 2018)

According to IPCC's report to achieve the target we should change most of our behavior dramatically very quickly and the change should be far-reaching and permanent. We should re-arrange our energy using and production, the building materials should be environmentally friendly (no concrete usage for instance), land using should be planned to form more carbon sinks and our moving and cities should be carbon neutral. IPCC emphasizes that the whole global population should decrease their emissions from 2010 level up to 45% to the year 2030. The total carbon neutralization in the globe should be reached by the year 2050. (IPCC 2018)

To be carbon neutral is just a step to become carbon negative. This means the carbon emissions caused by a human should be lower than the number of carbon sinks can bind. IPCC argues that, in principle, it is possible to temporarily heat more than 1,5 Celsius degrees, but it should be on 1,5 degrees level latest to the year 2100 again. IPCC describes the situation vividly: If the globe is not heating more than 1,5 degrees, most likely the arctic glaciers would melt once in approximately 100 years only. That would also mean that the coral reefs would perish only 70-90%. If we are not able to do it water level will be at least 10 cm higher, coral reefs will be destroyed completely and arctic glaciers would melt about once in ten years. (IPCC 2018).

IPCC's other report from the year 2019 verifies the fact that not only we have to find new solutions for decreasing greenhouse gas emissions. We also need to find ways to use the land better. This report deals with the topics of land use and forests. For example, the production of food needs to change, and we need to build carbon sinks which are forming carbon storages. The report shows how humans can affect the usage of the land: do we want to have it as an emission affecting cause, or do we want to have it as a carbon sink. Forest industry, agriculture, and all the other land-usage causes about one-fourth of global greenhouse gas emissions. Sloppy land use has impoverished the land in many places. Biodiversity has damaged widely and vital carbon sinks like rainforests and swamps are shrinking dangerously. (IPCC 2019)

IPCC's land report lists some key factors to reduce climate change by using the lands. They are such as the protection and rehabilitation of the swamps and peatland, the planting of the new forests, and a significant reduction of meat consumption. IPCC recommends combining the food and forest production in meat consumption so that diversity is guaranteed. The report tries to emphasize also that the stop waste natural resources, food

waste reduction, and finding new, environmentally friendly, technologies help the whole globe's ecosystem. One of the main messages of the report is to afforest new lands and changing the ways to farm. This way we can reduce the emissions and do new carbon sinks. (IPCC 2019)

Finnwatch has researched with Taloustutkimus where they found out that 65% of the Finnish people are willing to change their purchasing habits to prevent climate change. The vast majority (74%) of Finnish people want responsible actions from the companies and they are more willing to purchase the products that are produced with renewable energy. For support of their purchases, they want more information about the environmental impact of products. 67% of the population of Finland would want the companies to inform the carbon footprint of the company's providing products like clothes and food. More than half (56%) would want the law forcing the companies to inform such a thing. The margin of error was 3,2% in the research. (Finnwatch, 2019).

### 3.1 Finland's responsibility

Finland has obligations to decrease the level of greenhouse gas emissions, for example, by the Kyoto Agreement. European Union, its members, and Iceland have set up a target to decrease the emission up to 20% from the level of the year 1990. In the year 2018 Finland's carbon footprint was 56,5 million tons CO<sub>2</sub>eqv. Compared to the year 1990 it has decreased by 21%. These calculations have not been taking into account the land use, its changes, and forestry. Forestry in Finland is such a big sector as if the calculations would consider its effect to be as a carbon sink the emissions would be 30% lower than the previous year (2017). (SVT 2018)

75% of the year 2018 emissions come from the energy sector. Up to 82% of greenhouse gas emissions are carbon dioxide emissions. That makes it a remarkable source of greenhouse gas causes. The emissions from the energy sector increased 3% from the year 2017 but still, emissions were 21% lower than the year 1990. Kyoto's agreements second agreement period will end in 2020. (SVT 2018)

Finland accepted the Paris agreement in November 2016. Paris agreement aims to reach the greenhouse gases peak globally as soon as possible. And right after that, the emissions and carbon sinks should be in the balance by the end of the century. The reason for this is to try to keep global warming under 1,5 Celsius degrees. (Ministry of the Environment 2018)

Finland's current Finance Minister has said that the environmental issues are not enough company and working life oriented. She emphasizes that to achieve the ambitious goals Paris agreement requires, in the future, corporates should be taking more into the center of attention. According to the Finance Minister, emission reductions have been more on the ideological level in the private sector. Now, in the year 2019, unions and

government has agreed on a sort of map for different sectors of industries. So, the sectors causing most of the emissions could find their ways to lower the level of their greenhouse gas emissions. (Kervinen 2019)

### 3.2 What if the government is not supporting?

In all these reports mentioned above the picture for the future is very dark. As mentioned, IPCC uses the best possible sources in their independent researching groups, and they produce large special reports for every country's usage. It is every country to decide whether they want to use the information or not. The reports are long and diverse. For example, it is not necessary to think green walls or green dam in Finland in the same scale it needs to be taking into consideration in the countries that are suffering from land erosion and dust storms. There is made many important international climate agreements: the latest Paris Climate Agreement in 2015. Almost every country put their name on it but 2017 already the biggest carbon dioxide causing country, USA, decided on withdrawal from the agreement. (U.S. Department of State 2017)

Despite the U.S. government's decision to withdraw from the important agreement, it did not stop the companies in the USA to put effort to reduce the greenhouse emissions. (Farber 2018, 2). A lot of big companies like Google, The Bank of America, Walmart, and many more have already considered the willingness to use only renewable energy. Farber's study turns out that the decision to be environmentally friendly and aware does not necessarily need the government's sanctions or recommendations. Even if the government of the U.S. is not following the Paris Agreement at the moment and they have decided to withdraw from it, many major corporations have decided to continue their environmental efforts. (Farber 2017, 4, 14).

Farber emphasizes that when the government in the U.S. is missing out from the agreement the business sector, corporates, need to find other solutions to act. To take the climate change seriously, some major companies have already in the year 2016 set up a Climate Disclosure Project (CDP) which reported more than 600 companies were proactively planning the climate risk. This means that the corporates had already started to add so-called "shadow price" in their business strategies. For example, Microsoft already is charging a small carbon fee from its business groups. They are using that money to even out their carbon emissions, to get green power, and to make the actions more efficient. (Farber 2017, 6-7)

Some regulations in CDP require huge corporations, which are operating in market areas that are not aware of the GHG Protocol, or at least it is not commonly used, to make a sensitive analysis that includes the carbon costs. In other words, if a company is planning to establish itself in a new market that has no proper legislation for the pursuit of the green economy,

the economic analysis must involve some compensation costs. (Farber 2017, 6).

Farber (2017, 10) also presents one very interesting way of doing co-operation with companies for a carbon-neutral future. He tells about one American alliance called Renewable Energy Buyers Alliance. It is a group of huge corporations that are purchasing renewable power for the smaller companies that otherwise would not have the ability to do so. Similarly, Apple has agreed to help China to forest preservation with the co-operation of the World Wildlife Fund (WWF). Apple has also issued green bonds with low margin rates to fund the Chinese company's energy efficiency projects. Basically, Apple is doing this because otherwise the Chinese company's producing its components for different devices would not meet Apple's carbon requirements.

### 3.3 How to become a carbon-neutral company

The Finnish Association for Nature Conservation did a survey in autumn 2019 where they interviewed 16 specialists who oversee carbon neutralism, compensations, and environmental responsibilities in different kinds of organizations. With this survey, they tried to find out what kind of role companies and communities has when it comes to climate targets. They also tried to have answers about how companies could be honestly carbon neutral and prevent greenwashing. (Hiilipörssi 2019, 6)

The results of the survey show, that the most significant matter to get carbon neutral, in specialists' opinion, was the legislation. Both in the European Union and domestic legislation. After these aspects, the next most important, in the specialist's opinion, are renewable energy, low emission transport, and education for the environmentally friendly issues in general. The specialists were almost unanimous that in the future there must be incentives and sanctions more than now. Otherwise, the ambitious goals are unreachable. (Hiilipörssi 2019, 24)

Most of the specialists in the survey clearly emphasized the actions corporates should do in order to get carbon neutral. The path is three-staged:

- Avoid
- Decrease
- Compensate

Avoiding means that companies should get rid of the damaging and unnecessary emissions completely. Decreasing means that the emissions that are not avoidable should be shrinking as small as it is possible. Compensating means that companies should compensate for the rest of the greenhouse gas emissions they are not able to prevent. (Hiilipörssi 2019, 24)

Voluntarily compensation systems are provided normally by non-governmental organizations. (Suomen Ilmastopaneeli 2019) These systems are globally approved quite commonly if they are implemented according to the following:

- The provider needs to testify they are using some commonly approved protocol with their calculations
- When the actions are causing decreased emissions, some independent author should verify them
- The sponsor of the project gets an official proof of executing the compensation into action

The Finnish Association for Nature Conservation has presented a hybrid version for the governmental sanctions to companies. They have demanded that all state-owned corporations should have more sanctions when it comes to environmentally friendly and sustainable business. They see that there should be set legislation for state-owned companies and it would help other companies to look for example from them. The current government in Finland has made a policy that is quite the same as the association has demanded, but it is still not legislation so the situation can change when the government is changing. The specialist says that this demand is quite soft in this sense. (Aho interview 4.5.2020)

### 3.4 Greenwashing

The term greenwash can be a bit dangerous or provocative for the thesis, but it might give a little support for this thesis. As this thesis' project plan includes the marketing aspect too it is justified to go through the concept of greenwashing. This thesis is not considering the marketing area, but this thesis' project will give tools for marketing usage and that is how they are sort of entwined.

Basically, greenwashing means all the actions a company shows to its customers and other partners which are not aiming for genuine emission decreasing. In other words, finding out the carbon footprint is a good thing, but not trying to lower the emissions compared to the base year, makes it greenwash. And if the information of compensating the footprint does not include the aim to lower the level of the footprint. (Hiilipörssi 2019, 34.) Also, little things like taking part in Earth Hour can be seen as greenwash, if the corporations are not doing anything else than just turn the lights off once a year for one hour. (Pearse 2012, 150)

Most of the theory and articles researchers found for the matter of greenwashing were quite provocative. They did not give a good overview, so this question was asked for the specialist in The Finnish Association for Nature Conservation, Hanna Aho. Greenwashing can be something where is a lack of information. The company is telling only half of the truth. She speaks about two different aspects that should be taking into consideration when speaking such matters. The first one is the

communication company does. How and what the company is telling about their actions or improvements and the second topic is the calculations. By this, she means what is taking into consideration when the calculations are done, and what left out. These two factors should be taken into account to avoid greenwashing.

She emphasizes that simplifications in company communication to customers and other stakeholders can be easily greenwashing. She adds, that communication should be very carefully thought through, and instead of using the words “carbon neutral” companies should communicate about the actions they have done to reduce the emissions. It can be the compensation actions or emission reduction acts or other projects a company has done. If they are communicated with transparency and a responsible way, the company could prevent the greenwashing. (Aho interview, 4.5.2020)

She also would like to see the companies concentrate on other environmental impacts caused by the companies’ actions, not only greenhouse gas emissions. If a company could point out how they are affecting the waters, forests, animals, and other organisms in nature, the scale for environmental actions would be greater. Aho would like to see the company communication to be open and transparent, but also when a company calculates the impact of their actions on the environment, it should be a comprehensive environmental assessment. She adds, if something of the calculations is missing out, it does not tell the truth about the company’s emissions. So, special attention should be paid to the calculations. (Aho interview 4.5.2020)

#### **4 PRACTICE-BASED THESIS - CARBON NEUTRAL LUNDIA**

The idea for Lundia to be carbon neutral started on Nordic Business Forum in October in 2019. (von Wendt interview 10.10.2019) The topic came up many times in there and it took a while to find some time to go deeper to this. First Lundia had to figure out what kind of companies do carbon footprint calculations and how much that require time and money resources from Lundia. In a small company where there is a lot to do for everyone, Lundia had to first think who is in charge of this project. I, the researcher, am working as a Sales Manager in Lundia and at the same time studying for Master of Business. It was a natural decision that the project came to him to do and he does a practice-based master’s thesis out of this project.

First, the researcher started to target the topic to more detailed pieces. Lundia’s management group discussed why this is important for Lundia, what this means for the company and their customers and other stakeholders, how the company can use it in their marketing, and how

much time and effort they are going to use for this project. CEO of Lundia made a budget for the year 2020 where there was targeted some money for the project. The costs were calculated based on the offers Lundia got in November and December 2019. There were not calculated any other costs for the budget.

The result of deep discussions was that the CEO of Lundia wanted to know how and when the company could be completely carbon neutral. Lundia's production is almost completely in Finland. Only some little metal parts come from other European countries. The level of domestic production is more than 95% (von Wendt interview 10.10.2019). Of course, the company wants to use this in their marketing too, and that is why Lundia set up the timetable for the project. There is more information about the timetable in the next chapter.

This project can be seen as a part of a bigger plan. Finland, as a country, has set up a carbon-neutral date to the year 2035. (Valtioneuvosto, n.d.) The government of Finland has not set up an objective or goal when Lundia and other SME's need to be carbon neutral. Lundia decided to do their part as soon as it is possible. One of the government's biggest issue to be carbon neutral is energy production. Lundia believes that it is going to be one of their biggest emitters too in their carbon footprint calculations.

Also, Ministry of Economic Affairs and Employment of Finland has together with European Union set an emissions trading system. It aims to keep the greenhouse gas emissions from industrial and energy production plants and flights below the EU-wide gap. This system covers more than 40% of the total greenhouse gas emissions in the EU. In Finland, this means just a little under half the emissions. This can be seen affecting companies too when considering the indirect emissions (scope 2) of any company. (TEM, 2019).

#### 4.1 Carbon neutral – what does it mean for companies?

Suomen ilmastopaneeli's report argues that by the year 2014, companies could define what is carbon neutrality for their company. They said in their report called Kohti hiilineutraalia yhteiskuntaa, that by that time there were not so many companies in Finland that had announced them to be carbon neutral in the future. It was more popular to announce some particular product, or some service or department of the company is carbon-free than the company as a whole. (Suomen Ilmanstopaneeli, 2014, 24).

By the year 2014, other greenhouse gases than just carbon dioxide were not taking into consideration when calculating the carbon footprints, as they are not so easy to calculate. A carbon footprint is seen as how much the company is using fossil fuels in their actions. So, for many companies that try to have a smaller carbon footprint, it also means just a fossil



freeness or as low usage of them as possible. (Suomen Ilmastopaneeli 2014, 26)

The company's motivation to find out their carbon footprint was the knowledge, where they can decrease their expenses and benefit from that, moneywise. The ambiguity of the definition has caused that every company has a habit of defining the concept of carbon neutrality good for its usage. The definition is made from their company's point of view and that can easily corrupt the whole concept of carbon neutral. For example, one company can leave out all the emissions caused by transportation or other greenhouse gases than just carbon dioxide. In many cases, companies leave out the product life cycle too. Some companies use in their marketing communication the word "climate neutral" even if in the closer look they consider for their emissions only carbon dioxide. On the other hand, there are, too, companies that speak about carbon footprint even there is considered the other greenhouse gases too. (Suomen Ilmastopaneeli 2014, 26).

SYKE's research in 2015 is already made a proper study of companies' responsible behavior when it comes to climate matters. This research also argues that there are significant benefits in cost-efficiency for companies when they start to look at their actions more closely. Especially cost-efficiency comes from the energy savings, optimizing the value chain, and from the production lines where the company can find some better ways to manufacturing. The study also argues, though there are companies who after finding out the carbon footprint wants to reduce their emission and lower the level of them to really make green actions, on the other hand, there are those, too, who do not make any changes and just compensate their action with compensation tools. (Alhola et al. 2015, 7.)



it takes so long to launch the marketing actions is the most important fair event of the furniture business in Finland called Habitare. Habitare is taking place in September always. That fair is the best place to launch and kick off the new products or come out with a piece of information like this. (von Wendt interview 10.10.2019).

After October 2019 Lundia started to evaluate and explore what kind of operating companies there are in Finland who can provide the service Lundia needs. Lundia needed a partner who can calculate a company's carbon footprint and who can evaluate the carbon footprint for Lundia's most selling product. Lundia decided to take Puuni Oy as the partner for this. Puuni is introduced in the chapter where are the results of the footprint calculation. The decision making will also be told later.

Puuni was visiting in Lundia's headquarter on 19.11.2019 and soon after the meeting, Lundia decided to choose them for their partner. Lundia approved the offer on 20.12. and the contract was made after Christmas in early January 2020. This followed quite a long period of time where the researcher gathered the information for Puuni. The gathered information is from the year 2019 as the information is almost without exception taking from the whole past year. (Siitonen 2020) The gathered information consists of all the actions that cause greenhouse gas emissions.

- Flights used for work
- How many cars the company owns and how much they drive (gas or diesel)?
- The average of the length of the journey between home and work
- Nights spend on hotels
- Work trips with the car (how many kilometers per year, gas or diesel)
- Used energy: how many kWh, the name of the energy company and how the energy is produced
- Heating system: how the HQ and production hall is kept warm
- Cooling system: how the HQ and production hall is kept cool
- How much we produce waste in our production and what the waste is
- How much Lundia bought electronic devices and what they were
- Transportation for the products

The report and the results came on 6.4.2020. Puuni informed Lundia that they are not able to figure out the carbon footprint for Lundia's product. The reason for that was the fact that Puuni decided to leave that out from their service portfolio when they realized how much more difficult it is. As Puuni is such a young company still, it is normal that the core business of the young company forms all the time. Puuni decided to keep the carbon footprint of the company's actions in their center of attention as it is their core business. Puuni helped Lundia to find a potential partner to calculate the carbon footprint for one piece of furniture. Still in this phase, it was

uncertain if Lundia is going to figure out the product lifecycle too. For this matter, Puuni recommended a company called AFRY Finland Oy.

AFRY Finland contacted Lundia in April 2020 and the offer came in late April. Due to the COVID-19 virus, Lundia decided to postpone this calculation at this point. The project will be taken forward when the normal situation appears.

#### 4.3 Where Lundia is going to use this information and how it should be used?

Lundia wants to release the information in Habitare fair in September 2020. Like it is told earlier Lundia sees this the best time and place to release new information or new products in the furniture business field. Even though the furniture's carbon footprint left out from the original plan, Lundia can tell the intensifying actions they are going to do and the possible compensations they would do to compensate the carbon footprint from the base year 2019. Because of the COVID-19 virus compensation will decide a bit later when the company has seen how it is going to affect its economic situation.

As mentioned in Finnwatch's study made by Tilastokeskus, most Finnish people would want to know more about the Finnish company's carbon footprints. Lundia believes this means they want to know, too, how the companies are reducing the emissions and intensify their actions in such a way they could prevent the carbon footprint to grow. That is why Lundia is going to use the information for marketing matters to let the consumers know Lundia is doing research and it is acting for the carbon-neutral future. (Hollo et al. interview 23.3.2020)

As mentioned in theory, the Protection Expert from The Finnish Association for Nature Conservation mentioned, that simplification in company communication should be avoided. She even mentioned that the carbon-neutral as a word should be used very carefully. It would be preferred to mention the actions and the real matters that have affected the emission reduction. Instead of marketing with the carbon-neutral point of view, it would be more transparent for companies too, to show the real cases they have done for the environment. They can be compensations or reducing emissions for instance. The specialist emphasizes that they want companies to think about the impacts on the environment with a wider scale than just with the greenhouse gas emission. If one company could show they care about the waters, forests, and all the animals and other organisms, and consider them with their action, that would be the best solution for the environment. (Aho interview 4.5.2020) All this should be taking into consideration when Lundia is choosing the marketing actions in the fair event and from that point forward, too.

To prevent the accusation of greenwashing Lundia should be very careful with the communication of the matter. Aho (interview 4.5.2020) argues that the openness and transparency in all the company actions, including the communication, would make the information company provides more credible when thinking about the fair image of the company's green actions. She adds, if a company appoints someone responsible for the environmental matters, it inevitably affects the company's actions. It would be desirable if the responsible person would be in a high position, possibly in the management group, so the impact would become in the company strategy better.

#### 4.4 Responsibilities in the project: who does, when does?

I, the researcher, was named for the project manager because he also needed a topic for the master's thesis. This was a natural way to hand over the project for someone who really needs to put time and thoughts into it. He, also, has always been very interested in biology and geography and has a natural interest in this topic. The topics and things in this nature are easy for him to understand. This further supports why he is in the main charge of this project. He also works in a high position of Lundia so he has the best knowledge of the company and has the permission to act if needed.

Lundia's store manager evaluated the service providing companies. The evaluation process started with Googling the different potential partners. She listed them on excel and started to gather a little more detailed information out of them. All the potential partners were commercial companies, in other words, they were from the private sector. Lundia did not see this problem. Lundia's store manager together with the researcher of this thesis evaluated and decided to meet a couple of them to get a better overview of their services.

The store manager arranged the meetings with the companies and after that, the leading group decided to move on with Puuni Oy. The more detailed reason why Lundia decided to go with Puuni is explained later in the chapter that tells about Puuni's idea, business model, and results.

The contract was made by Lundia's CEO. Marketing planning is made by the development manager of Lundia, who is in charge of Lundia's attendance at Habitare fair. Information gathering was made by the researcher and product manager of Lundia. The researcher will not be a part of the marketing planning or implementing it. He will at the most take part in the ideation where the knowledge of this research and study shows. He also has an overview of the topic itself so the marketing planning group can ask him to join to give the updated information about the theme.

The researcher gathered all the information from Lundia's emissions to Puuni's files. The results came in relatively quickly after the needed information was collected. It took only one week to produce a carbon

footprint. Over that one-week, Puuni Oy asked some additional information that was still unclear, or some they did not get right away from the author. These topics were, for example, the number of employees in the year 2019 and how much was the turnover in the same fiscal year. These indicators are affecting the carbon footprint. The effect of these factors is explained in the chapter that deals with the results. Due to Lundia's strategical change to the year 2020, Lundia will have fewer employees. Still, turnover is estimated to be on the same level as in the year 2019. This is, of course, still uncertain and COVID-19 can affect Lundia's turnover negatively.

As the results came in April 2020 the COVID-19 has already put the world off from its track. The virus affects to this project and Lundia in many different ways. This is explained in a more detailed way in its own chapter later. To this phase, it has such an impact that the results were handled in Lundia remotely via Google Hangouts. Lundia decided already in this phase that they are only going to ask an offer from ARFY Finland Oy, but they would most probably postpone the purchase of the service. For the first time, they discussed Habitare fair too. Is it going to be held at all in the year 2020? Uncertainty in the whole world is affecting this thesis from this point forward.

Puuni gave Lundia an offer alongside the results. Puuni provides to make a carbon sink by planting wood to compensate for the carbon footprint of Lundia from the year 2019. Lundia found the offer to be relatively good and doable. Lundia's management group decided to give time to all in the management group to think about whether to compensate for the carbon footprint or not. In a normal situation, it would have been absolute "Yes" from all the leading group representatives. Due to the threat posed by COVID-19's representatives wanted to think a couple of weeks.

Puuni's next planting was going to be in May 2020. If Lundia decides to compensate their carbon footprint they would have needed to inform Puuni in April to arrange the afforesting material.

## **5 CARBON FOOTPRINT CALCULATION**

Lundia decided to do a contract with Puuni Oy. Puuni was established in 2019 with the mission to count carbon footprints for the companies. At first, they had an idea to calculate the carbon footprint for products too. As they are a young company and had no experience in that, they soon realized it is not so simple to calculate the product life cycle or emissions for the products as it is for corporates. Before Puuni sends in the offer, they understood this and left that service out from the actual offer. The reason why Lundia decided to move on with this company was the kind of thinking about how Puuni can compensate the company's carbon dioxide

emission by planting wood to the places that would not normally be planted. (Siitonen, interview 27.3.2020)

After the greenhouse gas emissions have been calculated for the company, Puuni can offer a compensation package where they plant a forest to meadows that are owned by municipalities. Municipalities for the reason, they normally do not afforest their meadows because they don't have much money to do that. Puuni will afforest the meadow and municipality gives a guarantee that the forest is protected for the next one hundred years. This way the growing forest forms carbon storage when the forest binds carbon from the atmosphere. It forms a real carbon sink because otherwise it would not be afforested at all, and the proper carbon sinks are those which add the forest acreage. (Siitonen, interview 27.3.2020)

Puuni does a Framework Agreement with municipalities about the afforesting and then an Annex Agreement to support the idea that the forest will be protected over the next one hundred years. There are, of course, some important forestry actions that are inevitable to keep the forest healthy and alive, but it will not be cut down. In the opinion of Siitonen, clear-cutting is going to end, inevitably. He forecasts that in the next two decades they are going to end because the researches already show that clear cuttings have dramatically worse effects on the climate than the cuttings that will not harvest the whole area completely empty. In Finland, it can take twenty to fifty years before the forest can be carbon sink after clear-cut areas because the released carbon from clear-cut areas is much more than the areas where all the trees are not cut down. (Siitonen, interview 22.4.2020)

From the Finnish Association for Nature Conservation's point of view, the clear-cutting should end as soon as possible. They have had a campaign called clear-cutting to history, which aims to end the clear-cuts in states' lands completely. That campaign started an initiative for Finnish citizens that has already come up with some results. The state does not own all the forests, but the association sees this show as an example from the state level how the forests should be handled. The specialist from the association could not say if the clear-cutting is going to end entirely, but it is going to decrease. The researches have already shown the trends, how continuous forest growth can affect the carbon dioxide releases, and for a forest to be a carbon sink. That, too, is still forestry but it is still better for the climate to handle the forest with continuous growth method. Especially peatlands should not ever be cut clear. There is a common pressure to use the forests also from the peatlands, but they should never be cut clear for environmental and emission reasons. (Aho interview 4.5.2020)

Even the campaign from the association is not covering all the forest owners they still see that the sanctions to the Finnish government set up a trend of how the big private owners start to treat their forests. It gives a

good example for the others. The association sees that all the recommendations, sanctions, and pressure to forest owners, government, and for different industries is important when protecting forests. (Aho interview 4.5.2020)

If the forests would only be considered about their ability to bind carbon nowadays, the spruce forests would be the most efficient ones. Unfortunately, climate change is causing so much heating that the coniferous forests are not surviving at least in eastern Finland in the near future. That is why Puuni has decided to afforest mixed forests that are mainly deciduous forests. Deciduous trees are most probably going to last the whole one hundred years on its place where the coniferous forests would be very unlikely able to last the whole one hundred years. In other words, the forest will be resilient when facing global warming. (Siitonen, interview 22.4.2020)

The forest planted by Puuni is not going to be homogeneous for the reason of pests. The pests do not thrive in mixed forests consist of several different tree species. That is why Puuni is planting many kinds of trees to the meadows they choose to afforest. In addition to the diverse forest also comes the fact that the diverse forests form more ecological trays. That enriches nature and allows different kinds of species to live in the forest. (Siitonen, interview 22.4.2020)

Lundia found this kind of thinking proper for their values and they see this was the only good way to carry the responsibility of their emissions from the year 2019. As Lundia's main product is made of Finnish pine they use the carbon sinks to their products quite much. They don't see this as a problem since the wood is raised responsibly. Lundia has over 70 years of experience in making of their main product, Lundia Classic, and from looking closely to this history they know that the life cycle for their furniture is several decades. (von Wendt, interview 17.2.2020)

Lundia is using only PEFC certificated wood for its products. All the wood used for Lundia Classic shelves is from Finland. The forest owners are private owners who are committed to treating the forests as a PEFC certificate requires. (von Wendt, interview 17.2.2019). This certificate can guarantee that the forest is taking care of the most responsible ways. For example, it means that the forest's diversity, its health, and growing is guaranteed. It also means it is used for the recreational purpose of humans. To get the certificate it is a must to have documentation and transparency for the whole production queue so you can always track the origin of the wood. PEFC certificate also means that an independent authority can check the documentation and do check-ups for the forest. The authority is not linked to any of the parties who will benefit from the forest, so it is an independent party. (PEFC Suomi - Suomen Metsäsertifiointi Ry, 2019)



By this point, it is already certain that Puuni is not able to calculate the carbon footprint for a particular product. So, this chapter will consist of only the footprint for Lundia's HQ and Logistic Department where the production and packing are made. Along with this building, Lundia has only one 80 square meter showroom in Helsinki that was not founded yet in 2019 so it is not included in the base year's calculation. After Puuni announced they are not able to find out the Lundia Classic shelf's carbon footprint or product life cycle, they started to find a partner who could do this, and right after the calculations were ready, they recommended Lundia a partner called AFRY Finland Oy.

### 5.1 How the chosen partner calculates the footprint for Lundia

The carbon footprint accounting gives a general overview of Lundia's greenhouse gas emissions, converted into CO<sub>2</sub> equivalents, based on reported data from internal and external systems. These data are mentioned earlier in the timetable of the project. The analysis facilitates the identification of possible measures to reduce energy consumption as well as the overall carbon footprint.

Suomen ilmastopaneeli has announced in 2014 what carbon neutral as a subject means in different fields of actors. Suomen Ilmastopaneeli's report says what carbon neutralization means for companies. Companies should divide their emission and actions into 4 scopes. (Suomen Ilmastopaneeli 2014, 13)

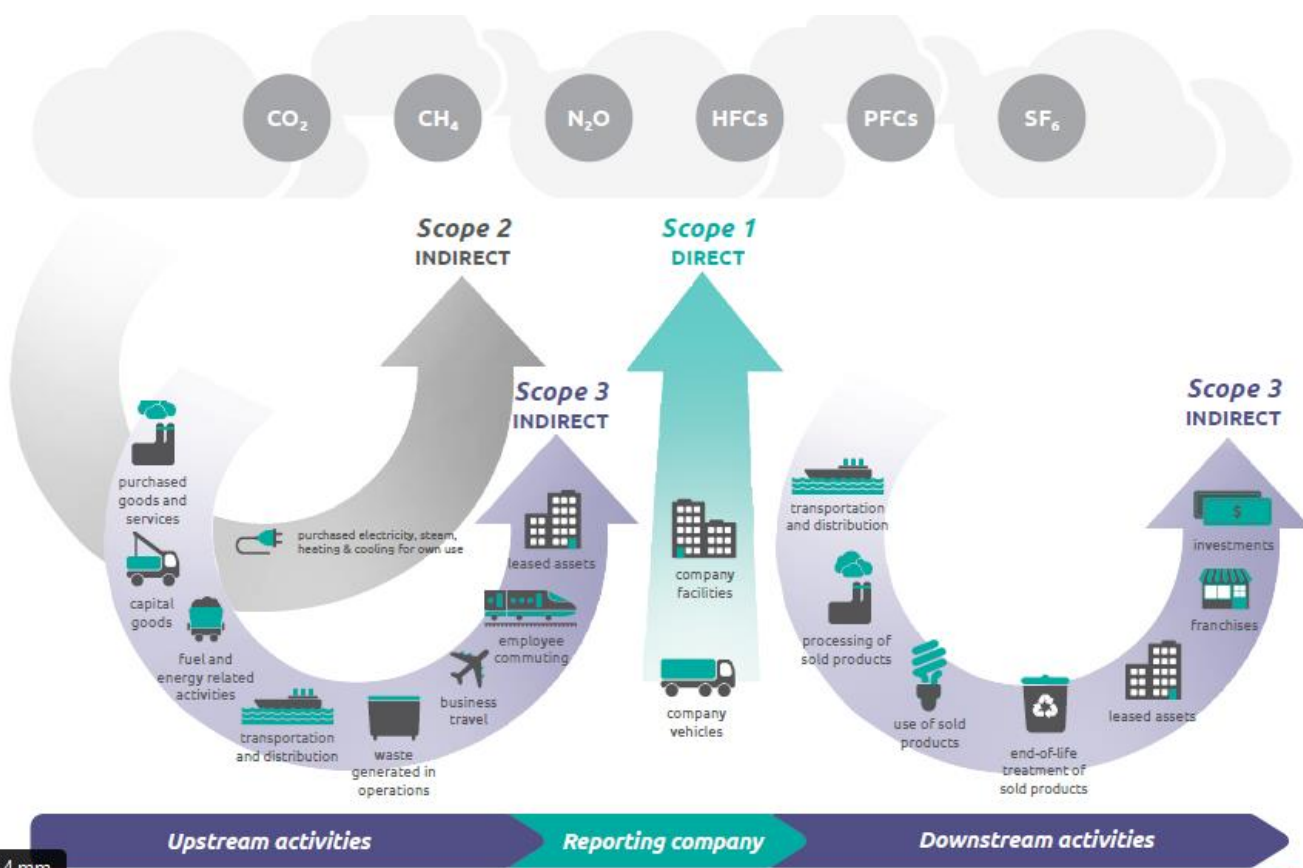
These scopes are:

- Scope 1: Direct emissions the company causes. For example, oil or gas usage for their own use or the emissions caused by trucks and cars of the company's own cars
- Scope 2: Indirect emissions the company causes. This consists of the emissions of energy (electricity) causes when it is produced for company usage. It also means the emissions caused by district heating.
- Scope 3: These are some other indirect and fugitive emissions the company causes in its everyday actions. For example, the hotel stays, commute, transportation, and production emission causes.
- Scope 4: Means the compensations the company uses. The idea is to lower as much as possible the Scopes 1-3 and then compensate the rest of the emissions that are not possible to avoid. (Suomen Ilmastopaneeli 2014, 13)

The reason for companies to compensate for their emissions and reduce to cause greenhouse gas emissions is the customers in Ilmastopaneeli's opinion. Suomen Ilmastopaneeli argues that the customers that want to

buy commodities and services from the company that acts responsibly are the only motivation for companies to do the wanted emission reduction. It says in their report that the carbon footprint must be calculated under the guidelines of the International Organization for Standardization (ISO). (Suomen Ilmastopaneeli 2014, 13)

The carbon accounting is measured by using standards and guidelines, such as the Greenhouse Gas Protocol. The international standard the Greenhouse Gas Protocol Initiative (GHG-protocol) is an accounting tool to manage greenhouse gas emissions. Today, hundreds of companies and organizations around the world are using GHG Protocol standards and tools to manage their emissions. The standard was developed through a decade-long partnership between the World Resources Institute and the World Business Council for Sustainable Development. The Greenhouse Gas Protocol Initiative is working with businesses, governments, and environmental groups around the world. (Greenhouse Gas Protocol n.d.)



215,9 x 279,4 mm

Figure 2. Reporting boundaries of the GHG Protocol. (Puuni Oy 2020)

The methodology considers the six most important greenhouse gases: carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF<sub>6</sub>). These are converted into CO<sub>2</sub> equivalents based on their global warming potential. (Puuni Oy, 2020)

## 5.2 The results of the emission calculations of Lundia

The results were ready on 6.4.2020. As mentioned before, the base year is, almost every time, the past whole year. In this case, the base year was 2019. The results give Lundia a starting point to intensify their actions and it helps the eye to catch the right emission causing actions. The amount of carbon dioxide is informed by tons of CO<sub>2</sub> equivalents (CO<sub>2</sub>eqv.). This abbreviation version of the words is from Puuni's report for Lundia.

The report consists of three sections: methods, results, and recommendations. This part of the thesis is going to explain those three sections more detailed. The results are divided into three scopes that are explained too and marked to the pictures to make it clearer.

The report itself will not be published because Lundia wants to keep it partly confidential but all the results can show by the separate wish if needed. One of the Lundia's core values is openness in all the actions. Lundia wants to be open, flexible, and show high-quality standards in all the actions, performances, and products we produce. Anyhow, this report is made for inner usage so we can make better tomorrow. (Hollo et al. 23.3.2020)

Below you may find a chart where all the three different scopes are separately informed. The three scopes are direct emissions of Lundia coming from the production, indirect emissions which means bought energy and last the other indirect emissions from the value chain. These are explained shortly in more detail.

In the base year, 2019 Lundia's carbon footprint was 99 tons CO<sub>2</sub>eqv. As mentioned before the turnover and the number of employees have been taking into consideration too. The number of employees is affecting this around 5 tons CO<sub>2</sub>eqv per employee and the emissions per revenue were 34 tons Co<sub>2</sub>/M€. (Puuni Oy, 2020.)

Source	Emissions tnCO <sub>2</sub>
Direct from the production (Scope 1)	<b>6,180</b>
Indirect, bought energy (Scope2)	<b>52,941</b>
Indirect from the Value Chain (Scope 3)	<b>39,516</b>
<b>Total</b>	<b>98,637</b>

Figure 3. Total CO<sub>2</sub> Emissions of Lundia. (Puuni Oy 2020)

Above, you may see the closer amounts of the CO<sub>2</sub> emissions of Lundia's HQ and operations. In the next picture, you may find the percentages. Scope 2 (bought energy, electricity) gave the largest source of GHG-emission with a 54% share. The Scope 3, value chain, (combined purchased goods and services, waste, business travel, and employee commuting) emissions were around 40% of total emissions. Scope 1 emissions (direct from the production) were only 6% of Lundia's total emissions.

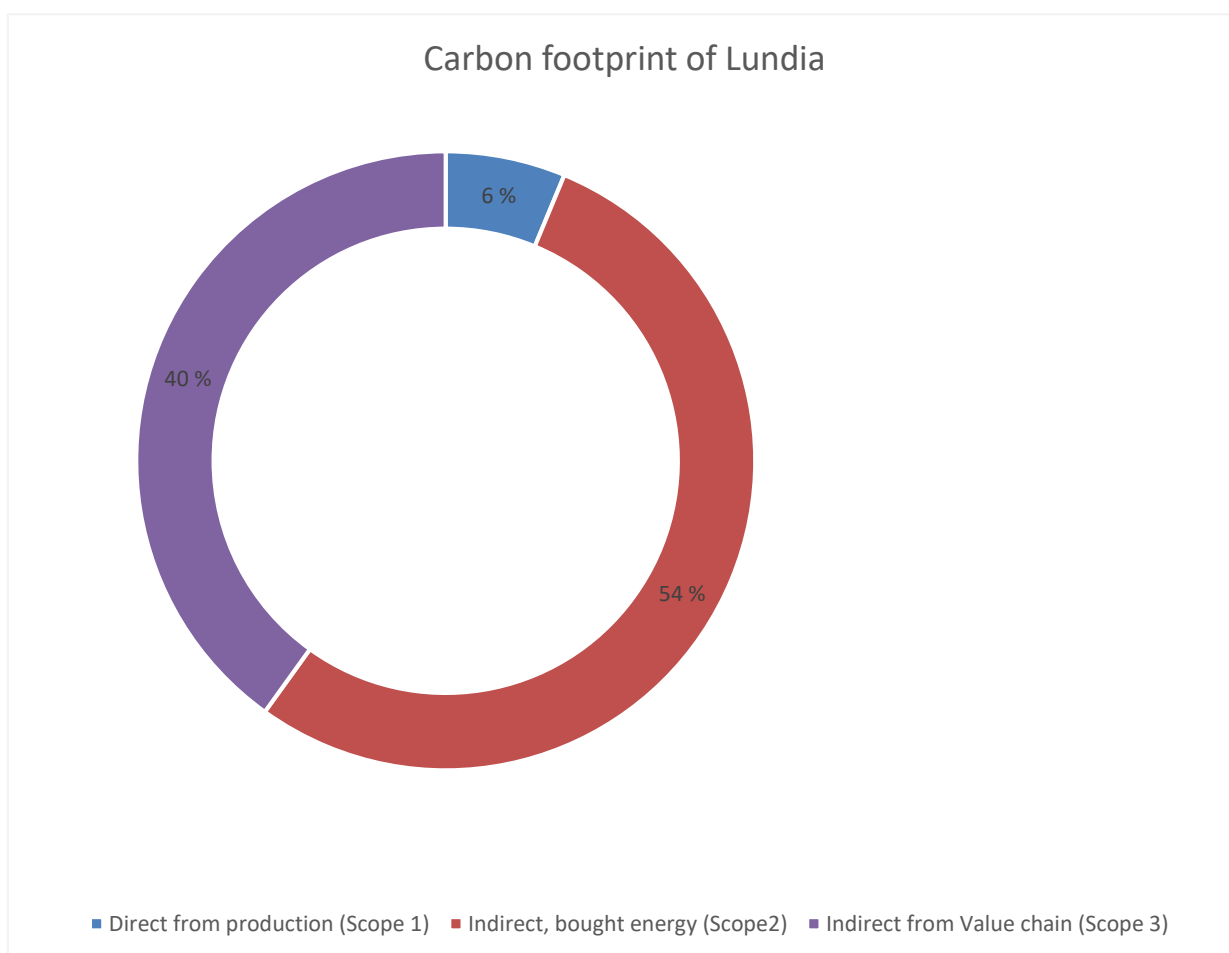


Figure 4. The carbon footprint of Lundia. (Puuni Oy 2020)

Scope 1 consists of all direct emissions from company-controlled sources, such as internal transport with company vehicles, own energy generation, and other emissions that come from unintentional releases such as equipment leaks, for example, hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment. Basically, in Lundia it means the following:

- Lundia has one company vehicle and that's consumption was counted in. Lundia's production plant is heated by own heating system based on the combustion of wood chips (renewable) hence no emissions from that. There is a backup oil burner for heating, in case of running out of the wood chips. The amount of fugitive

(momentary/brief) emissions from cooling are zero since the production plant does not use cooling devices and the office cooling device has not ever been filled.

- Lundia has one vehicle (diesel-powered) that had approximately 15 000 kilometers of work-related driving during 2019 resulting in emissions of 2558 tons of CO<sub>2</sub>eqv. Lundia's back-up heating system was used for ten days during 2019 resulting in the use of 1000 liters of crude oil that equals emission of 3662 tons of CO<sub>2</sub>eqv. Combined these make up 6180 tons of CO<sub>2</sub>eqv Scope 1 emissions. As mentioned, it was 6% of Lundia's carbon footprint

Scope 2 includes all emissions from purchased energy: electricity. Service provider emission factors for Lundia is Keravan Energia Oy. Lundia has not bought, by far, renewable energy certificates (RECs). When doing the data collection, it turned out that Lundia used 171.531 kWh energy in the year 2019. The used electricity was made 11,1% out of renewable sources, 44,8% out of nuclear power, and 44,1% out of fossil fuels such as peat, coal, and oil.

Bought energy	kWh	Emissions CO <sub>2</sub> (tn)
Electricity	171 531	52,941
<b>Total</b>		<b>52,941</b>

Figure 5. CO<sub>2</sub> Emissions caused by electricity usage. (Puuni Oy 2020)

Scope 3 includes purchased goods and services in the year 2019. Including two mobile phones, two laptops, and two computers. Waste from production consists of 2450 kg of mixed waste and 2440 kg cardboard. 12 flights were resulting in 31966 flown kilometers during 2019. 40 000 kilometers from cars (diesel) not owned by the company related to business travels. As well as 80 nights in the hotel. Ten employees drove average 40 kilometers a day for the employee, commuting, resulting 80 000 kilometers in 2019.

Direct emissions (scope3)
Purchased goods and services
Waste from production
Business travel
Employee commuting
<b>Total</b>

Figure 6. Carbon indicators for Lundia in their value chain. (Puuni 2020)

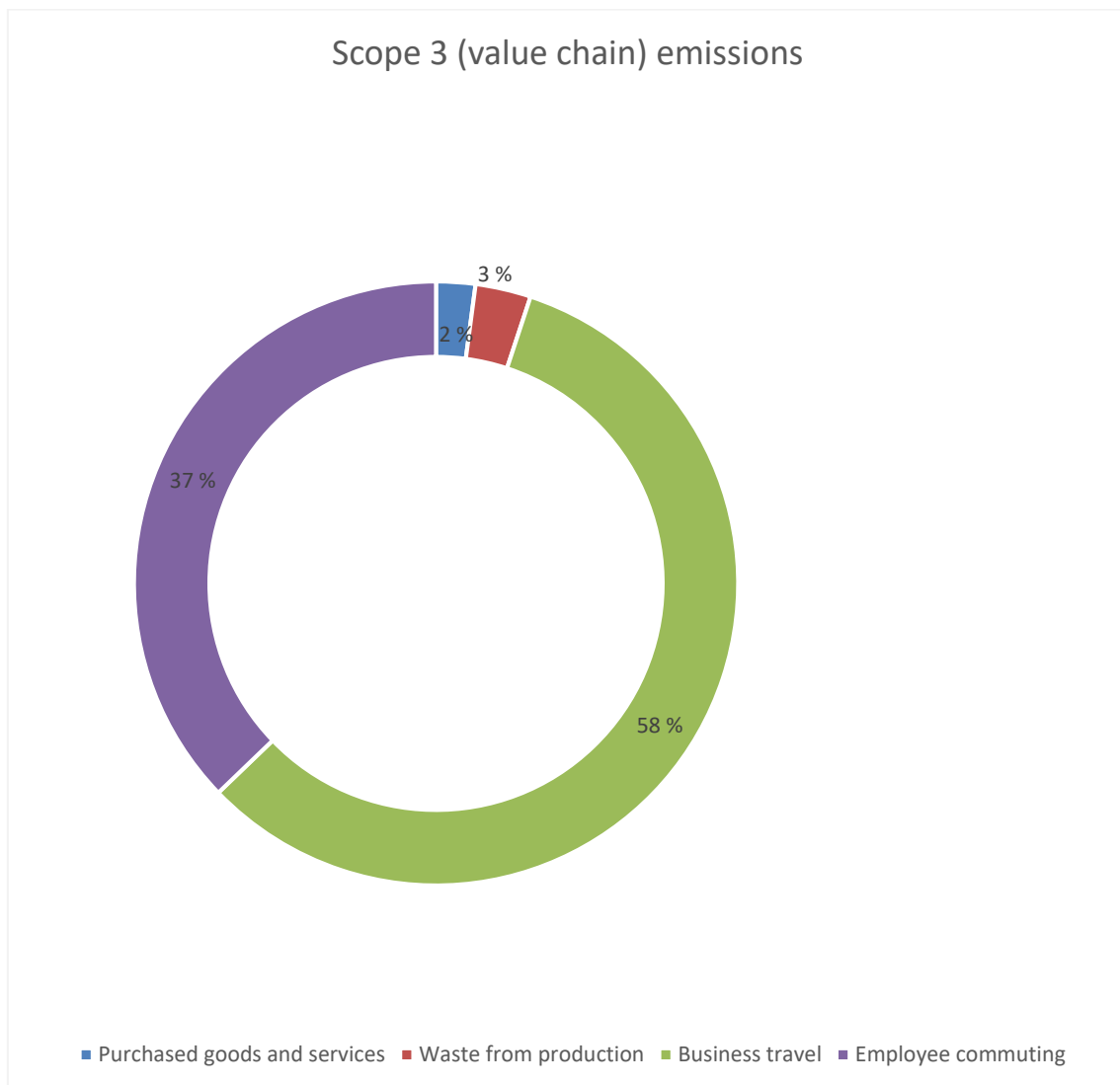


Figure 7. Value chain emissions. (Puuni 2020)

Business travel was the biggest emission causing factor within calculation boundaries in the value chain (scope 3) with 58% share. Around 2/4 of this came from air travel and 1/4 from driving a car and 1/4 from hotel nights. Employee commuting was the second biggest emission source with a 37% share of scope 3 emissions. Purchased goods and waste resulted in only 2% and 3% share respectively. These are around 1% of total emissions as shown in figure 7 above.

### 5.3 Recommendations for Lundia

Puuni's recommendations for Lundia was to watch closely to indirect emissions. The major source of emissions came from indirect emissions of bought energy, electricity to be precise. It could be feasible and very cost-efficient to buy electricity produced by renewable energy sources that result in zero emissions. This leaves for Lundia to decide. Puuni gives a complimentary that Lundia was willing to add the employee commuting to scope 3. This way it gives detailed information and realistic version of the real emissions of Lundia. Puuni emphasizes that these emissions are not

easy to reduce. It always makes the footprint a lot bigger for one company, but it is important to add them to calculations too.

Puuni gives Lundia very positive feedback also about the heating its factory and HQ with wood chips. Burning is happening in the same yard where the factory is, and this causes such a small carbon footprint as only 6% of the whole footprint.

Lundia decided to postpone the compensations due to the coronavirus. The researcher interviewed the co-founder of Puuni Oy, Juha Siitonen, by phone, to ask his opinion of what the next steps could be to become carbon neutral still. Siitonen suggested Lundia intensify their actions in the year 2020 and after that, do a new carbon footprint calculation. Lundia could evaluate how they have improved their actions compared to the earlier the base year 2019. He also recommended releasing some of the Concerns Policy which could lead to a more environmentally friendly direction. Then, each of the companies in SINI Group can decide what kind of actions they are willing and afforded to do. In the opinion of Siitonen, this could help Lundia very much to become carbon neutral. Lundia is not able to decide how the energy they are using is manufactured. If Lundia would use energy that is made from renewable sources the invoices from the energy company can be a bit higher now. But when Lundia decides to compensate their carbon footprint the afforesting costs would be lower if Lundia could decide what kind of energy they are using. This would affect to Lundia's carbon footprint remarkably. (Siitonen, interview 22.4.2020)

All in all, Siitonen hopes the positive cases are seen around the world, where the polluting and decreased consumption of fossil fuels due to coronavirus, has cleared the air so much that the cities have had a clear vision to tens of kilometers, is going to wake the larger groups to understand how humans can affect to the climate. He hopes that countries, cities, and individuals would wake up now, when they can see the difference clearly with their own eyes, to see how economic growth could happen in a much more sustainable way. (Siitonen, interview 22.4.2020)

#### 5.4 COVID-19 effects

COVID-19 set the world out from its track in March 2020. When the project started in October 2019, Lundia's big strategic change was coming soon to the implementation phase. It took a lot of effort from company workers and the start of the project was very slow. When there finally was time to act, the virus started to spread in Europe and all around Finland, and on the 12<sup>th</sup> of March 2020, the World Health Organization (WHO) announced COVID-19 as a pandemic. (Lääkärilehti 2020). By the time this line of this thesis is written, the virus is spreading approximately 80.000 cases per day worldwide. (The Ulkopolitist 2020)

To this thesis COVID-19 affected in several ways. And not just in a negative way, there were positive aspects too. First, the positive thing was the time researcher had to put in writing and studying. Doing it alongside the normal day job would have stretched the timetable significantly. Now, the lockdown forced everyone to stay home and avoid social contacts to avoid the virus's rapid spreading.

The other positive impact was its affection to the climate. All around the world flying, moving, or any kind of social gathering is forbidden. At least for a very short period, it is widely reported of the effects that happened when air pollutions have vanished. Unfortunately, the scientist has assessed that the impact will be extremely small to climate change. Climate change can be prevented only in a long period of time and its very likely that the COVID-19 virus will not be a problem for humanity in 2021 anymore. Hopefully, the positive experience for breathing bright air and seeing far affects to big cities and countries in the world. (The Ulkopolitist 2020)

The negative experiences the virus brought with is the economic problems for companies and states. The reason for the upcoming recession is unseen and it is uncertain when the limitations and boundaries are over. By the time this thesis is written all the sports events around the world have been canceled. All the restaurants, libraries, museums, swimming halls, almost every gym, sports halls, schools, day-cares, movie theatres, theatres, many shops, etc. are shut down in Finland and globally. In March-April 2020 more than 4500 companies started employee co-operation negotiations in Finland. It considers by the time this thesis is written about 400.000 Finnish people. (Verkkouutiset 2020)

The impact of this thesis comes from the economical aspect. The uncertainty mentioned above, and the threat of unseen global recession put this project on hold. Lundia could not do the project in its entirety. Lundia did found out its carbon footprint formed from its HQ and Logistic Department. Lundia could not compensate for their carbon footprint at all due to the economic uncertainty virus came along. Also, it was not possible to decide whether to figure out the footprint for a single piece of Lundia's most selling shelf or not. Cashflow was slowing down a bit during the spring and new orders coming in was slowing a bit too. It is still very uncertain if there will be any Habitare fair this year.

Lundia was following the situation every week. The situation changes very fast day after another. Due to the uncertainty of COVID-19 is causing, the writing of this thesis is not going to continue to September 2020 as it was planned. The aim was to write the conclusions after the trade fair event. The idea was to write open the feedback from consumers and people working in the field. Since the project got the uncertain end on this point researcher decided to leave that phase off from this thesis. Worst case scenario, if the big B2B customers of Lundia are falling to bankruptcy



Lundia can fall too. That is one reason too, why the researcher wants to end the thesis sooner than it was planned.

When interviewing the specialist of The Finnish Association for Nature Conservation, it was also asked about their opinion of the impacts of the virus causing to the environment. She was seeing the climate effects caused by the virus, but she was clearly emphasizing the effect will only be temporary. She speaks about the Paris agreement that shows the emissions should decrease from the year 2020 forward. Aho says that the estimates of how much the emissions are reduced this year vary widely in different estimates. Emissions will most likely be decreased and it is lethal for an environmental point of view, where governments are pointing the recovery money now. (Aho interview 4.5.2020)

Unfortunately, Aho was quite worried about the situation. Aho told that some of the decisions made by the governments are pointed to the fields that are not supporting the environmental goals set globally. For example, Norway and Finland, just to mention a few, are supporting their airlines (Norwegian and Finnair) to survive over the COVID-19 crisis. Many of the large economies, countries, are giving support to the actions that are not helping to achieve the set goals for the environment. Aho adds, that the supportive actions should be pointed to green economic recovery. Green investments are not so much more expensive compared to the fossils, that there would not be afforded to do that. She thinks that Finland has emphasized green recovery, if not thinking about the Finnair case. But more, Aho thinks the EU has the greatest potential for green recovery actions now. She is leaning to research where 75% of the EU citizens would like to see investments in green actions. (Aho interview 4.5.2020)

## **6 CONCLUSIONS AND OPTIONS**

This chapter deals with the conclusions of the project: what was made and what left out from the original plan. As mentioned, the project faced unseen difficulties which could not have been foreseen. Despite the difficulties, the thesis was made but the project itself got smaller. At least some of the actions must be postponed. This chapter deals also with the subjects that the next researcher could study. Criticism is going to point out some mistakes or things could have been done differently. Criticism also points to the carbon footprint's real size and things that were left out from the calculations.

### **6.1 What was made and what left out**

By the time the project started, Lundia wanted to figure out their carbon footprint. The aim was to figure out how and when Lundia can be carbon-

neutral too. The CEO of Lundia wanted to find a partner who could calculate the carbon footprint from Lundia's HQ and Logistic Department and one of the most selling single pieces of furniture too. Partners were evaluated and studied before doing a contract. Lundia decided to make a contract with Puuni Oy. By the time the evaluations were made, Puuni thought they could do the carbon footprint for furniture too, but along the project, they figured out that is out from their core knowledge. They decided to find another partner for Lundia to that matter.

For the reasons mentioned earlier, Lundia decided to postpone that part of the project where they are going to figure out the carbon footprint for their furniture. The carbon footprint for the HQ and Logistic Department was ready on the 6<sup>th</sup> of April 2020. It shows that Lundia's carbon footprint was approximately 99 tons CO<sub>2</sub>eqv. The biggest part of that was the indirect greenhouse gas emissions (scope 2). That means the energy Lundia uses in the building. Puuni's most significant proposal or suggestion for Lundia was to intensify their actions by changing the form of energy-producing. If Lundia could use energy that would be produced only with renewable sources, Lundia's carbon footprint would be significantly smaller. On the other hand, that could mean the costs would maybe raise. This leaves for Lundia to investigate, evaluate, and decide.

Lundia has three main values: high quality, open, and flexible. These values formed in 2014 as a result of the management group's deep discussions. As there were almost six years since the last discussions were properly made, Lundia decided in January to have a Kickoff-event for the whole organization in March. That was postponed to the end of May so the discussions would have been able to be written down to this thesis. That plan was again postponed to autumn 2020. That is why this thesis could not deal with the values which might have changed over the years.

After the carbon footprint was figured out Lundia got an offer from Puuni how they could compensate their footprint from the year 2019. Puuni offered afforesting in the city of Mikkeli in Finland. Puuni's main idea is to afforest the meadows that are owned by municipalities. These meadows would not otherwise be afforested. In the first place, Lundia decided to move on with Puuni for this reason especially. Lundia thought this supports their values and this was how a genuine carbon sink would be born. Afforesting would have been taking place in May 2020. Lundia would have got a QR code from Puuni after the meadow was afforested. This QR code Lundia could use in their marketing materials widely. Behind the QR code is a satellite picture from the very meadow where the trees were growing. This way the compensation process in Lundia's opinion would have been very transparent and verifiable. Unfortunately, Lundia could not do this part of the project either. Afforesting and compensate their carbon footprint will take place somewhere in the future when the cashflow is normal again. It would not have been sustainable business from an economical point of view because the risk was too high.

Also, the aim was to interview one other CEO or corporation under the same Group, but the researcher was not able to reach any potential persons for this matter. The interview would have given guidelines on how to become more environmentally friendly on a bigger scale too, and not just one company of the Group. Still, this can be made afterward, and the discussions can be made on the board level if wanted.

If the uncertainty shows up like this globally, we can think this is not doing good for the climate crisis. As mentioned at the beginning of this thesis the polluting and emissions are, in this very moment, decreasing rapidly but the fear is, this would affect in a negative way to the climate in the long run. In a public speech, many have emphasized, for example, Sitra's Secretary-General Jyrki Katainen, that the companies would think further and put the effort into so-called green economic growth now. At least right after the crisis is over. (Yle Areena, 2020)

## 6.2 Difficulties along the way

As many of the projects, this faced difficulties on the way too. First and for the most COVID-19 changed the whole project dramatically from March 2020 forward. On the other hand, the researcher had a lot of time to put to this thesis due to global lockdown. As this is a practice-based thesis, the idea of leading the project to an end and do the conclusions including the feedback from it, was impossible. This can affect the quality of this thesis, but the researcher decided to end the thesis before the planned deadline. There were two significant reasons for that. First, it is uncertain that Habitare fair 2020 is even possible to arrange in September 2020 due to COVID-19. Secondly, the virus affects the slowing cash flow for the company, so the budget needed to be freeze in April 2020.

According to the CEO of Lundia, the project needs to be postponed from that part where was supposed to figure out the furniture's carbon footprint and compensation actions. This decision was made from budget reasons and for the uncertainty features. Lundia has as strong willing to proceed with the project still. (von Wendt interview 21.4.2020)

## 6.3 Criticism

Difficulties appeared also in the data collecting phase. The needed information was in small crumbs and that required a lot of time and effort. Lundia needed to inform plenty of different data considering commuting, flying, moving, energy-using, heating, cooling, transportation, etc. In this phase, the transportations were left out from the calculation. Transportation in this sense means the deliveries for the furniture to the customer's homes and the transports from the subcontractors' factory to Lundia's Logistic Department. To calculate all these would have taken a lot

of additional time and effort to find them out. Lundia uses transportation mainly in Finland but there is some export too. In the year 2019 mainly to Germany, Sweden, and Denmark. Some of the transportation is paid by the third party so Lundia cannot affect how and what delivery companies they want to use for the purpose.

This was decided to leave out as mentioned. The choice was Puuni's and Lundia's joint decision. Partly this manipulates the actual size of Lundia's carbon footprint. The real size of it must be bigger considering the amount of transportation Lundia does yearly basis. Partly this can be seen as a socially significant matter too. Trucks are the only possible transportation instrument for Lundia. While trucks are still moving with fossil fuels it does not give Lundia any other choice. The companies who can use the train for transportation can deliver products with a smaller emission. Since Lundia is selling ready goods and not raw material, the deliveries are normally done to consumer's homes or the retailer's warehouse. For this kind of transportation, there are no other options than just use trucks.

In other words, Lundia can say they have found out their carbon footprint and greenhouse gas emissions from the year 2019 as far as the Logistic Department and HQ are causing. They were not able to continue this further even it was planned. Now, one thing Lundia could do is the actions to lower the carbon footprint. They could use it in their marketing if wanted. At least after the COVID-19 crisis is over, they should think about the environmental issues and consider using it in their marketing then.

As mentioned in this thesis before, tree harvests diminish the carbon storage totally. At least clear-cutting, where all the trees are cut down, leads to increased carbon emissions. Once the new trees are planted, the carbon sink slowly starts to bind the carbon again. Finland is a northern country which means it can take decades when the forest is binding the carbon as much as it did before harvest. (Aalto et al., 12)

This leads to thinking about Lundia's product range. The most important product for Lundia is branded under the name Lundia Classic. This same product has been produced more than 70 years out of Finnish wood. This means a lot of used forest and harvesting over the decades. Since Lundia cannot avoid using the wood in their core product could they use, or at least study if it is possible to use, wood which is not from clear cut areas? There could be something to explore in this topic: to figure out how they could be more environmentally friendly, when, inevitably, they are wood from carbon sinks.

On the other hand, the wood for their products comes always from Finland where the wood and paper industries are very important for the economy. Harvesting will happen from the same forests as they are cutting the wood and the raw material comes from the sawmills that produce the timber. Besides, Lundia cannot affect to the subcontractor's purchases. The

subcontractor producing Lundia the shelf parts is a relatively big company in the region of eastern Finland. The wood they purchase is not for Lundia to decide. The quality of the product and the wood quality determine the purchases. Not the way they are harvest.

Criticism is also directed at the aim to be carbon neutral and not carbon negative. As the thesis tells the aim is to be carbon negative in the future, and relatively small company as Lundia could put effort into the actions that make them carbon negative. So that they would bind more carbon than they cause greenhouse gases. Maybe solar panels for the Logistic Department would lower their energy usage. But first and for the most, they should intensify their actions, especially indirect emissions, compensate the rest of it, and then think forward to the carbon negativity phase.

Renewable energy productions would still be the first step to do. The reason why Lundia cannot decide what kind of energy they are using comes from the Group. Lundia is part of the Group which has the policy to do competitive bidding yearly to have better conditions. This consists, for example, energy, transportation, internet connections, telephone companies, etc. This is affecting Lundia's carbon footprint dramatically, as mentioned in the results. To prevent and avoid the emissions in the future it would be crucial to let the companies in the Group decide the actions that are affecting the climate. This would help the individual companies to reduce their emissions if they could decide some of the contents of the contracts made by Group. This is the most significant criticism of the company's behavior in this thesis.

#### 6.4 Topics for the next possible researcher

As the thesis was the practice-based thesis, it considers only one project from the start to the end. Inside this project, some tasks mentioned in the timetable are postponed but they are still under the researcher's responsibility. The interesting thing would be to find out the carbon footprint of Lundia in 2020. How they have intensified their actions, and have they lowered their greenhouse gas emissions from the base year? And how they could use this in their marketing and sales. As Lundia's CEO emphasized, Lundia is against disposable culture, could they be genuinely against greenwashing too?

One interesting topic to research would also be to study more detailed what actions Lundia could intensify so they could lower their carbon footprint as small as it can be. Lundia is already using their heating plant and the heating is happening with renewable sources but what else there could be? Could they try to lower their indirect emissions from the value chain (scope 3) and how? Should Lundia encourage to use only electric cars for example? Is encouraging to use electric cars, in general, the right thing to do and how that is correlated with society's level? One very interesting

topic would be, also, how much the work-related flying changes due to COVID-19. Not just in Lundia but in general.

The third topic could be how and when Lundia could be carbon negative permanently. What actions it requires and is it still too expensive to execute. What actions should change in Lundia to lower the caused emissions and how much the carbon negativity would cost after that? And maybe how much is enough to be under the level of caused greenhouse gas emission? This matter did not come up in this thesis.

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## Appendix 1

## INTERVIEW QUESTIONS FOR HANNA AHO

1. Does The Finnish Association for Nature Conservation have an opinion on how SME's should or would decrease their greenhouse gas emissions?
  - a. ways and means?
2. To reach the state's target, should there be more sanctions for companies to reduce global warming causing emissions?
  - a. do you have concrete means in mind?
3. What is The Finnish Association for Nature Conservation's view on clear-cutting?
  - a. Will it end at some point?
  - b. What are they causing?
  - c. What would be the ways to get rid of them?
4. How should a product life cycle calculation or emission be taken into account when calculating a company's carbon footprint?
  - a. If they are not taken into account, will the actual emissions be distorted?
5. What kind of thought COVID-19 brings to your mind when speaking of climate change?
  - a. Can this worsen or improve the outlook for the future?
6. What do you think is greenwashing and how could companies avoid it?