

# Building the Future

- A case study on creating a climate neutral construction sector in Malmö, Sweden

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# Abstract

The climate on our planet is changing, and with it the conditions for its people. As the need for housing grows, the construction sector will have to balance increasing environmental requirements with a continuous need for construction. In order to do so, Sweden has a national roadmap with set goals for climate neutrality. But the question of how to work toward the set up goals remain as there is no common methodology in place. This essay therefore aims to look at in which ways the Swedish construction sector is working towards climate neutrality and what obstacles lie in the way of this goal. Using mixed methods of document analysis and interviews, this study looks at the case of a local initiative and roadmap called LFM30.

The study showed that LFM30 has produced a common methodology of climate budgeting from which connected members should work, and a climate promise with yearly goals on the way towards climate neutrality in 2030. Additionally the initiative has created a platform for sharing and exchanging knowledge surrounding questions related to sustainable construction. By dividing the construction process into six focus areas the initiative has enabled progress to be made on multiple fronts as well as collectively. Some challenges in the process is incentivizing members to join, for connected members to balance the role of their work in LFM30 with their other role of the connected actor, and how to actually become climate neutral. The initiative has built up an organization and methodology which is seen as plausible to introduce also in other places. Proving that change is possible, LFM30 could therefore be leading the way for the Swedish building sector on the way towards climate neutrality.

*Key words:* LFM30, Sustainable Construction, Climate Neutrality



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# 1. Introduction

## 1.1 A changing climate

The world we live in is in constant change. The climate has been fluctuating for as long as the planet has existed. But for thousands of years the climate on the planet has been in a state of equilibrium, with a concentration of carbon dioxide in the atmosphere of 280ppm<sup>1</sup> (Letcher, 2021). Carbon dioxide is a gas that together with other gases, such as methane and water vapor, stop some of the infrared heat that is refracted off the surface of the earth after having been heated by the sun from leaving the atmosphere. This phenomenon is known as the greenhouse effect, with the gases causing it called greenhouse gases. Without it the temperature on the planet would be around 33° Celsius cooler than it is today. The concentration of greenhouse gases and carbon dioxide in the atmosphere has increased since the beginning of the Industrial Revolution. In 2020 the level of carbon dioxide in the atmosphere reached 417ppm, a significant change compared to the pre-industrial revolution levels. These increasing levels of CO<sub>2</sub> in the atmosphere is in our time widely accepted as the reason the climate is changing, and human activities such as the burning of fossil fuels being the cause (Letcher, 2021).

The past six years have been the warmest in recorded history and in 2020 the global overall temperature was around 1.25° Celsius warmer than pre-industrial times (Voosen, 2021). This human induced changing climate will have potentially devastating and widespread effects for both nature and people (IPCC, 2022). The risk of an environmental collapse is increasing, and signs of this can be seen in a higher frequency of extreme weather events such as floodings, droughts, and water-crises (Letcher, 2021). Other effects of climate change include desertification, loss of biodiversity, sea-level rise and ocean acidification (United Nations, 2015a). Natural disaster resulting from the changing climate can in turn

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<sup>1</sup> In parts per million, referring to the ratio of number of CO<sub>2</sub> molecules in the atmosphere to the number of molecules of all gases in the atmosphere.

indirectly result in human-made disasters such as reduced ability of land to soak up water due to urban development. In the wake of changing climate more land will become inhabitable and there will likely be an involuntary migration from lands unable to support growing of crops and from areas threatened by rising sea levels, also bringing a potential risk of further human conflict (Letcher, 2021).

Climate change is one of the biggest challenges we face going into the future, and one of the biggest threats to achieving sustainable development. The United Nations' Intergovernmental Panel on Climate Change (IPCC) have stated that human actions to decrease carbon dioxide and other greenhouse gases, especially in the built environment, can limit the increase in global warming (IPCC, 2021).

### **1.1.1 International commitment**

On an international level there are several agendas and plans set into motion in order to reduce or delimit the effects of global warming. One of the most significant ones being the 2030 Agenda for Sustainable Development.

This agenda builds on the concept of 'sustainable development', which has become something of a leading theme and buzzword for the times we now live in. But the actual meaning of the concept is hard to pinpoint as it has been associated with a plethora of definitions, meanings and interpretations since its first use (Mensah, 2019). Withstanding criticism, it is a concept today more or less implicit as a method to create a 'good' future society and a concept which can be found in most planning and policy documents (Campbell, 1996).

Sustainable development revolves around the ability of humanity to create development which meets the needs of the present without endangering the ability for future generations to meet their own needs (WCED, 1987). There is no absolute consensus regarding the definition of the concept, but based on the Brundtland Commission's report "*Our Common Future*" and the Rio document "*Agenda 21*", a general consensus has been reached regarding the concept including competition and cooperation between economic, ecologic and social aspects (also called dimensions or pillars). In this there is also an inherent institutional aspect which is often forgotten (Littig & Griebler, 2005).

As the term sustainable development has been criticized for being ambiguous and open to a wide array of interpretations, a clear definitions of the concept and explanations of the involved aspects is essential in order to be able to translate it into practice (Mensah, 2019). Different interpretations depend on how the individual sees the concept, how they value and prioritize different aspects and their inherent contradictions (Campbell, 1996). In this the 2030 Agenda defines sustainable development as; "*development that meets the needs of the*



*present without compromising the ability of future generations to meet their own needs” (United Nations, 2015a).*

When operationalizing the concept of sustainable development a divide between one-pillar models and multiple-pillar models is typically made. One-pillar models give ecological aspects a higher priority as ecological sustainability, from this point of view, is vital for the existence of other aspects. Therefore the main goal of one-pillar models is to protect and preserve the ecological systems and resources, and the economic system and social concerns are seen mainly as the biggest threats against sustainability (Littig & Grießler, 2005).

On an international level of sustainability discourse the perhaps most well-known model is a multiple-pillar one called the three-pillar model. This model builds upon a triple bottom line concept where balance has to be reached between the three pillars in order for sustainable development to happen. In other words ecologic, economic and social aspects have to be balanced (Klarin, 2018). The three pillar model has been criticized for limiting the concept of sustainable development to only these three aspects, where some mean that the concepts should additionally encompass say a political-institutional pillar (Littig & Greißler, 2005).

The 2030 Agenda conceptualizes sustainable development as the harmonization of economic growth, social inclusion and environmental protection (United Nations, 2015a). Based on this three-pillar model, the agenda was in 2015 adopted by all member states of the United Nations and is meant to show the way forward for peace and prosperity for the people of the planet. At its core there are 17 Sustainable Development Goals often referred to as SDGs. These goals are built upon years of work and several previous United Nations conferences and summits, as well as the Millennium Development Goals and Agenda 21. In order to measure development these goals come with 169 targets (United Nations, n.d.)

The set up goals in the 2030 Agenda are comprehensive, far-reaching and people-centered, with an end-goal of a world where all life can thrive. The goals are grouped into the categories people, planet, prosperity, peace and partnership. All of these goal areas are intertwined and balance the three dimensions of sustainable development. The agenda recognizes that social and economic development is to some level dependent on the sustainable management of the planet’s natural resources (United Nations, 2015a). When it comes to goals set for the planet, the agenda states;

*”We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.” (United Nations, 2015a p.3)*

In regard to climate change the 2030 Agenda recognizes the United Nations Framework Convention on Climate Change as the primary, intergovernmental forum for discussing questions relating to the global response to climate change (United Nations, 2015a). This framework convention took place in 1992 and established the Conference of the Parties (COP), which among other things review national communication and emission inventories submitted by the parties (UN, 1992a; United Nations, 2022). The 2030 Agenda recognizes international cooperation as needed in order to reduce global greenhouse gas emissions if there is to be a chance of keeping the global increase in average temperature below 2 or 1.5 degrees Celsius more than pre-industrial levels. This goal was set in the Paris Agreement on Climate Change, also from 2015, which was adopted by 196 parties at COP 21 (United Nations, n.d.). The Paris Agreement is a legally binding international treaty (United Nations, 2015b).

The 2030 Agenda was to be incorporated by each country on a national and regional level in order for countries to be able to handle their own specific challenges in reaching sustainability. Goals and targets set up take into consideration the different capacities, levels and realities of the nations. Due to this, the nature of the goals are aspirational and global where every government can set their own national targets and decide how these should be incorporated into national policies and strategies (United Nations, 2015a).

Having aspirational and global goals goes well in hand with the nature of sustainable development. The concept has been criticized for having vague and holistic goals, deemed to be set too far into the future to be operationally used in daily activities (Hill & Bowen, 1997). In Sweden the 2030 Agenda and the 17 Sustainable Development Goals have been incorporated within national and regional strategies (Regeringskansliet, n.d.) From a global perspective Sweden is at the forefront of driving the change of the 2030 Agenda and the country ranked highly in several global comparisons during 2020 (Regeringskansliet, 2021).

## 1.2 A changing world

The population of the world is increasing, and is expected to reach 9.8 billion around the year 2050. Already today over half the world's population, more than 4 billion people live in urban areas (Ritchie & Roser, 2018). This megatrend of urbanization is projected to be continuous, and overall about 67% of the world population is expected to live in urban areas by the year 2050 (Koop & van Leeuwen, 2017). It should, however, be noted that there is a broad distribution and density for urbanization across different parts of the globe and also varying accounts on how 'urban' is defined (Ritchie & Roser, 2018). Cities take up only

about 2% of the land surface on the planet but stand for 75% of global CO<sub>2</sub> emissions. Due to population growth and migration from rural areas to cities it is expected that around 190.000 people per day will need to find a new place to live (Koop & van Leeuwen, 2018). This, in turn, will lead to a continuous need for construction and the Global Alliance for Buildings and Construction has in a report stated that the building stock is set to double by 2050 (Global Alliance for Buildings and Construction [GABC] et al., 2019).

With an increasing demand on the limited resources of the earth and a growing awareness of questions related to the big issues of our time such as global warming, the concept of sustainability has become more present also in areas outside of environmental science (Halliday, 2008). The principles of sustainable development are crucial for the survival and well-being of urban areas. As climate change and construction are interlinked, a strategy for addressing climate change should also include sustainably changing the design and operation of the built environment in order to reduce carbon emissions (Kibert, 2016).

The 2030 Agenda for sustainable development recognizes sustainable urban development as vital to the quality of life. Through a safe use of chemicals, a reduction and recycling of waste, a more efficient water and energy use the Agenda sets the goal for minimizing the impact cities have on the climate system. This can be seen in the 11<sup>th</sup> Sustainable Development Goal, which is “*to make cities inclusive, safe, resilient, and sustainable*” (United Nations, 2015a).

Here the term ‘sustainable construction’, a subset of sustainable development, which addresses the role of the built environment in reaching the overarching goal of sustainable development, comes into play (Kibert, 2016). Sustainable construction, like sustainable development, has been given a number of meanings since its first appearance. One of the earliest conceptualizations of the term was to describe the construction sector’s responsibility in achieving sustainability by conserving scarce resources and promoting a healthy environment (Det Udomsap & Hallinger, 2020).

The construction sector is today one of the most environmentally damaging sectors globally, consuming over 50% of all raw material extracted (Murtagh et al., 2018; Ruuska & Häkkinen, 2014). Responsible for almost 40% of energy- and process related emissions globally (GABC, et al. 2019), the IPCC has recognizes the construction sector as one where significant improvements in terms of environmental impact are both necessary and possible to achieve. The construction sector, here seen as civil engineering and building construction industries, thus has the possibility to play a significant role in moving development towards a more sustainable path (Hill & Bowen, 1997).

The construction sector is often characterized by its complexity, large number of stakeholders throughout the value chain, transient organizational structures and avoidance of risk. Factors seen as critical in influencing higher

levels of sustainability are policy, regulation and market forces, but the fragmented nature of the sector can act as a barrier (Murtagh et al, 2020). In recent times environmental concerns have taken up a bigger space in the public debate concerning construction. Core concepts such as sustainability, resilience, environmental impact and social value have emerged and reflect an ongoing process which will hopefully lead to a construction sector with a diminishing impact on the climate. Research within climate change in relation to construction encompasses a wide range of topics across several different disciplines which also can complicate the progress (Murtagh et al, 2018).

Applying sustainable construction approaches in the built environment is today often referred to as 'green building' or 'green construction' (Kibert, 2016; Det Udomsap & Hallinger, 2020). These concepts refer to the quality and characteristics of the buildings themselves. As for how to measure this, the most commonly used method for determining sustainability in construction is by using a building assessment or a rating system. These provide criteria and a grading system from which to judge. This way of thinking had its breakthrough in the late 1980's with a building assessment system known as BREEAM (Building Research Established Environmental Assessment Method). The system proposed a standard definition for green building, and also means to evaluate the performance of a building after the requirements of the assessment system. Following the success of BREEAM many countries developed their own assessment systems (Kibert, 2016).

A study conducted by McGraw Hill Construction in 2013 found that the construction of green buildings is accelerating in pace and is becoming more and more common all over the world. The same study showed that companies no longer work with green construction mainly in order to 'do the right thing' or trying to have a positive sustainable impact. Instead the most cited triggers for green building worldwide were client demand, market demand and branding/public relations. The actors taking part of the study still indicated that they wanted to have a positive impact, but it had moved from being the top priority to being further down the list as the concept of green construction entered mainstream business (McGraw Hill Construction, 2013).

Since the emergence of the term, sustainable construction has challenged developers and builders to adopt a more sustainable practice when it comes to the design and management of construction projects. Sustainable construction, in practice, requires significant changes in every phase of construction projects, including site selection, land use, design, material use, project management etc. This, in combination with the construction industry in many cases being motivated by economic gains, makes a transformation into sustainable construction practices a difficult undertaking (Det Udomsap & Hallinger, 2020).

In Sweden the construction sector generates about 20% of the country's total greenhouse gas emissions (Boverket, 2021a). The sectors yearly climate impact

has been calculated to be equal to about 15 billion tonnes carbon dioxide equivalents, including imports and indirect effects but excluding emissions connected to heating<sup>2</sup>. To put this in context this number almost equals the total emissions from national transports. More than half of these emissions come from materials and services, where manufacturing of construction materials create approximately 80% of the climate impact of the construction process. Transportations to construction sites as well as the construction of the building itself together in turn stand for about 20% of the sector's climate impact. These numbers can, however, vary due to the conditions of individual projects. The construction industry is of great importance to the Swedish economy as it contributes to growth, development and wealth. The sector has a yearly turnover of about 1.100 billion SEK and it employs roughly 550.000 workers (Fossilfritt Sverige, n.d.).

On a national level as well as globally, the sector has long been seen as a laggard when it comes to transitioning towards climate neutrality (Ramboll, 2021). Fragmentation with a number of actors in long and complex value chains is characteristic for the sector nationally, making it difficult for individual actors to have a comprehensive strategy when it comes to research and development (Fossilfritt Sverige, n.d.; Ramboll, 2021). There is also a project-structure within the industry which makes long term development and exchange of skills more difficult. Pilot projects can have gotten far in terms of level of development but scaling up and spreading change once again becomes a slow process due to the sectors fragmented and project based nature (Fossilfritt Sverige, n.d.).

There is a nationally increasing awareness of the environmental impacts from the construction sector, along the line of an increasing awareness for environmental questions in general (Fossilfritt Sverige, n.d.). This increased awareness is generating tougher national standards within the sector (Boverket, 2021b), and from the first of January 2022 all new buildings will need a climate declaration reporting the climate impact of the new building in question (Boverket, 2021d). Simultaneously, there is an increasing need for housing as the Swedish population is growing and a housing shortage can be identified (Statistikmyndigheten, 2021; Boverket, 2021c). In order to fulfill the need for continuous construction as well as fulfilling stricter requirements, the sector needs to adapt.

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<sup>2</sup> Including the emissions connected to heating the total carbon dioxide emissions land on over 22 billion tonnes carbon dioxide equivalents.

### 1.2.1 National commitment

In Sweden, governmental climate-related work is since 2018 governed through a climate framework consisting of a climate law (SFS 2017:720), climate goals and a climate politic council (Naturvårdsverket, n.d.). In line with the 2030 Agenda, Sweden has set a national goal of zero net emissions of greenhouse gases by the year 2045. This can be compared to the European Union and most non-EU Schengen European countries having set the goal for becoming climate Neutral by the year of 2050 (Elavarasan et al., 2022). 2050 is the year which the IPCC have stated that emissions would have to globally reach net-zero in order to limit global warming to 1.5° C (IPCC, 2018).

Climate neutrality is a concept implying that there are zero net-emissions of greenhouse gases to the atmosphere. The IPCC states that net-zero means that there is a balance between the anthropogenic emissions of greenhouse gases released to the atmosphere and the anthropogenic removals over a specific time (IPCC, 2018). This balance can be reached by reducing the levels of greenhouse gas emissions to an as great extent as possible and compensating for any remaining emissions (Nicolaidis, 2021).

With an increasing interest in sustainability in regards to climate change, net-zero pledges have become a statement strategy for many companies, governments and organizations. But there is no common international criteria or standard in place to measure or judge how these actors are doing in terms of reaching their goals which makes it complicated to assess the pledges. This could partly be due to an inconsistency in terminology. For instance the concepts ‘climate neutral’, ‘carbon-neutral’, and ‘net-zero’ are often used interchangeably due there not being a standardized definition in place (Larrea et al., 2022).

For it to be possible to reach climate neutrality by 2045 in Sweden, there needs to be change in all sectors, including the construction sector. In order for this to happen the construction industry came together, within the frame of the government initiative “Fossilfritt Sverige”, to make a plan with common goals for the sector called *Roadmap 2045*. This national roadmap aims to create a climate neutral as well as competitive construction sector by bringing together key actors throughout the value chain of the construction process. Climate neutral is in the national roadmap defined as *“zero-net emissions of greenhouse gases to the atmosphere. Meaning that the emissions that do occur can get taken up by the ecological system or through technical solutions and thus not contribute to global warming”* (Fossilfritt Sverige, n.d.).

The industry organization Byggföretagen is since 2018, together with seven other industry organizations, the driving force behind the work with the roadmap. They in turn give yearly rappers to government initiative “Fossilfritt Sverige”. Over 160 companies, municipalities and organizations are part of the work with the roadmap (Byggföretagen, n.d.).

In order to reach a climate neutral value chain within the construction industry by the year of 2045, the roadmap has put down goals along the way. These goals are as follows;

- 2020-2022: Actors within the construction industry identify their emissions and set up climate goals
- 2025: Greenhouse gas emissions show a clearly declining trend
- 2030: 50 % decrease of greenhouse gas emissions<sup>3</sup>
- 2040: 75 % decrease of greenhouse gas emissions<sup>3</sup>
- 2045: net-zero emissions of greenhouse gases

To reach these goals there needs to be a complete life cycle perspective when it comes to planning, design, construction and use of the built environment. The national goals existing today refer to emissions which take place within the Swedish boundaries. But in order to actually achieve a climate neutral and competitive construction sector the roadmap concurs that all emissions connected to the construction process have to be considered, no matter what country they occur in or what time during the life cycle they take place (Fossilfritt Sverige, n.d.).

In order for the set up goals to be reached the steering group of the roadmap have identified five key factors; (1.) Cooperation, leadership, and knowledge, (2.) Long-term ground rules making investing and transitioning to climate neutral materials as well as processes possible, (3.) A shift from linear to circular processes, (4.) Access and efficient use of bio-based raw material, and (5.) Public procurement as a motor for change (Fossilfritt Sverige, n.d.).

### **1.2.2 Local commitment**

The construction industry stands for more than 20 % of the climate impact in the City of Malmö. The city has the goal of becoming the most climate smart city in Sweden and is the first city in the country to ratify the 2030 Agenda of Sustainable Development (LFM30, 2021b). It is also the location in which a local roadmap is working to advance the work of reaching the goals set up in the national roadmap.

This local initiative, and organization, is called LFM30. The goal of the initiative is to create a geographical arena to speed up the process of creating a

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<sup>3</sup> The goals are set in comparison to the greenhouse gas emissions of 2015 and are in absolute tonnes of carbon dioxide equivalents

climate neutral construction sector, making the sector climate neutral by the year of 2030 compared to the national goal of 2045 (LFM30, 2021a).

The organization is driven by its members who all agree to take their responsibility for their individual part of the transition. The organization is made up by a managing group, a steering group, a coordinating group and a secretariat. The partaking actors have agreed to be transparent, measure, follow up and communicate their commitments continuously (LFM30, 2021c).

With a step by step plan to gradually optimize the construction process and increase the requirements on all actors within the construction process the LFM30 initiative strives to lead the way to a more climate neutral construction sector. The initiative has an overarching goal of all new construction, reconstruction and building maintenance, as well as infrastructure being climate neutral by the year 2030 (LFM30, 2021b).

## 1.3 Objective and Research questions

With a background of a construction sector which in the coming years will have to balance increasing environmental requirements with a continuous need for construction this essay aims to look at in which ways the Swedish construction sector is working towards becoming climate neutral and what challenges and obstacles lie in the way of this goal. This will be done by looking at the local initiative LFM30 in Malmö.

The research questions are:

- Which ways are the LFM30 initiative working to reach the local and national goals of climate neutrality?
- What challenges lie in the way of reaching the set goals?

### 1.3.1 Delimitations

The study will be delimited to looking at the specific case of LFM30 within the Swedish construction sector. This will delimit the study geographically as LFM30 is a local initiative based in Malmö. In addition to this the choice has been made to look at the organizational part of LFM30, and on how the initiative works towards climate neutrality.

The organization of LFM30 has different managing bodies, and is split into six strategic focus areas which all have their own work group. This study is



limited to looking at the work of actors from within the work groups along with the work of the actors within the managing group. Focusing on the overarching work of the initiative and the work groups there will be limited possibilities to delve deeply into the specific focus areas of the project, but this could very well be further investigated in a future study.



## 2. Method

In order to analyze the Swedish construction sector's way towards climate neutrality this study used a mix of methods. By looking at a single case study and combining document analysis with semi-structured interviews this essay intends to get an in depth insight into how goals on climate neutrality can be reached. The results of the data gathering were analyzed through qualitative content analysis and theme development. The first research question will be answered both through document analysis and interviews, and the second research question will primarily be answered through interviews.

### 2.1 Case study

Case studies are prevalent in a variety of different disciplines and can therefore be interpreted in different ways. Common for all these interpretations is the idea that the case study looks at a limited unit, but for what purpose and to what extent they generalize and particularize can differ (Perry, 2011). One interpretation is using a sample of a unit to generate credible theoretical explanations which may be generalizable and transferable in an analytical sense (Baxter, 2021). This way of using locality to see larger patterns or societal trends is one of the ways in which case studies have been used historically (Perry, 2011), and also the way this particular study relates to what a case study is and how it is performed. Case studies can consist of many different cases in a so-called multiple case study or a single case. If the case itself is the primary interest of exploration this is called an intrinsic case study (Mills et al., 2010).

This project is a qualitative, single case study, which focuses on the specific case of the LFM30 initiative in Malmö, Sweden. Given the limits and scope of this project, looking at a local and specific initiative was deemed a good option to get an insight into the world of sustainable construction and climate neutrality. By looking at this local initiative the aim was to get a better understanding of the general situation on a larger scale, in accordance with the theoretical understanding of case studies this essay is based on. In order to conduct a case study on the LFM30 initiative a mix of document analysis and interviews were used within the frame of the case.

## 2.2 Document analysis

Document analysis is a qualitative research method, and a systematic procedure for reviewing and/or evaluating documents. In the process data, most often in the form of text, is examined, appraised and interpreted in order to give it understanding, meaning or to develop empirical knowledge. This method combines elements of content analysis with elements of thematic analysis (Bowen, 2009). Document analysis as a method, can sometimes be seen as a vague concept due to the fact that it lacks common, clearly defined characteristics. It is therefore important to delimit not only which documents are to be analyzed but also in what way they will be analyzed. In order to create a deeper understanding document analysis is often paired with other methods (May, 2011), which is also the case in this study.

### 2.2.1 Choosing documents for analysis

In terms of evaluating the usefulness of a document John Scott (1990) suggests four different criteria; authenticity, credibility, representatively and meaning. In the case of this study these criteria have been used. The documents chosen for analysis have been found to be authentic, from credible sources, and representative for documents within the field. In terms of meaning, the two questions: what kind of document is it and what does it tell us, have been asked. In regard to these two questions documents were chosen if their content and origin were seen as relevant for the research questions.

Documents do not exist in a vacuum as neutral objects, but must be considered in the context they are taken from in order to make them understandable and analyzable (May, 2011). In document analysis, as in all research, it is important to be critical, and in this the original purpose of the document along with the intended audience should be considered (Bowen, 2009). Therefore the questions of why the document was produced and for what reason have also been taken into consideration when choosing what documents to conduct the analysis on. Since the documents chosen are connected to the LFM30 initiative they have a purpose which aligns well with the research questions of understanding how the initiative is working towards climate neutrality.

The documents chosen for this project are connected to the single case study. LFM30 has two key documents connected to its organization; the local roadmap for LFM30 and the statutes of the organization (LFM30, 2021c). Apart from this

there are documents presenting how the initiative works and yearly result of the work on both a project- and company level as well as documents on how the work towards climate neutrality is to be measured and progress accounted for (LFM30, 2021d). A selection of what have been considered the most useful documents, those describing the initiative and the way it works towards climate neutrality have been chosen for analysis.

The documents chosen for analysis in this project were;

- Local Roadmap for LFM30 – *”How we collectively develop a Climate Neutral Building and Construction Industry”*
- LFM30 Method for Climate budgeting - *”Beräkning och redovisning för klimatbudget, version 1.6”*
- LFM30 Climate promise – *”Översikt LFM30:s klimatlöfte version, 1.6”*

### **2.2.2 Criteria for analysis**

As previously mentioned, document analysis often combines elements of content analysis with thematic analysis. Content analysis can be quantitative, often focused on how often certain words or phrases are used in text (i.e. counting and measuring), or qualitative, more focused on processes and societal context (i.e. interpreting and understanding) (May, 2011). Thematic analysis is a concept which has had a number of meanings over time and has also been used interchangeably with the term content analysis. Today, the most used approach is in research within the qualitative paradigm, where coding and theme development is conducted on the analyzed text. (Clarke et al., 2015).

So what separates qualitative data analysis from thematic analysis? Qualitative analysis is a broader term encompassing different types of data collection and analytical approaches. Though both approaches use a context-based framework for analysis, they have different terminologies and different levels of description and interpretation. Qualitative content analysis allows for a more free development of categories rather than themes. This development of categories can then in turn be used as a ground for theme development. Thematic analysis can therefore be seen as a form of qualitative content analysis (Vaismoradi & Snelgrove, 2019).

This study has used qualitative content analysis as it aimed to look at correlations and patterns rather than to measure or count. In this content analysis there are characteristics of thematic analysis present. In order to conduct the analysis the text has been coded for reoccurring categories and themes. During the initial read-through categories and themes related to the research questions as well as sustainable development, sustainable construction, and climate neutrality were

taken note of. The initial categorization of the data was kept open for modification in order to be able to branch them out or change them if necessary. Due to the comparative nature of coding, this allowed the answers to not only be confined only to a pre-set range of categories (May, 2011).

## 2.3 Interviews

In addition to the document analysis this study also consists of interviews with a number of actors within LFM30. The actors come from varied sectors but their participation in the LFM30 initiative binds them together and is the most relevant factor to this study. People which have been interviewed are either in the managing group of LFM30 or group leaders of the different work groups within the project. The people interviewed were;

- **Member of managing group 1** - Urban planning strategist at Malmö city. Came up with the initial idea for LFM30 and is one of the initiative takers behind the project. Member of the managing group of LFM30.
- **Member of managing group 2** - Regional Project Manager at Vasakronan, Sweden's largest property company. Member of the managing group for LFM30.
- **Group leader 1** – Scientist at RISE in the unit for wood construction. Also lecturer and scientist at the faculty of Industrial Economy at Linköping University, specializes in business development and sustainability. One of the group leaders for Work Group 1: Business models, Incentives & Collaboration.
- **Group leader 2** - Researcher at the Division of Building Materials at the Faculty of Engineering at Lund University (LTH), specializes in bio-based building materials. One of the group leaders for Work Group 4: Climate Neutral Building Materials.
- **Group leader 3** – Development Manager and architect at FOJAB, one of the leading architecture firms of Sweden. One of the group leaders for Work Group 4: Climate Neutral Building Materials.
- **Group leader 4** – Environmental Manager at Wihlborgs, market leading property company in the Öresund Region. One of the group leaders for Work Group 5: Climate Neutral Management, Operations & Maintenance.
- **Group leader 5** – Logistics Manager at Beijer Byggmaterial AB, the biggest completely owned construction trade chain in Sweden offering construction materials, tools and services. One of the group leaders from Work Group 6: Climate Neutral Building Sites and Transports.

The actors were initially contacted through email and given information on the purpose of the interview and the project. These emails were sent out to all the members of the managing group as well as to at least one representative of each work group. Following this a time and place for the interview was set for the actors interested in participating. Interviews were, in the cases where this was possible, conducted face-to-face as the interaction of the interview itself was deemed to be of value. In cases where in-person interviews were not possible, interviews were conducted via video-conference on Microsoft Teams or Zoom in order to keep a visual aspect. The interviews were recorded in order to reduce risks of missing or forgetting details of value for the study. Notes were also taken, but sparingly. The recordings of the interviews were then transcribed.

The interviews conducted were about 40 minute long, semi-structured and built upon a pre-set range of questions (see Annex 1). This allowed for room to explore the topics further with follow-up questions as the interview went on and made it possible to go deeper into each answer. There was also room for clarifications and corrections for the answers given (Dunn, 2021). The interview questions were set after the research questions of this essay and were written in order for the actors to be able to give open answers, some actors requested the pre-set questions in writing and were given these ahead of the time for the interview. The interviews were conducted in Swedish and answers given translated by the author for use in this study.

### **2.3.1 Criteria for analysis**

The given answers from the interviews have been coded for recurring categories and themes. During the initial read-through of the transcriptions categories and themes related to sustainable development, sustainable construction, and climate neutrality were taken note of. The initial categorization of the data was kept open for modification in order to be able to branch them out or change them if needed. Due to the comparative nature of coding, this allowed the answers to not only be confined to a pre-set range of categories (May, 2011). Following the coding and categorization of the interview answers, these have been set in relation to the findings of the document analysis.

## **2.4 Ethical aspects**

There are several ethical questions of relevance which have been considered for this project. One being that the construction sector is not a homogenous group, but rather consists of many different actors of different scales and with different

conditions and prerequisites. Since this project is limited to looking at actors involved with the LFM30 project and not the construction sector as a whole, it is likely that these actors have an interest in environmental work as well as some means to actively work towards climate neutrality. The interviews conducted could therefore not be said to give a full overview for the construction sector in Sweden.

How to conduct interviews and present results is in itself also an ethical question. When asking people to partake in interviews they have after getting information on the project agreed to participate. Objectivity is important to consider when conducting research, and in this it is important to know of the built in subjective views the author might have in this. It is therefore important that the project openly shares how the study was conducted, what results were found and how these were analyzed.

As the study aims to look at how the Swedish construction sector is working towards climate neutrality, it is important to keep in mind that there might not be just one right answer. The results are based on an initiative in a specific location, involving certain actors, and thus the results could differ if looking at other locations with different actors. This, whilst something to keep in mind, is not a bad thing as the results of this project in the future could be compared to similar studies in other locations or with other actors.



## 4. Results

### 4.1 What is LFM30?

#### 4.1.1 The start of something new

LFM30 is a local initiative and road map working towards climate neutrality in the Swedish building sector. The development of this local roadmap was initiated through a feasibility study conducted by Malmö city in collaboration with actors such as Sustainable Building in the South. Through this initial feasibility study possible roads forward along with different strategies and objectives were mapped out (Holmgren and Nellerup, 2019).

The idea for the initiative first originated from within Malmö city, when a small group of actors were invited to a meeting about how to make the initiative happen (Member of managing group 1, personal communication 27/4/22; Group leader 3, personal communication 12/5/22). This small group discussed how to drive the project forward and much of the initial work surrounded what tasks were to be solved and how to go about solving them. Six focus areas were created at this stage and the next step was to decide how to package and communicate the initiative to others (Group leader 4, personal communication 5/5/22.)

Speaking to Member of managing group 1, getting different actors on board for the roadmap was essential for getting it up and running;

*“The most important part of anything you attempt to do is getting people who can pull the project along, people who say: ‘they are right, I have decided I am going to do this’. Because that person is going to make three others say the same thing. And these three will make five others agree” - Member of managing group 1, personal communication 27/4/22 [translation by the author]*

And that is essentially just what happened. The initiative was originally presented to a small number of actors which were all eventually on board with the plan. They in turn reached out to their contacts and by the official release of the local roadmap 30 actors had signed on. These actors reached out to their contacts and

whoever they thought could be interested in this initiative resulting in about 110 actors signing it by the first official LFM30 meeting (Member of managing group 1, personal communication 27/4/22). At the start-up meeting work groups were formed connected to the six focus areas, and work with shaping the initiative continued. A website was launched and a lot of effort was put into creating an interest and getting as many people on board as possible. The efforts have resulted in the initiative having about 190 connected members as of today (Group leader 4, personal communication 5/5/22).

Even though the initiative came from Malmö city a number of strong actors in the building sector stepped in early on and took over the steering wheel (Group leader 3, personal communication 12/5/22). The fact that these actors chose to step in and join LFM30 early on helped accelerate the process as it made people who were more hesitant feel that they could be missing out if they didn't jump onto this opportunity when others did (Group leader 2, personal communication 2/5/22). Because of the local context many actors who decided to partake in LFM30 already knew each other or knew of each other since before due to running into each other in different projects. Having these relations already in place further helped get the LFM30 project up and running very quickly (Group leader 4, personal communication 5/5/22).

Malmö city were very positive to the idea of a local road map for climate neutrality as a strategic initiative but became worried about how involved they could get without becoming biased or creating stronger relations to certain actors (Group leader 4, personal communication 5/5/22). This resulted in Malmö city choosing not to be a connected actor in the initiative. Instead they have adopted an individual strategy for climate neutral construction but work alongside the LFM30 initiative, supporting it and participate in some of the work group meetings (Member of managing group 1, personal communication 27/4/22; Group leader 4 personal communication 5/5/22). As the initiative has grown, Malmö city now showcases it as a good example and there are plans for them to sign onto the project as a connected actor in the future (Group leader 4, personal communication 5/5/22; Group leader 3, personal communication 12/5/22).

#### **4.1.2 The LFM30 Method**

The overarching goal of LFM30 is to reach climate neutrality by implementing measures which step by step raise the requirements of the connected actors. In this process the objective is:

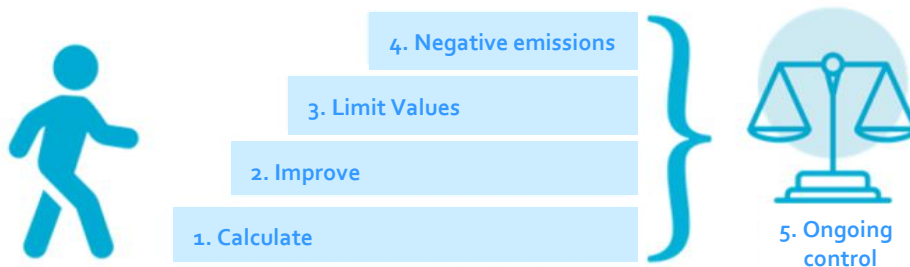
*“to optimize the process through adding, subtracting and substituting methods in our projects to reduce the climate impact as well as make it*

*possible to follow up and learn from our actions” - Holmgren and Nellerup, 2019.*

Tools to help make this possible include a LFM30-specific method for climate budgeting as well as LFM30s climate promise with yearly goals for how to move towards climate neutrality. Additionally, there are strategies connected to the six focus areas within LFM30.

Life cycle analysis (LCA) is a method through which it is possible to calculate environmental impact for a product. By producing an LCA it is possible to get an overarching picture of the resource flows and value chains leading up to a finished building project, making it easier to see which part of the process could most efficiently be changed in order to lower the environmental impact. When it comes to producing LCAs for the building’s or construction site’s separate stages. LFM30 uses an LCA which is completed in the early stages of the building project called a climate calculation. This climate calculation is calculated according to the National Board of Housing, Building and Planning standards for LCA as well as IVL Swedish Environmental Research Institute’s certified climate calculation (Holmgren and Nellerup, 2019).

Climate calculation is then used in the LFM30 method for climate budgeting which contains five steps as can be seen in Figure 1 below. These steps are 1. Calculate, 2. Improve, 3. Limit values, 4. Negative emissions, and 5. Ongoing control (Holmgren and Erlandsson, 2022).



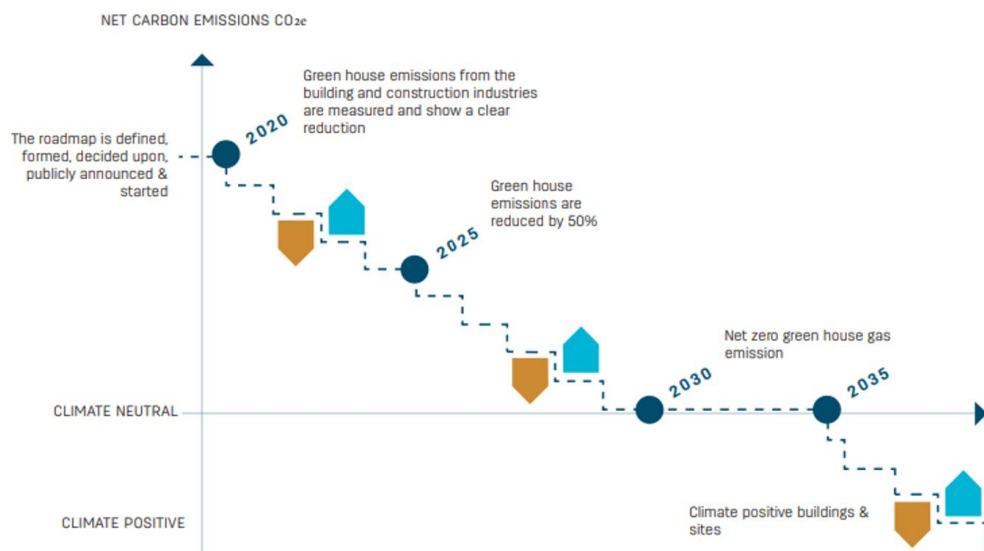
**Figure 1 LFM30 method for Climate bugeting**

*Method for climate budgeting, step 1-5 visualized through an ascending stairway. Figure reference. Holmgren and Erlandsson, 2022.*

In the first step climate calculations are done for the life cycles of the construction phase and the operational phase, and involved actors calculate and give an account for the building project/building in question. Step two includes analyzing what climate improving measures can be taken. For step three buildings are required to meet a certain limit value which LFM30 has set, based on the

principle of best possible technique at a reasonable cost. In this step climate bettering measures from step two are implemented, analyzed and controlled in order to reach the limit value. Following this, step three has to be fulfilled in order to move on to step four. In this step all CO<sub>2</sub> emissions of a building's life cycle needs to be continuously balanced with climate compensation. The fifth step lies outside the stairway, and is the process of ongoing control which includes continuously updating and bettering step 1-4 (Holmgren and Erlandsson, 2022).

In addition to the model for climate budgeting LFM30 has also set a climate promise. This climate promise sets a goal for climate neutrality by 2030 and a half-way goal of emissions being reduced by 50 % until the year of 2025. This climate promise of reducing emissions is visualized in the form of a staircase, as can be seen in Figure 2 below.



**Figure 2 Climate promise of LFM30**

*The climate promise of LFM30 visualized as a descending stairway. Figure source: Holmgren and Nellerup, 2019.*

The climate promise has set several sub-goals along the road, one for each year until the year of 2025. For 2021 this goal was to produce a method for which to measure and account for the climate promise, both on a company and project level. On a company level the current situation was measured and compared to the year 2020, and a goal was set for 2025. All connected actors should have started their work of measuring and lowering their levels of CO<sub>2</sub> emissions (Holmgren et al., 2022).

During 2022, the goal is to keep evolving the method for climate budgeting. On a project level, criteria to make it possible to declare using an LFM30 specific climate declaration tool are being developed. Additionally all connected builders are expected to test and help drive the development of the LFM30 criteria on a project level (Holmgren et al, 2022).

For 2023, the method and IT-tools of the initiative are to be further developed. Buildings and facilities which are not required to produce a climate declaration by law are now being climate declared within LFM30. All connected actors are expected to participate in developing the initiative after their own ability (Holmgren et al, 2022).

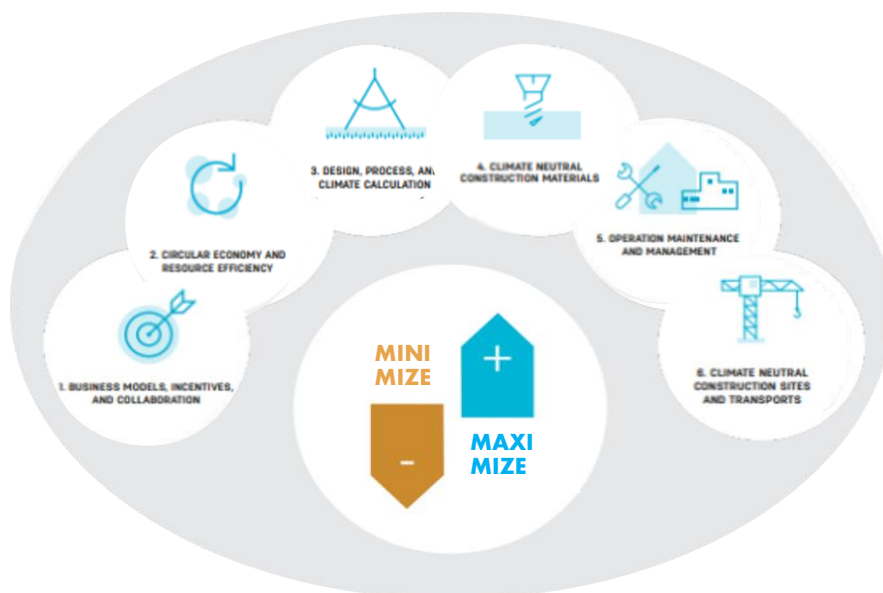
In 2024, the method is further refined. There are at this time existing criteria for climate declaration in LFM30 which follow the whole life cycle of a building. For smaller projects, a simplified climate declaration shall be done. By this year a climate declaration database is to be taken into use (Holmgren et al, 2022).

The year of 2025 is the year when all connected actors should have reduced their emissions by 50 % in comparison to the year 2020. All builders are also at this time expected to have begun at least one climate neutral building project (Holmgren et al, 2022).

By 2030 all buildings and facilities which are part of the local test bed should be built and maintained in a climate neutral way, and the initiative will have reached its goal. For newly produced buildings the CO<sub>2</sub> emissions are expected to be reduced by 40-50 % compared to 2020 and the emissions which remain should be climate compensated (Holmgren et al, 2022).

In following these steps, after the year 2035 there should be a climate positive building sector in Malmö. And builders are by this year expected to have reduced their CO<sub>2</sub> emissions by 75 % compared to 2020 (Holmgren et al, 2022).

In order for the connected actors to make it to these set up sub-goals there are strategies connected to the six focus areas of LFM30, which can be seen in Figure 3 below.



**Figure 3 Strategic focus areas**

*The six strategic focus areas of LFM30 which have work groups connected to them. Figure source: Holmgren and Nellerup, 2019.*

When it comes to the first focus area of Business models, Incentives & Collaboration, the aim is for the individual actors to adopt climate neutrality goals and obligations in their organization's budget and operations/business plan based on the objective of a 50 % decline of climate impact by 2025 and climate neutrality by 2030. Some of the strategies set up include; promoting green financing solutions, developing skills, promoting networking and collaboration, yearly reports on results, and influencing the supplier chain to be more climate neutral (Holmgren and Nellerup, 2019).

Strategies connected to the second focus area of Circular Economy and Resource Efficiency include adding spillage and waste to the climate calculation, gradually reducing the total amount of waste, phasing out dangerous substances in building materials and promoting circularity. The goal here is to strive for 100 % circular use of materials (Holmgren and Nellerup, 2019).

For the third focus area of Design, Process & Climate Calculation all actors should base design, construction process, material decision and methods on a life cycle analysis. The aim is to step by step digitalize the planning and building process whilst integrating climate calculations at an early stage (Holmgren and Nellerup, 2019).

When it comes to the fourth focus area of Climate Neutral Building Materials, the actors should climate optimize buildings through their choices of materials and designs. In this priority is given to renewable and circular building materials. And EPD (Environmental Product Declaration) is required for all building materials (Holmgren and Nellerup, 2019).

Strategies utilized in the fifth focus area of Climate Neutral Management, Operations & Maintenance include implementing measures to minimize the property's climate impact. When it comes to rebuilding, priority should be given to materials and methods which are better based on climate calculations and resource efficiency. For developers, densification, renovation, addition and rebuilding should be prioritized over tearing down existing property. For renting or leasing green and sustainable contracts should be used as standard (Holmgren and Nellerup, 2019).

For the sixth and final focus area of Climate Neutral Building Sites & Transport strategies include working together to promote development of processes which reduce the need for transportation, through more efficient logistics systems, pooled deliveries and a higher degree of industrialization (Holmgren and Nellerup, 2019).

### 4.1.3 Organization of LFM30

The LFM30 initiative is built on individual actors taking initiative on their own and thus very dependent on the people involved. The roadmap directs itself at all actors working within construction of new buildings, structures, or renovation/rebuilding/demolition. This includes, but is not limited to, publically owned companies, purchasers/developers (both private and public), financial actors, builders/prime contractors, subcontractors, suppliers, consultants, as well as high education and academics (Holmgren and Nellerup, 2019). By joining, actors promise to be climate neutral by 2030 and are required to, within the frames of the initiative, send in climate reports and calculations each year (Group leader 2, personal communication 2/5/22).

The structural organization of LFM30 is made up by a managing group, a steering group, a coordinating group and a secretariat (LFM30, 2021c). Additionally LFM30 takes the form of an economic association, working to further the economic interests of its members (LFM30, 2020).

Within the organization, there is a division of six strategic focus areas, see Figure 3. These are meant to overarch the complete construction process, from an idea stage to maintenance of the completed building (Holmgren and Nellerup, 2019). Every focus area has its own work group connected to it, and the work groups are connected to the different stages of the building process (Group leader 1, personal communication 9/5/22).

All actors which choose to join the LFM30 initiative have the possibility to send one or more representatives to one or several of these work groups. Joining a work group is not a requirement as participation in work group activities is done on a voluntary basis, like participation in the initiative itself. Which work group/s actors choose to join goes hand in hand with what area they work within and what interests they have. And how much effort and engagement is put into the work in the group is up to the representatives themselves (Group leader 2, personal communication 2/5/22).

An incentivizing factor in joining the work groups is the mutual sharing of information, where actors see that if they share what they know, they also get information back. The work group meetings provide a platforms for this exchange of information which most actors find very valuable (Group leader 4, personal communication 5/5/22; Group leader 2, personal communication 2/5/22). The way the different work groups work differ slightly depending on the group in question, but generally, most groups have initially been working on creating a base of knowledge. In doing so, the work groups arrange activities such as workshops, seminars, conferences and study visits (Group leader 1, personal communication 9/5/22; Group leader 2, personal communication 2/5/22).

The work groups are structured to have two group leaders, one from within the business sector and the other one from the academic or research based sphere

(Member of managing group 2, personal communication 29/4/22). In some groups this connection has worked better than for others. Group 6 is an example of where this communication between sector and academic side could have worked better, as an interview found the group lacked this dual perspective (Group leader 5, personal communication 9/5/22). On the other side of the spectrum there is group 4 where the connection between the two spheres has worked well and is seen as beneficial to the group (Group leader 3, personal communication 12/5/22).

Collaboration between the different groups occur, but not at the level many of the interviewed actors would have hoped. Collaboration is mostly based on individuals contacting each other regarding certain projects rather than as an ongoing process. There are some groups whose focus areas are more connected to each other than the rest which therefore interact more. There are also people who sit in work groups for several work areas and are better equipped to spot opportunities of collaboration (Group leader 1, personal communication 9/5/22; Group leader 3, personal communication, 12/5/22).

There is a coordination group in place within the frame for LFM30. In this group the group leader and vice group leader from work group 1-6 come together to check in on what is going on in the different groups. However the aim of this group is to keep track of progress rather than to work for increased collaboration between the groups (Group leader 4, personal communication 5/5/22; Group leader 3, personal communication 12/5/22).

## 4.2 Accelerating change

### 4.2.1 Building blocks of positive change

Speaking to the actors about which the most important aspects surrounding the initiative are, many similar answers appeared across different interviews.

The first one being how the initiative has brought together all the actors of the sector under a united banner, something which in itself can be seen as symbolic (Group leader 4, personal communication, 5/5/22). The initiative has managed to gather a sector where different actors typically only ever act as enemies and don't have much to do with each other (Member of managing group 2, personal communication 29/4/22). Before this initiative began most actors only met at conferences or ran into each other in different projects, but being connected through LFM30 has provided them new possibilities of reaching out and directly getting in touch with each other (Group leader 2, personal communication, 2/5/22).



Another aspect which kept reappearing is how the initiative has built up a platform for sharing and exchanging knowledge. The sector has not been known for its transparency or willingness to share progress, so changing this mindset and creating a culture where sharing and collaborating is possible has been vital (Group leader 3, personal communication 12/5/22). In this it is important to remember that every actor has their own expertise, but nobody knows it all. Therefore, having so many connected actors means that there is a big possibility that everybody that is needed in order to achieve the set up goals are present, and willing to help (Member of managing group 1, personal communication 27/4/22).

Building up a base of knowledge surrounding climate related questions has been an initial goal for the work groups of LFM30, and the willingness of the actors to help each other grow an important building block in this (Group leader 4, personal communication 5/5/22). Being a member of LFM30, all information and progress within the initiative is available and the transparency within the initiative allows companies to look at how their competitors are working (Group leader 1, personal communication 9/5/22). This makes it possible to make comparisons between companies which is something that can result in a positive competitive situation, where actors continuously aim to do better (Group leader 3, personal communication 12/5/22).

A third important aspect is how LFM30 has provided a common goal to work towards and a methodology to follow the progress. Creating a common methodology for how to calculate and measure has been a big step in the work of getting all the actors on the same track and working the same way (Group leader 3, personal communication 12/5/22). Providing palpable goals in the form of different models and limit values makes the end goal of the initiative more tightly anchored to the practical work and therefore easier to work towards. Having these goals also makes it possible to translate climate benefits to economic benefits which can incentivize more actors to work with these questions (Group leader 1, personal communication 9/5/22).

#### **4.2.2 Obstacles to overcome**

When speaking about challenges ahead, in much the same way as it did speaking about important aspects, many similar things were mentioned in different interviews.

Perhaps most mentioned was the challenge of how to create change. The building sector works with long time frames and long limit values but during short periods, which means creating change can be challenging (Group leader 1, personal communication 9/5/22). The building sector is in addition to this known to be quite set in its ways as it is a mature sector with existing models and methods already in place (Group leader 3, personal communication 12/5/22).

Because of this it is important not to create one single path, but to keep opportunities open for new solutions and new thinking along the way. At this point nobody knows which the right way to proceed is, and processes and materials might change with time (Group leader 1, personal communication 9/5/22).

In the work towards climate neutrality, somebody has to be willing to take the first step and try new things. Trying is key, as without it there is no knowledge for whether something is possible or not (Group leader 5, personal communication 9/5/22). But in order to create lasting change, having front runners trying new things is not enough. Everybody in the sector, no matter how big or small, must participate and collaborate. And this must happen throughout the entire value chain (Member of managing group 2, personal communication 29/4/22; Group leader 4, personal communication 5/5/22).

Another thing which was mentioned is how to spread the change throughout the value chain. A lot of things have to change for many actors which are all at different levels in the transition towards climate neutrality. Some of the actors have worked with these kinds of questions for a long time and for others LFM30 is the first time hearing about certain concepts. This can prove challenging as the whole group has to be on board and move forward. What is happening at the front of development is important but to get results and the full picture the actors who have not yet developed their climate work must also be included (Group leader 4, personal communication 5/5/22).

The challenges of creating change and spreading it throughout the value chain are essential parts of a bigger challenge, making it all the way to the finish line. Taking the first steps and lowering the climate footprint by 20-30 percent will be possible for all involved actors, but lowering it further and actually reaching zero CO<sub>2</sub>-emissions is seen as a huge challenge (Group leader 2, personal communication 2/5/22).

The beginning of the initiative has been filled with engagement and excitement, with many people wanting to join in and participate. But as the initiative reaches a certain degree of maturity, actors have to sustain their investments so they don't run out of steam and leave as things get more challenging (Group leader 1, personal communication 9/5/22). In this fact that participation is voluntary can be problematic as people could stop prioritizing showing up to meetings and instead focus on their other commitments if they feel this is more giving (Group leader 4, personal communication 5/5/22).

Closely intertwined to keeping the steam up and getting more people to join in is an aspect of how to incentivize actors. As having an environmental focus can often come with a bigger initial price tag and the market is profit-driven, how to incentivize actors becomes a key aspect (Group leader 5, personal communication 9/5/22; Member of managing group 2, personal communication 29/4/22). The individual actors who participate most often want to get something back from

participating. This could be the knowledge gained from participation in work groups, a strengthened network, financing for projects or something else (Group leader 3, personal communication 12/5/22; Group leader 1, personal communication 9/5/22). The brand of LFM30 has gained a positive connotation over time and because of this being connected to the brand in itself could offer incentive, as it can be used in marketing and to help sales (Member of managing group 2, personal communication 29/4/22).

Another thing which was mentioned as a possible challenge ahead is how to keep the incentive grounded in practice. LFM30 is made up of people who are very enthusiastic about their roles and who drive questions of climate forward within the organization. Something very positive in itself. But what must not happen is that LFM30 becomes all talk and no action. The ideas discussed within the frames of the initiative need to be anchored also within the companies that these people represent and implemented in practice. Otherwise LFM30 risks becoming nothing but greenwashing as actors join in but don't do what they have promised to do (Group leader 4, personal communication 5/5/22; Member of managing group 1, personal communication 27/4/22).

### 4.3 The road ahead

What LFM30 has done up to this point is lay down the groundwork. The initiative has created a knowledge base by mapping out what knowledge exists within the initiative and what further knowledge is needed for the road ahead. Additionally LFM30 has worked to set limit values, produced a climate calculation model and started to put all of this together into a package which can give others a method for how to work with these questions (Group leader 1, personal communication 9/5/22). By doing this, LFM30 has shown that change is possible. Knowing this, it is possible to showcase what is being done and question why the rest of Sweden is not doing the same when there is proof it is possible (Member of managing group 1, personal communication 27/4/22).

This said, there are other projects in different parts of the country which are also looking at how the building sector can become climate neutral. What sets LFM30 apart from these is that it is the initiative which has gotten the furthest, has the biggest network and also that it has contacts at the National Board of Housing, Building and Planning (Group leader 3, personal communication 12/5/22).

LFM30 has due to its initial success received large interest from other municipalities and businesses, and even though the work groups and their knowledge are so far mainly available to the affiliated members of the initiative there is talk about expanding it to a national level (Group leader 2, personal

communication 2/5/22). Already today there are seminars given both at a member level but also at a national level, for instance in regards to the climate calculation model (Group leader 3, personal communication 12/5/22). The discussions which are being held surround LFM30 perhaps becoming LF30, leaving out the M of Malmö, and making it less geographically bound (Group leader 4, personal communication 5/5/22).

As the organization is seen as being well suited to be implemented also in other places, expansion is a natural next step (Group leader 3, personal communication 12/5/22). But there needs to be time and effort still put into the local initiative so that it can thrive whilst simultaneously putting in another gear and showcasing the methodology to a national audience. If the LFM30 initiative is working transparently from the beginning and shares its findings, it is more likely that what is being developed within the frames of the initiative can turn into the industry standard for all of Sweden (Group leader 4, personal communication 5/5/22).

## 5. Discussion

LFM30 is working in many ways to reach climate neutrality by 2030. Under the banner of this initiative, the building sector in Malmö has come together to work towards a common goal. Along the way different sub-goals and a common methodology of climate calculation has further connected members and made it possible to measure progress. The initiative has become a platform where knowledge and progress is being shared transparently. The different work groups and the strategies connected to the focus areas have allowed for progress to occur at many fronts as well as for the initiative as a whole. And even though there are challenges to overcome, such as how to incentivizing members to join, how to keep the initiative anchored in practice, and how to actually make it the whole way to climate neutrality, the initiative has shown that change is possible and happening at this very moment.

LFM30 is built to accelerate the work of the national roadmap for the building sector in order to reach the goals set up in the 2030 Agenda of Sustainable Development. As such the initiative has set a goal of reaching climate neutrality a whole 15 years prior to the goal set in the national roadmap. In the year of climate neutrality under LFM30, the national roadmap aims at a 50 % decrease of greenhouse gas emissions. This goal in the LFM30 roadmap reached 5 years ahead of this time, in the year 2025. Showing that change is possible, and that change is possible within a time-frame which is more ambitious than the national plan means that LFM30 could put pressure on the sector in other parts of the country. Hopefully this could advance the work with climate neutrality on a national level and benefit to the work on a global one.

As the goals and targets of the 2030 Agenda for Sustainable Development are aspirational and take into consideration the different capacities of nations, this allowed each country to put realistic goals in place to meet the global ones. Sweden is being seen as a driver of change for the 2030 Agenda, and the goals set at a national level can be more specific than on the global ones. In the same way, goals for a specific sector can be set more concrete than for a country as a whole. By delimiting the frame of the goals for the sector to a specific geographic location these goals can be even more elaborate and hammered out. As such the LFM30 initiative both deepens and advances the goals set up in the national roadmap. At the same time as it makes goals for the 2030 Agenda more palpable and anchored in the specific practices of the building sector. This way of

anchoring the specifics of the building sector to the global goals of the 2030 Agenda hopefully creates a deeper understanding to why it is important to change the way work is conducted within the sector. And having more specific goals hopefully makes it more likely that the goals are actually being worked towards.

The construction sector is generally characterized by fragmentation with a large number of actors in long and complex value chains and project based work structure which makes it difficult to create long term development and exchange skills. Certain pilot projects have been known to get far in terms of development, but scaling these up and spreading change has been a slow process due to the way the sector works. These are some issues which LFM30 have tackled straight on. By creating a platform for knowledge exchange and binding actors together as more than competitors LFM30 has managed to change the way the members of the project work. Pilot projects within the initiative are being showcased and knowledge gained spread down through the value chain. In doing this, LFM30 have managed to overcome some of the biggest obstacles in the sectors transition to climate neutrality.

By dividing the construction process into six focus areas the initiative has enabled progress to be made on multiple fronts as well as collectively. The six strategic focus areas with the corresponding work groups give all the connected actors a possibility to contribute to the initiative to a larger extent than just fulfilling the goals in the climate promise. This means that work can be done at a faster pace as compared to if all work was done collaboratively, since every group has its own expertise in the field and more freedom to use it. Having development happen at multiple fronts could mean that the level of development differs between the groups. Here, having the coordination group to keep track of progress can offer possible opportunities for knowledge exchange which could somewhat even out these differences. Since the work groups work with different parts of the construction process and wildly different topics, this uneven development is not necessarily bad. Development will not always occur at the same pace over the entire construction process and it does not have to. Development in one work group can benefit the work of other work groups, and is positive for the initiative as a whole.

For many especially smaller businesses, the day to day work of the company is to make the business go around. With stricter restrictions on the way it could prove to be economically beneficial to be proactive rather than reactive when it comes to working with climate questions. Having already built up a business model which is focused on sustainability could make it easier to change other parts of the work, as compared to trying to change the way of work with a non-climate specific business model. Having had LFM30 show how climate benefits can be translated to economic benefit will most likely get actors more interested and incentivized to join the initiative as the sector is profit-driven to a great extent. As the study by McGraw Hill Construction showed, many actors now

work with sustainable construction primarily due to a market demand or/and for their branding/public relations. This will most likely mean that even companies whose top priority is not to build sustainably will begin the work of at least appearing to do so. This process risks turning the initiative into greenwashing and it is therefore essential that the actions and progress of members is followed up consistently.

What moves the work of LFM30 ahead is a culture where knowledge is shared and results are transparent. Reports are made to LFM30 on a yearly basis where actors send in climate reports and calculations. Having actors promoting their own business would reflect badly on the company's commitment in a common initiative where the whole sector has to cooperate in order to reach common goals. The chain of involved actors putting pressure on one another to do better is an important factor in maintaining progress. This transparency and openness in connection to results is also something which makes it harder for actors to promote their own product or process. This, in combination with the involved actors from the academic/research sphere means that the work of LFM30 is more likely to stay objective and not promote specific actors or products.

Any actor who wishes to join the LFM30 initiative is free to do so, as long as they agree to the set up goals. But as the initiative started as a small group of invited actors reaching out to their connections, which in turn reached out to their connections, the initiative has spread from one actor to another. This word of mouth system for referring the initiative to others could have meant that the outreach throughout the value chain was not as quick as it could have been initially. As the project gained a larger interest and became more and more well known, actors who were not invited to the project by word of mouth and had not previously heard of it could also get in on the action. As the interest for sustainable construction grows the market is also more likely to request building methods and construction materials which are better from a climate perspective. LFM30 gaining a bigger interest from the public, and making news will make it more likely that actors who previously were not interested in doing these sorts of things, or did not know about the initiative, also join.

A key piece in the puzzle of LFM30 is that the involved actors are working with these questions on their own initiative. The fact that the initiative is actor-driven and work is done on a voluntary basis means that most actors also have another job, and another role outside of the initiative. This role has to be continuously balanced with that of the role they have in LFM30. Something which could turn out to be challenging. Involved actors which are active in the initiative are often individuals who have an interest in questions related to sustainability and climate. The balancing act for these members becomes how to handle the goals of LFM30 in relation to the goals of their individual business. Here a number of factors could be of importance, from how big the company is to

how developed their environmental and climate work is. The companies which they represent are in some cases smaller ones, located solely in the Malmö area, and in other cases bigger ones which exist on a national or even European arena. An actor who is representing a smaller company which has little to no previous work with questions of sustainability and climate being might have a harder time translating the commitments of LFM30 back to the business. And an actor who represents one of the bigger construction companies which are known for their dedicated climate work will perhaps have an easier time in making these commitments, as the company could already be on a level above the commitments of LFM30.

What makes LFM30 so fascinating is that both of these type of actors, representing their individual companies, have a very distinct role within the initiative. There have to be followers and there have to be leaders, otherwise no overall, continuous progress for the sector is made. On the side of the spectrum which has more advanced climate knowledge, the leaders are essential in advancing the work. They perhaps get less knowledge out of participating in LFM30, but being a member and a sector leader can offer other benefits. The actors who are not very well versed in climate- and sustainability related questions are the ones who likely get most practical knowledge out of being a member. For these actors too, there are other benefits which come with being connected to the LFM30 brand, but perhaps of most use is the gained knowledge. The aspect of there being something to gain in joining seems to be a strong driver for the project, even if this is not always direct economic gain.

Within the initiative different solutions and new ways of thinking are encouraged, and rather than to give one correct way forward, an unlimited number of possible ways are provided. These are all dependent on the thinking and innovations of the connected actors, who are either part of the sector through their practical work or their academic/research position. As such new thoughts and innovations arise the connection to the academic sphere gives a whole new possible outcome for how to proceed. The sector can influence new research on the topic at the same time that the academic/research sphere can keep the sector up to date on the newest developments in the area.

By using the city of Malmö as a test bed, the actors of LFM30 have shown that not only is change possible, it is happening right now. And as the need for construction increases, it is possible to use materials and methods which enable sustainable construction. This puts pressure on others within the sector who are not doing the same. A possible next step for the LFM30 initiative is branching out and expanding the initiative. What LFM30 has created is a foundation of knowledge and a building frame in the form of a common methodology, making the construction of a complete house of climate neutrality far easier than before. LFM30 does not have, and does not claim to have, all the answers for how to reach climate neutrality. But having a base and a frame in place makes it much



easier to add on to existing structures instead of having to produce a new foundation for each new project.

As there is currently no common methodology for how to work with these questions on a national level, an expansion of this local initiative to a national level could set a standard for the sector. This would help unify and bring together different actors within the sector, and make it possible to see more of the complete picture, in much the same way LFM30 has shown is possible. Nobody in the sector or outside it knows which way forward is the correct way to go, but LFM30 works in a way which does not close the door on any option. Having an open mindset and allowing development to take place in different ways is most likely a good way forward as there is no right or wrong way yet. Taking the LFM30 methodology and implementing it in other places could be a good trial run for how an expansion to a national level could work.

As there are other similar initiatives in place around the country, these could also be used in the work of creating a national standard. A future study could be to compare these different project and see what level they are at. Only time will tell which is the correct way to work towards climate neutrality. And if the building sector waits for a solution which covers all the aspects of this change, it might already be too late to implement it. Continuous trial and error, with improvements added over time seems a good option.

All actors have the possibility to start the journey towards climate neutrality. By changing business models and using common methodology, more change is possible at a quicker rate further down the line. Gathering knowledge on how to deal with these questions now will similarly lead to an easier transition. Nobody knows everything, but in an initiative with so many actors from different areas involved, the knowledge gathered is immense. LFM30 is an initiative with a big number of different actors, the sector even more so. All of these actors will have to do their part if the goals of climate neutrality are to be met. The test bed of Malmö has provided good examples and a common methodology, but there are still obstacles to overcome which can hopefully be solved along the way. Providing a common methodology and a base of knowledge, LFM30 has begun the transition towards climate neutrality and encouraged others to do the same. The time to act is now, and the tools needed are present. What remains is to see how far this structure for how to advance work with climate neutrality will reach.



## 6. Conclusions

LFM30 is an initiative which has gathered the building sector in Malmö under a united banner working towards one common goal. This is being done primarily by the connected actors joining in the LFM30 climate promise and utilizing the LFM30 method for climate calculation. Since the initiative gathers the entire industry, it is very broad and covers all phases of the construction process, work is divided into six strategic focus areas, which are connected to different parts of this building process. These focus areas all have connected strategies and work groups for reaching the goals set up in the climate promise.

Even though the work of the work groups differ depending on the focus area, most of them have worked in similar ways in this initial part of the initiative. All groups are structured the same way, with a representative from the sector and a representative from the academic/research sphere acting as group leaders. Any connected actor is free to join the group meetings and has access to what work and progress is being done within the initiative. The work groups arrange activities such as seminars, conferences and study visits in order to further deepen knowledge in different areas. In some cases the connection between the sector and academic/research sphere has worked better than for others. And in general more collaboration between the groups is wanted, and believed to be in the making.

Challenges to overcome on the way include; how to incentivizing members to join, for connected members to balance the role of their work in LFM30 with their other role of the connected actor, how to keep the initiative based in practice, and how to actually make it the whole way to climate neutrality.

But even if there are challenges to overcome along the way, LFM30 has shown that change is possible within the sector. It has shown that it is possible to make choices regarding building materials and methods which allow for sustainable construction. And this is absolutely necessary in order to meet the need for continuous construction, because if the construction is not sustainable what future are we building?



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# Annex 1

## Questions to build semi-structured interviews around

- Short introduction
- How were you first introduced to LFM30?
- What is your role in LFM30 and what does that role entail?
- Which are the, according to you, most important building blocks of the initiative?
- How does your work group (if applicable) work to reach climate neutrality?
- In what way does the connection between the sector and the academic/research sphere work?
- How is [actor] working with climate neutrality? Has that work changed since joining LFM30?
- What are some challenges that you have experienced [work group/actor]?
- What is going to be the biggest challenge in reaching the set goals?
- What are your biggest take-aways from being involved in LFM30?