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Bjørvika: a Pioneer in Environmentally Sustainable Urban Development?

A Case-study Assessing the Legitimacy of Bjørvika's Environmental Sustainability Proclamations from the Perspectives of Ecological Modernisation and Degrowth

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Foreword

This master thesis marks the end of my five-year urban- and regional planning education at NMBU. The thesis research- and report-writing process has been a steep learning curve full of challenges and frustration. Nevertheless, through the struggle I have gained priceless knowledge and experience that is only attained through perseverance. I would like to thank my thesis supervisor for valuable feedback, guidance and tips. Moreover, I would like to thank the interviewees from Bjørvika Utvikling, Hav Eiendom, Plan- og Bygningsetaten and Byrådet for Byutvikling who took time out of their workday to contribute with indispensable insight. I hope this thesis can provide for an interesting reading.

Abstract

With the climate crisis as a reference point, this thesis investigates environmentalism in a Bjørvika: an ongoing urban waterfront development in Oslo, with high promises for environmental sustainability. Environmental sustainability in the case is scrutinised through the lenses the dominant green growth discourse and the emerging degrowth discourse. Based on these theoretical notions, this thesis seeks to accomplish three objectives regarding the case: (1) to trace the underlying environmental discourse in Bjørvika, (2) to assess the legitimacy of Bjørvika's claims to environmental sustainability, and (3) to shed light on barriers hindering the project from being more environmentally sustainable. The objectives are approached in a qualitative manner, with data acquired through interviews with key stakeholders in the Bjørvika development, study of secondary sources and observation. The study found that the Bjørvika development is driven by a strong growth ideology, to which environmentalism strategically serves as a catalyst. As a result of the strong growth ideology, the project's sustainability claims lack legitimacy from a degrowth perspective. Bjørvika's environmental sustainability claims also lack legitimacy from a green growth perspective because the project failed to extensively implement eco-efficiency solutions. The study suggests that neoliberal tenets of privatisation, profit-orientation and governance serves as a partial barrier to implementation of ecological modernisation, and that embracement of growth and freedom of choice serves as a fundamental barrier to degrowth.

Keywords:
Degrowth, Ecological modernisation, Green growth, Planning, Urban environmental management

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Attachements:

- Interview guide

Abbreviations:

BI = Bjørvika Infrastruktur (In Englsih: Bjørvika Infrastructure)

BU = Bjørvika Utvikling (In English: Bjørvika Development)

EM = Ecological Modernisation

GHG = Greenhouse gas

OMOP = Overordnet miljøoppfølgingsprogram (In English: Overarching environmental monitoring program)

OSU = Oslo S Utvikling (In English: Oslo S Development)

PBE = Plan- og bygningsetaten (In English: Planning- and building department)

PPP = Public-private partnerships

RQ = research question

WVS = Waste vacuum system

1. Introduction

1.1. Problem statement

In response to the ecological crisis, the United Nations has through the Paris Agreement of 2015 (United Nations, 2015) agreed on "holding the increase in the global average temperature to well below 2 ℃ above preindustrial levels and pursuing efforts to limit the temperature increase to 1.5 ℃" (p. 3). Achieving these targets requires radical reductions in GHG emissions. Having ratified the climate commitments from the Paris Agreement, Norway now embark on becoming a low-emission-society by 2050, which require a 60-80% emission-reduction compared to 1990-levels (Miljødirektoratet, 2014). Today, a Norwegian citizen on average releases about 10 tons of CO_2 equivalents, which is way above the world average of 7 tons. With its new commitments, the Norwegian government expect to revert per capita CO_2 emissions down to 1,5 tons (Miljødirektoratet, 2014). The targets are ambitious, but clear. Although the targets are clear, there are diverging opinions on what path to follow to realize the set goals.

Currently, the Norwegian government (through the environmental directorate) indicate that Norway intend to reach its climate commitments through eco-efficiency measures – and not through negative economic growth (Miljødirektoratet, 2014). Eco-efficiency measures seek to make an increasing level of production and consumption processes less energy and resource demanding, thus reducing the total emission level. Technological advancements and innovative structural changes are believed to reduce emissions to an extent that allows further economic growth to coexist with ecological sustainability (Mol, 1995). Thus, this approach could be considered as a "greening" of the current capitalist economy. Reconciling ecological sustainability with growth is the dominant approach to environmentalism and is in the academic discourse known as ecological modernisation (EM).

The EM approach to the environmental crisis, is resolutely criticised and contrasted by an emerging alternative discourse referred to as degrowth. Degrowth advocates contend that a persistent pursue of economic growth is antithetical with the formulated goals of ecological sustainability. They argue that technological innovations are insufficient to solve the ecological crisis, partly due to the urgency of the problem and partially because eco-efficiency reduction benefits risks being offset by increased rates of consumption (Demaria, Schneider, Sekulova, & Martinez-Alier, 2013). Instead, degrowth proponents claim that eco-efficiency measures

need to be coupled with a decline in the scale of production and consumption systems (Schneider, Kallis, & Martinez-Alier, 2010).

Globally, cities are responsible for about two-thirds of energy-use about 70% of GHG emissions (C40 Cities, 2018). Therefore, decisive and proactive urban environmental management is fundamental if Norway are to not only meet its climate commitments, but also produce proper ecological sustainability.

Due to a birth surplus and immigration surplus, coupled with urbanisation processes, the urban population in Norway's capital Oslo is increasing. Hence, urban development projects are in demand. Considering the ecological crisis, new urban development projects should accommodate people in a way that has the least impact on the environment, and that promotes low-emission lifestyles. However, the real ecological sustainability of urban development projects in capitalistic, growth-oriented economies has been questioned. Brand (2007) argue that ecological goals are subordinated to profit-oriented goals in market-driven urban development. Environmental sustainability measures are mainly supplementary to economic agendas and seek to enhance attractiveness and competitiveness of a city. Similarly, Holgersen & Malm (2015), point to a waterfront development project in Malmö, to demonstrate how environmental consciousness was used as a promotional strategy to attract investment to a city that struggled financially after the 1970 economic crisis. On an regional level Vogel (2016) criticises the ambivalence of planning strategies in a Danish city region, where goals of becoming an eco-metropolis, are combined with unsustainable settlement structures and mobility measures. As an ideological critique (Xue, 2016) contend that the growth ideology serves as a fundamental barrier to sustainable urban development.

Taking a degrowth conception as the favoured path for ecological sustainability, I will in this thesis investigate 'Bjørvika', a current waterfront development in Oslo. By analysing the strategies, policies and governance that define environmental efforts in the project from a planner's perspective, I will assess the ecological sustainability of the project and highlight potential barriers to strong sustainable development.

1.2. Objectives and research questions

The objective of this research is to scrutinise environmentalism in the Bjørvika development to assess the legitimacy of its environmental sustainability proclamations and

reveal potential barriers to ecological sustainability. From this objective I have derived the following research questions (RQs):

- *RQ 1: "What different ways are sustainability and environmentalism understood?"*
- *RQ 2: "What specific goals, strategies, measures and policies are applied in the Bjørvika development, and how does it correspond with current discourses on environmentalism?"*
- *RQ 3: "Can the Bjørvika project claim to be ecologically sustainable?"*
- *RQ 4: "What are the barriers preventing the development to be more ecologically sustainable?"*

The first RQ is a theoretically-oriented question, that I pose to establish my analytical perspective. In answering RQ (1), I will present two notions on how to perceive ecological sustainability: weak and strong sustainability. Through RQ (1), I also intend to establish how these two notions of ecological sustainability are related to dominant and alternative discourses on environmentalism.

RQ (2) is an empirical and analytical question. The first part of the question is purely empirical, and is posed to learn through what specific strategies, policies, goals and measures Bjørvika and its developers claim to foster ecological sustainability. This question also assume that I consider strategies in a wider sense that merely ecological. Ecological sustainability efforts might to a lesser or larger extent serve alternative purposes aimed for instance at liveability, attractiveness, competitiveness or economic growth. The second part of RQ (2) is analytical and is answered by interpreting the empirical data in light of the environmental discourses. In order to answer this question, it is necessary to know not only what measures are being applied, but also why. Tracing the underlying environmental discourse of the Bjørvika development is important to conceive its potential for ecological sustainability.

RQ (3) takes a critical and appraising stance to the Bjørvika development. By answering this question, I seek to reveal whether there are any inconsistencies between the articulated goals of ecological sustainability and applied strategies and realised measures, thus hindering an ecologically sustainable transition. Does the development utter hypocritical claims or ambivalent policies, which makes one doubt its green agenda? Furthermore, I will consider whether there are certain measures that was promised or could have been implemented to enhance the ecological sustainability of the project? The applied environmental discourse

found through RQ (2) will also assist the assessment of the legitimacy of Bjørvika's sustainability claims.

By posing the final RQ, I wish to highlight particular impediments that work as barriers to EM and degrowth. These barriers can be of a political, institutional, ideological or strategical nature. Such barriers are crucial to recognise if we want to handle the climate crisis in an effective and sustainable manner.

By underlining internal inconsistencies as well as barriers to strong sustainability in Bjørvika I wish to inform planning practice of possible areas of intervention. Moreover, I aspire that this case study will add to the growing literature on urban development in a neo-liberal context.

1.3. Structure of thesis

The introduction presented the topic, its relevancy as well as the objectives and research questions. The methodology chapter (2) explains how I will go about answering the research questions posed in the introduction. It will: present the specific methods I use to gather data, explain the rationale behind the methodological choices, and indicate of how I intend to analyse the data. Moreover, the methodology chapter provide an assessment of validity, reliability, and ethical implications related to the topic and applied methods. Subsequently, I present the theoretical framework in chapter (3). The theoretical framework presents theories and ideas from scientific literature that will be used to scrutinise the Fjordby development. The chapter puts forward different notions on sustainability and relate them to two contrasting discourses on environmental sustainability: one growth-oriented (EM) and one anti-growth-oriented (degrowth). The first research question will be answered through the theory chapter. In chapter 4, I will analyse the gathered data considering the theories presented in chapter 3. The analysis will assess the sustainability of the Fjordby development. Chapter 5 discusses the analysis in a wider context. I will highlight what barriers are preventing the development from being more ecologically sustainable. Chapter 6 concludes, with a summary of the key findings and main arguments before I propose some suggestions for further research.

2. Methodology

The methodology chapter describes how the research will proceed to investigate the research questions formulated in section 1.2. The chapter will clarify the applied research design, sampling method, data collection method and analysis method, as well as the rationale behind the choices I made. My own evaluation of validity and reliability is also provided in this chapter. Furthermore, the chapter presents a section on ethical implications of the applied methods and research topic.

2.1. Study design: Case study

As already revealed, this research project is designed as a *case study*, with the Bjørvika development in Oslo being the unit of analysis. The case study is frequently utilised within social science (planning included), and is a pertinent design when the researcher want to investigate, explore or understand an aspect of a subject/unit thorough, in-depth and holistic manner (Kumar, 2014). Considering Kumar's assertion, this research qualifies as a case study because a comprehensive understanding and diligent exploration of sustainability aspects and the decision-making process in Bjørvika is necessary to fathom the real nature of its environmentalism. In other words: there is a need to dig deep into the sustainability and environmentalism to answer the RQs. Yin (2009) raises three more criteria to decide whether a case study is ideal. He emphasises that case studies are suitable when: (1) "why" or "how" questions are being posed, (2) the researcher has little control over events in the case, and (3) the focus of the study is on a contemporary phenomenon in a real-life context. Also, by Yin's three criteria this research qualifies as a case study. Firstly, the MRQ is formulated as a "how" question. "How" questions are typically open-ended and explorative, and imply that the study aims to scrutinize a subject in a holistic manner. Secondly, I will as a researcher have zero control over the development of the case, as the development occurs in a dynamic socio-political context, with an unknown number of variables. Instead of isolating and adjusting variables this research aims to interpret and explain environmentalism in the case as a unit. Thirdly, the study focusses on a contemporary phenomenon (ecological sustainability and environmentalism) in a real-life context, which is the Bjørvika development.

Among the many types of case studies, this research was shaped as what Yin (2009) defines as a *holistic single-case study*. As the name implies a holistic single-case study, operates with one case as opposed to multiple cases. One single case, Bjørvika, was used to answer the research questions. Moreover, the design is holistic because the research only used one unit of analysis within the case. The alternative would have been an embedded single-case

study where multiple subunits of the case become subjects of analysis. An embedded approach could have been relevant if I decided to consider more of the subprojects in Bjørvika (e.g. Sørenga, Bispevika, Bjørvika and Barcode) as separate units of analysis. However, I opted for a holistic approach because environmental measures, policies and strategies often transcend the borders of a single subproject. Therefore, when environmentalism is the topic of analysis, it is more purposeful to consider Bjørvika as a whole – in a holistic manner.

A *single* case study is appropriate in a variety of circumstances. One of the main rationales to justify the selection of a single case is when it is a representative or typical case (Yin, 2009). Representative cases portray what is believed to be a typical "project" among many different projects. Having performed preliminary desktop research on the case and a literature review, I identified Bjørvika as a *representative case* because it similarly to many earlier and contemporary projects (e.g. Malmö, Stockholm, Toronto) is a green profiled urban waterfront development in an advanced capitalistic country. Through what I assume to be a typical case, I will highlight how environmentalism is applied in a neo-liberal setting and emphasise why strong sustainability might be hard to achieve.

The choice of Bjørvika as a case is not merely based on its representativeness. Bjørvika was also selected for theoretical reasons, or through what Silverman (2014) calls *theoretical sampling*. Theoretical sampling means that my choice of a case is derived from relevant theories (see chapter 3.), through which I to scrutinise the case. Although, I consider Bjørvika as a representative case, the goal of a case study is not to generalise to a population or a universe (other cases), but rather to generalise to theoretical propositions (Silverman, 2014; Yin, 2009). Generalisability are discussed further in section 2.5 about validity and reliability.

2.2. Data collection

When striving for a holistic understanding of an aspect in a case study it is recommended to utilise multiple data collection methods (Kumar, 2014; Yin, 2009). By triangulating different methods, it becomes possible to gather more and different types of information. Additionally, triangulation of methods can to some extend cover for flaws in the individual data collection methods. Considering the case study research design and the RQs, I chose to gather data through interviews, secondary sources and observation: three of the six data collection sources endorsed for case studies by Robert Yin (2009). I landed on these three methods after performing an exercise summarized in table 1. The exercise is grounded in the

RQs and ask what information is required in order to answer them. Based on the required information, I identified the sources through which such information could be generated. Mostly, the information was generated through interviews and different sorts of secondary sources. Observation was utilised to a lesser degree.

Table 1: This table showcases my research questions, the information required to answer them, and the data collection methods to gather such data.

RQ's:	Information needed about:	Sources of information:
1: What different ways are sustainability and environmentalism understood?	- Contrasting views on what sustainability is. - Dominant discourse of environmentalism - Alternative discourses on environmentalism.	- Scientific literature
2: What specific goals, strategies, measures and policies are applied in the Bjørvika development, and how does it correspond with current discourses on environmentalism?	- Overall goals and aims. - Strategies aimed at enhancing economic or ecological sustainability. - Implemented measures aside from the general strategies influencing economic and/or ecological sustainability. - How the actors responsible for the development perceives the project to pursue ecological sustainability. - Whether the project's strategies, policies and measures draw towards an ecological modernisation rationale or a degrowth rationale.	- Public planning documents - Regulatory provisions - Newspaper articles, - Interviews - Observation.
3: Can the Bjørvika development claim to be ecologically sustainable?	- Internal inconsistencies between applied strategies/measures and environmental efforts. - The extent that the development adopts a weak or strong sustainability approach.	- Public documents - Interviews - Scientific literature
4: What are the barriers preventing the project from being more ecologically sustainable?	- Ideological, institutional, political and strategic impediments to strong sustainability. - Rationale behind non-realised strategies.	- Interviews - Scientific literature

2.2.1. Secondary sources

Secondary sources refers to a wide range of data sources that has already been collected by other individuals or institutions, that you as a researcher can extract for the purpose of your study (Kumar, 2014). In this study, secondary sources like scientific articles, governmental-

and semi-governmental publications, mass media posts have been pivotal information sources to respond to the RQs. On the one hand, the non-academic sources have provided valuable information regarding the case, its goals, strategies and governance. On the other hand, academic articles have provided me with a theoretical understanding of the neo-liberal context of the case as well as a conceptual framework to assess sustainability and environmentalism.

To answer RQ (1) and to solidify my theoretical understanding of environmentalism in the Bjørvika development (presented in chapter 3.), I reviewed many scientific articles related to the following keywords: "weak and strong sustainability", "neo-liberal governance", "ecological modernisation", "green growth", "entrepreneurial cities", "green fix", "degrowth", "ecological economics" and "sustainable urban planning".

Governmental documents directly linked to the case was crucial source to comprehend the development as a whole, and its official goals, strategies, policies and measures. Planning documents such as the official Fjordby-plan (Plan- og bygningsetaten, 2008) and Bjørvika-plan (Plan- og bygningsetaten, 2017a) provided overall presentations of the development with its societal and spatial implications. Regulation-plan documents has supported the more general planning documents with by-laws. Yin (2009) assumes government publications as commendable sources. They are typically stable and trustworthy sources that provide a broad coverage on a topic, its related processes and setting. Additionally, governmental publications (and other secondary sources) are valuable because they exist independently from my research and are constructed with a different purpose than answering my RQs. Therefore, governmental documents have been used to cross-check information gained through the interviews.

The OMOP (Bjørvika Utvikling, 2012), collectively produced by several private and semi-public parties, has as the main document for environmental efforts in Bjørvika been central to appreciate the specific measures and environmental work done up until this point of the development. Newspaper articles has also been an influential information source to better grasp environmental dimension of the development. Moreover, newspaper articles have raised some critique regarding the Bjørvika development, which has served as inspiration for my own assessment. Together, the governmental publications, the OMOP and the newspaper articles, have assisted with information needed to answer RQ (2) and (3). Consultation with secondary sources (both academic and non-academic) was the foundation for most of the questions posed in the interviews.

2.2.2. Focus interviews

To supplement and elaborate on the information gathered through secondary sources I conducted several interviews. According to (Yin, 2009), interviews represent one of the most important data collection sources in a case study where the objective is to grasp a subject in a holistic manner. In my data collection, interviews with key stakeholders was necessary to: elicit information about subjects that did not transpire in the documents; allow them to expand on subjects mentioned in secondary sources; and to make them explain their rationales related to strategies and measures. For these purposes, and due to time and resource limitations, I opted for *semi-structured interviews*. Semi-structured interviews are typically based on an interview guide, and entail face-to-face interviews centred around a specific topic with a single interviewee. Although the interviews are based on an interview guide it should flow more like a conversation to allow the participant to explore the various subjects (Longhurst, 2016).

Because environmentalism in the Bjørvika development is shaped by multiple powerful actors, these stakeholders become essential sources of information. Through a preliminary study, I defined four categories of actors that directly influence environmentalism in Bjørvika: planners, politicians, developers and land-owners. These four categories are referred to as 'the key stakeholders' and were the targeted groups for interviews. Representatives from the various groups was approached through e-mail invitations.

In total, four interviews were conducted. The first with a representative from Bjørvika Utvikling (Private company responsible for environmental reporting and infrastructure in Bjørvika), the second with a representative from Hav Eiendom (a private real-estate developer and land-owner), the third with a municipal politician (from the commission of urban development), and the last with a municipal planner from PBE. Out of the four interviews, the first, second and fourth interview were performed face-to-face in meeting rooms at the companies/organisation's respective headquarters. The interview with the politician was done by phone-call. All interviews lasted for about 60 minutes except the interview with phone, which lasted for 30 minutes. Each of the interviews were recorded and transcribed.

The semi-structured interviews were based on interview guides, which I had prepared prior to the respective interviews. Topics and questions included in the interview guide was formulated considering my research questions, secondary sources regarding the case, and relevant theories elaborated through scientific articles. Because the various participants represent different organizations/companies with different responsibilities and expertise, the individual interviews were approached with its own guide and own set of questions. The

content of the interview guide also developed as I acquired new knowledge by conducting more interviews. Therefore, in the later interviews I based questions on previous statements, and left out questions that had already been discussed. Certain topics and questions do however carry over from interview to interview. I opted for an approach that both maintained and developed questions. Some questions were maintained to evoke different viewpoints of stakeholders. I developed and added new questions to explore as many relevant aspects of environmentalism in Bjørvika as possible. Attachment 1 highlights topics that was discussed in the various interviews.

The interview process was mostly successful, but with a few exceptions. Firstly, a larger number of interviews would have been ideal. Preferably I would have appreciated two additional interviews with politicians: one with a politician from a different party in the commission for urban development, and one with a representative from KMD (a different political department engaged with urban development matters). Moreover, another interview with a municipal planner with different expertise would have been fruitful. Such interviewees could potentially have contributed with additional perspectives and information. During the recruiting period I attempted to invite such participants, through e-mail and by phone, but without luck. Both planners and politicians, were difficult to recruit. Many attempts were made before, a planner and a politician agreed to participate. But despite wanting more interviews, I consider the four interviews I managed to complete sufficient, as I recruited representatives from each of the key stakeholder groups. Also, my research is not so much geared towards perspectives, but rather at interpreting the processes that define environmentalism in Bjørvika in light of theoretical notions.

2.2.3. Observation

Besides focus interviews and secondary sources, data was to a lesser degree gathered through observation. The development site was observed in two ways: (1) through two field trips, and (2) through examination maps. Although the observation process was conducted in a less formal and structured manner than the other two methods, it was still relevant for the data collection process. Observation was initially used in an explorative manner to get a real-life understanding of the scale and content of the project at a surface level. A more casual and explorative use of observational activities is also endorsed by Yin (2009). During the field trips, I also attempted to comprehend the variety and extent of elements that affects the environment. I was for instance keeping an eye out for renewable energy technologies, bike and walking

infrastructure, green infrastructure and road infrastructure. Through the observation I got a rough idea of what environmental elements that have been incorporated, but also elements that are not incorporated. Based on my observations, I could through desktop research further investigate my initial observations. In this way, data collection through observation was the basis for some of my findings that I developed into arguments in the analysis section. Observation was also used in a more systematic way. Observation of maps was for instance used to grasp the prevalence of certain visible environmental elements (e.g. green roofs, road capacity) and to confirm or deny assumption I had.

2.3. Data analysis

Analysis of case study evidence can be a difficult undertaking. To create order among the chaos, I mainly used a strategy that Yin (2009) refers to as "relying on theoretical propositions" (p. 130). When relying on theoretical propositions, data analysis is guided by the theoretical notions that initially led to the case study, and creation of RQs. Because the RQs that I seek to answer already is shaped by the theoretical prepositions, the data analysis has already been focussed around certain themes and concepts. In my case the data analysis was throughout oriented around theoretical concepts such as "ecological sustainability", "green growth", "neo-liberalism", "ecological modernisation" and "degrowth". Thus, when I engaged with case study evidence, these theoretical concepts guided both the type of content I was looking for and the way I interpreted it. The theoretical notions also directly influenced the questions I posed during interviews, and thereby type of generated evidence. Because the evidence generated from interviews strongly relate to the applied theoretical propositions, it simplified the task of interpretation.

In addition to the general data analysis strategy (relying on theoretical propositions), I have also used two analytical techniques: pattern-matching and explanation building - both endorsed by Yin (2009). Pattern-matching involves comparing empirically based patterns with a predicted pattern and is a useful technique to enhance internal validity. Explanation building utilises a pattern-matching process to build explanations, and in turn hypotheses about the case. These techniques were prominent in the explanatory part of the research where I attempted to pattern-match: (1) case study evidence and (2) scientific literature, to unravel barriers to ecological sustainability, and ultimately to generate a hypothesis as to why EM/degrowth are hard to implement. In certain incidents, obstacles to environmental sustainability first surfaced in the case study evidence, for me then to pattern-match with academic literature. In other

instances, I became aware of a barrier through academic literature, for then to recognise a similar pattern in Bjørvika. From such a two-sided pattern-matching process between empirical evidence and peer-reviewed literature, I sought to produce an explanation/hypothesis. The purpose of generating such hypothesis or explanations is according to Yin (2009) not to conclude a study but rather to create ideas for further research.

In this report I have opted to present empirical data throughout my analysis and discussion, as opposed to having a separate section merely presenting the empirical data. Although, this is an alternative way of structuring a report, I found it convenient because it allowed me to present evidence in the same place I analyse it, and thereby enhancing flow while avoiding redundancy. A combined presentation of evidence and interpretation is also supported by Cohen, Manion, & Morrison (2007), who mentions that a hallmark of case studies is that it "blends a description of events with the analysis of them" (p. 253).

2.4. Research quality

Providing an account of validity and reliability is important for the reader to assess the trustworthiness of a research as well as how to perceive the results. This section elaborates on four quality tests for a reader to evaluate my research: construct validity, internal validity, external validity and reliability.

Construct validity is a quality test to ensure that correct operational measures are being used to study a concept (Yin, 2009). In the assessment of legitimacy, I assess to what extent applied environmental measures in Bjørvika are consistent with an EM and degrowth approach to the climate crisis.

Internal validity is according to Yin (2009) a concern in explanatory case-studies, where the researcher tries to explain a causal relationship. Even though most of this research takes an evaluative stance, I feel internal validity deserves a mention because the closing chapter about barriers takes a more explanatory route. In the barrier section, I attempt to explain what might hinder implementation of the two environmental discourses based on evidence from my empirical data and scientific literature. As mentioned in the data analysis section, pattern-matching and explanation building was utilised to enhance the internal validity of these explanations. Building a precise and extensive explanation about barriers is however difficult, as there might exist uncountable amounts of obstacles that to a larger or lesser extent, and in combination hinders environmental sustainability. Recognising this complex challenge, I have due to limited capacity and resources, rather focussed on raising awareness of some barriers

that potentially might hinder implementation of EM and degrowth. Further research can investigate to what extent the identified barriers are relevant, and how to overcome them.

External validity regards the extent to which the results and findings from the study can be generalised to other cases. A common criticism towards case-studies is that they offer little opportunities for generalisation, as they only consider one case with its particularities. However, when one conduct a case study the objective is not to generalise to universes (statistical generalisation). Instead case-studies should aim for an analytical generalisation: the results should be generalised towards a broader theory (Yin, 2009). Since I in this research scrutinise Bjørvika through the lenses of EM and degrowth, I should also strive to generalise the results to theories about these environmental discourses. Although, the goal is not to generalise to a population of cases, the results might also apply other cases in a similar context. The results might for instance also be relevant to other urban waterfront developments with a green agenda, realised in collaboration between private and public sector.

Reliability is a quality test to ensure replicability of a research project. The objective of the test is to be sure that other researchers can replicate the results and conclusions from my case-study by following the procedures used in this project (Yin, 2009). To maximise the chances for future researcher to replicate my study, I have attempted to provide a thorough account of how my data is collected as well as analysed (see section 2.2 and 2.3). The data collection section does for instance include a matrix showcasing topics that were being discussed in the interviews and examples of questions. Public documents and scientific articles has also been properly cited where used, to allow for future researchers to collect the same information. Complete replication might however be difficult because some data is gathered through social-interactions in a dynamic and changing context. Although another researcher poses the exact same questions as me, there is no certainty that they will receive the same answer. Due to my obligation to maintain the anonymity of the respondents, future researchers will probably gather their data from different respondents, which might affect the generated information. As Bjørvika is an ongoing urban development project, data gathered during my research might be outdated or changed in the future, which can affect the interpretation of the case and my results.

2.5. Ethical implications

As this is a qualitative social science research project that contains data collection through interviews ethics becomes relevant. Ethics are especially relevant when you engage

with human beings because their identity, values and feelings should be respected. However, because of the non-sensitive nature of the thematic and the resourcefulness of the interviewees ethical considerations are less complicated that if the interviewees represented vulnerable groups or if the topic required discretion. Still, my research project is considered notifiable to NSD, as personal information was handled through the interview process. In order to safeguard the identity of the interviewees, their names have been anonymised. Moreover, the interview recordings were deleted after transcription, thus making it impossible to track the interviewees from their voices. The interviews are all based on informed consent, and the interviewees received information about the interview in advance, so they could prepare.

3. Theoretical framework – Perceptions on sustainability and environmentalism

Chapter 3. presents the theoretical background for the research. The section will present theories, ideas and perceptions on environmentalism, which will serve as the basis for my analysis of the urban development in Bjørvika. Initially, I briefly present the term 'sustainability', and raise some concerns regarding its ambiguity. The ambiguity of sustainability stems from its multiple interpretative options. Two contrasting understandings of sustainability; weak and strong sustainability is presented. These two understandings are central to understand the dominant and alternative paradigms of environmentalism. I move on to explain the dominant paradigm of environmentalism, based on a weak sustainability conception: green growth, as well as its ideological background, criticisms and application to planning. The presentation of the dominant paradigm is followed by a similar presentation of the emerging alternative paradigm: degrowth, which is based on a strong sustainability conception.

3.1. Sustainability and different understandings of the concept

3.1.1. Sustainable development

The term "sustainability" has over the past four decades been a buzzword in developmental practice and policy, at every geographical scale and across disciplines. Its wide and frequent application echoes the term's accessibility and universality. Although, there exist various definitions of sustainability, the most known one is expressed in the Brundtland Commission's report of 1987 (WCED, 1987), describing that *sustainable development* is humanity's ability to ensure that it meets present needs without compromising the ability of future generations to meet their own needs. The definition implies that current economic activity should happen with respect to biodiversity, ecosystems and natural thresholds so that they can be maintained indefinitely. Furthermore, sustainable development is often understood for its triple-bottom-line. The triple-bottom-line emphasise that sustainability should be pursued within the environmental/ecological domain, the economic domain and the social domain. These sustainability domains are also called "pillars" or "dimensions". Thus, when "sustainability" is used without specification it usually refers to social, economic and ecological sustainable development. Despite commonly agreed for its intergenerationally and

triple-bottom-line, sustainability is understood and interpreted in many ways, which is a major criticism of the term. Main divergence points of interpretations include: the feasibility of pursuing economic growth while also enhancing social and ecological sustainability, how to measure the balance the different dimensions against each other, the role of technology, means of achieving sustainability, and underlying values and assumptions. The following section delves into two contrasting understandings of sustainability, namely: weak sustainability (WS) and strong sustainability (SS).

3.1.2. Weak and strong sustainability

WS and SS are most frequently used in ecological economics and describe two different discourses on what to perceive as sustainability. Whereas sustainability from a policy-perspective is about meeting current human needs while preserving the opportunity for future generations to meet theirs, from an economical perspective, sustainability is about maintenance of "capital". Capital is assumed to be stocks that serves as inputs in the production process. Within ecological economics the production process typically operate with four types of capital: manufactured, human, social and natural/ecological (Ekins, Simon, Deutsch, Folke, & De Groot, 2003). Manufactured capital entail produced goods, machinery, buildings and infrastructure, and growth of such assets is therefore a central part of economic sustainable development. Human capital refers to people and their physical and intellectual labour capacity, while social capital contains the networks and organisations that labour is mobilised and coordinated through. Natural capital is an important and complex category that performs four functions, some of which are related to the production process (Ekins et al., 2003). Of primary value is natural capital's life-supporting function, without which life as we know it would be impossible. Of secondary value, natural capital has a function in that it: provide the raw materials required for production, it gathers wastes and pollution from production and consumption (waste sink function) and provide amenity services such as visual pleasure. The goal of the production process is to combine these four types of capital to produce flows of goods and services that people want, in a way that the capital stocks are maintained or increased in quality or quantity (Ekins et al., 2003). If goods and services are produced while the capital stock is maintained or enhanced it is a sign of sustainability. On the flipside, if the capital stocks diminish, over time, the production output will also subside, which indicate an unsustainable production process. If for instance a plank producer over-harvests wood (natural capital), the forest will eventually shrink, which reduces the number of planks (goods) that the company

can produce in the future. What decides if this process is sustainable or not depends on whether one presumes that natural capital should be safeguarded, or that it could be substituted for other types of capital stocks, with particular emphasis on manufactured capital (Dietz & Neumayer, 2006).

From a WS perspective all types of capital are considered to generate essentially the same kind of well-being (utility). Therefore, capital stocks, natural capital included, are considered substitutable (Ekins et al., 2003). A process that decreases the natural capital stock would be deemed legitimate if compensated by an equivalent increase in manufactured capital. In line with this rationale, from a practical viewpoint, one could argue that a GHG emitting process is acceptable if it contributes to the production of physical (manufactured) capital such as cars and roads, more valuable than the negative cost of emitting. What matters from a WS perspective is the not the individual value of capital stocks, but rather the total value of the aggregate capital stock. As long as the total sum of capital stocks is maintained or enhanced (for the sake of future generations), the development is considered sustainable (Pelenc & Ballet, 2015). Thus, a WS draws on the ethical rationale of utilitarianism, where an action is assessed on how much utility it generates, and the fundamental goal is utility maximisation. Because natural capital is required to generate manufactured capital and utility maximisation is the goal, natural capital is particularly exposed to degradation, which is exacerbated by lenient environmental regulation, flawed emission quota schemes and insufficient monitoring. However, WS assumes that technological development will solve environmental problems created by increased production and consumption (Ekins et al., 2003; Pelenc & Ballet, 2015).

On the other hand, proponents of a SS conception acknowledge that natural capital is fundamentally different to manufactured capital, thus perceiving it as exclusive and to a great extent non-substitutable (Dietz & Neumayer, 2006; Ekins et al., 2003). Ekins et al. (2003) elaborates why natural capital should remain outside an aggregate capital equation, and rather be accounted for independently. Firstly, natural capital is qualitatively distinct to manufactured capital. Can to some extent absorb anthropogenic impact. But only to a certain point. Past this point damage is irreversible, which means that the system will not restore, potentially having devastating consequences to life-services. Irreversibility contrasts other types of capital which are reproducible. An additional point is that we know way too little about natural systems to know these irreversibility thresholds. In other words, there are irreducible uncertainty. So, with so much uncertainty around irreversible matters, there is reason to act carefully and respect nature: don’t substitute it. We should apply a precautionary principle.

3.2. Green growth: the dominant paradigm on environmentalism

Green growth is considered the dominant approach to achieve environmental sustainability and holds an important position in the policy discourse of international institutions such as the World Bank, OECD, and the United Nations, as well as most advanced capitalist economies (Davidson & Gleeson, 2014). Advocates of green growth recognise that current "business as usual" growth, which overly exploits natural capital, is insufficient to attain environmental sustainability on a long-term. To overcome the ecological deterioration of the current economic activity, the growth must be facilitated in a "greener" manner that provides significant environmental protection (Jacobs, 2012). Thus, from a green growth perspective, growth is considered as reconcilable with environmental sustainability.

Even though green growth primarily is used in a policy-setting, it is based upon theoretical and ideological notions. The environmental dimension of the green growth concept is based on theories of ecological modernisation (EM), while the economic growth dimension of the concept is related to neoliberal theory and ideology. The forthcoming two sections will explain these underlaying theories/ideologies of green growth.

3.2.1. Ecological Modernisation

As the concept might suggest, EM maintains that the environmental crisis could be resolved by 'modernising' the current growth in an 'ecological' manner. EM theory arose as a reaction to the ecological crisis, but also as a direct response to the eco-alarmist movements of the 1970s, which was critical to the persistent pursue of growth (McLaughlin, 2012). Accordingly, EM theory dismisses the eco-alarmist supposition that a fundamental reorganisation of the current economic system and its institutions is necessary to fix the ecological crisis (York & Rosa, 2003). From the perspective of EM theorists, because ecological problems stem from modernism and industrialisation, their solutions would necessitate more rather than less industrialisation (Buttel, 2000). Mol (1995), one of the core theorists on EM, expresses that the only way out of the ecological crisis is by advancing further into it: we should move towards "superindustrialisation".

Rather, EM advocates regard the ecological crisis to be resolved within current capitalist institutions (Xue, Walnum, Aall, & Næss, 2017) and while maintaining current growth- and consumption rates. In order for growth to coexist with environmental sustainability EM relies on technological advancements that will enhance resource- and eco-efficiency (Mol, 1995). Spaargaren (1997) hypothesises that capitalistic institutions are flexible enough to move

towards a "sustainable capitalism" where market competition (under certain political conditions) can be utilized to achieve pollution prevention and eco-efficiency in production processes and with time in consumption processes. Put differently, EM attempts to reconcile ecological sustainability goals with economic and social sustainability goals through so-called "no-regret" or "win-win" policies.

3.2.2. Neo-liberalism: the underlaying ideology

To comprehend the dominant green growth paradigm, it is necessary with a basic understanding of the context in which it operates: here called neoliberalism. Neoliberalism is a catchphrase used to annotate the ideas/ideology that has prevailed most of the global economic- and political landscape, in one way or another, since the 1970s (Boas & Gans-Morse, 2009). Like 'sustainability', neoliberalism could be considered a vague or unclear term, because it is applied recklessly to a wide array of circumstances, and also has developed with time. For the purpose of this research, I will resort to point out the main tenets that transcend most versions of neoliberalism, while leaving the fine grain differences, mutations and hybrids aside.

Neo-liberalism arose as a response to the economic crisis in the 1970s, where Keynesian welfare economics prevailed (Overbeek & Pijl, 1993). On a ideological level, neo-liberalism claimed that markets are superior to the public in organising economic, social and pollical matters (Hayek, 1944). On this basis Hayek, argued for less governmental intervention and centralised planning, and rather let "the invisible hand" of the markets organise our societies. Philosophically, neo-liberalism draws on tenets from two worldviews: liberalism and conservativism (Allmendinger, 2009). From liberalism, neo-liberalism emphasises laisses-faire economics, limited state intervention as well as freedom of choice. Simultaneously, neo-liberalism draws on the conservative values of a strong authoritarian state and rule of law. They argue that there can be no freedom without order. Therefore, conservatives support a strong (but non-interfering) government to: arbitrate disputes, ensure security, provide infrastructures, establish rule of law, and determine the market 'playing rules' (Allmendinger, 2009).

Because EM operates within the current economy and its related institutions, the neo-liberal rationale remains unquestioned. The neo-liberal tendencies of EM are clear in that it suggests a transfer of state initiatives and responsibilities to the market, as the market is seen as a more efficient channel to produce ecological sustainability (Mol, 1995). Thus, EM's process of sustainable transition relies on market logic, competition as well as innovation. An

open and unregulated market is necessary to create competition, which will spur innovation and novel technologies. These innovations will bring about enhanced eco-efficiency, which allow further economic growth. Advocates of EM support the notion that environmental impacts can be "decoupled" from growth (Smith, Hargroves, & Desha, 2010).

3.2.2. Economic growth in entrepreneurial cities

Alongside the emergence of neoliberal ideas and deindustrialisation in advanced capitalist economies, came a consensus that city governments should play an active role in the development of wealth and employment (Harvey, 1989). City governments pursuing tasks aimed at capital accumulation contrasts their earlier responsibilities geared towards local provision of services, facilities and infrastructures. Instead of such "managerial tasks" city authorities are challenged with attracting capital to their city – capital that in the globalised economy increasingly is held by private transnational companies and corporations. Moreover, capital is not anymore bound to the country of production, but to the country where the company is registered. Firms focussed on production therefore tend to locate themselves in a developed country, while outsourcing the production to a country with low costs. With production being outsourced, post-Fordist cities mainly depend on information, knowledge and service industries, which are spatially flexible (Gertler, 1988). Capital in the globalised economy is therefore spatially flexible and largely privatized. The challenge for city administrations is to tap into this private source of capital for the benefit of their region. Cities with more capital resources, will hold a powerful position in the global economy. Therefore, cities engage in an inter-urban competition to attract resourceful companies, which brings about capital to develop the city and country further (Harvey, 1989).

To compete for corporate capital, cities increasingly apply entrepreneurial strategies. Cities that apply "entrepreneurial strategies" are often referred to as entrepreneurial cities. Cities are called entrepreneurial because the involved actors use business-like approaches where they market, brand and speculate to promote the city (Madureira, 2014). The city is treated like a "product" that is being promoted in outward-oriented fashion to attract innovative and capital-rich companies, investors and real-estate developers (Andersen & Pløger, 2007). Moreover, entrepreneurial cities seek to entice highly-skilled, inventive and educated individuals – groups famously referred to as the "creative class" by (Florida, 2003). According to Jane Jacobs (1984), an agglomeration of the creative class and innovative business will turn a city into a growth machine.

To develop entrepreneurial cities the public sector must engage with a wide array of social actors who together hold the power to organise space (Harvey, 1989). Unlike earlier the public sector needs to interact with private realm to shape and develop the urban landscape. Harvey (1989) terms this as a turn from government to governance. Although, Harvey's "turn" indicates a decline of government in urban development, this is not the case. The turn rather implies a change in how the public and private sector interact within urban development projects and policy (Madureira, 2014). Governance refers to a governing system, meant to compliment market- and hierarchical governing, where both public actors, non-profit actors and private actors collaborate in inter-organisational and self-organising networks (Rhodes, 1996), also known as private-public-partnerships (PPPs). In entrepreneurial governance the local government is associated with a facilitating and coordinating role. Coordination and facilitating implies that the local government must create an institutional and physical environment that can attract investment. Therefore, many policies aim to spur growth by offering firms fiscal incentives and similar (Florida, 2003).

In the pursuit of flexible capital in the inter-urban competition environmental sustainability agendas could be utilised as means to boost a city's image and enhance attractiveness, and thus competitive edge. "Green fix" is a term used by Holgersen & Malm (2015) to describe a strategy to renew accumulation in the face of a crisis, realised in space over time. Awareness of ecological issues are used as a "vehicle" for the economic fix. The problem handled is not primarily environmentally unsustainable practices but rather slow capital accumulation. In a green fix a place is marketed as a place for environmentally concerned business. The marketing is typically done by state and capital in collaboration. In the political arena the fix is advertised as a solution to problems such as unemployment, lack of competitive edge, slow growth and some type of environmental issue.

3.3. Ecological modernisation in the context of urban development and planning

The previous section highlighted the theoretical and ideological foundations of Green growth and how it approaches the ecological crisis. On a macro-level EM is about integrating an ecological rationale into the current economy; in other words, greening of production and consumption processes, by enhancing eco-efficiency. Within the domain of urban planning the general principles of EM also apply. This section elaborates on how an EM rationale is translated into urban planning strategies at a local scale.

3.3.1. Spatial structure

In academic literature on sustainable urban planning, spatial structure and urban form are considered significant aspects of the environmental sustainability of a settlement, as they are closely tied to human travel behaviour and land consumption (Jabareen, 2006). The most recognised settlement structure to reduce the ecological impact from humans is the compact city (Steemers, 2003; Xue et al., 2017). A compact city model promotes a high land-use efficiency, brownfield development and mixed land-uses. Densification and emphasis on brownfield development serves as means to avoid urban sprawl (a dispersed, more energy-demanding and land-consuming settlement structure). Moreover, a combination of density and mixed land-uses are utilised to shorten distances between destinations and to make various functions, more accessible through proximity. By enhancing proximity, the compact city model aims to less transportation and thus less energy-use.

3.3.2. Mobility

With regards to the transport sector, EM aims to improve the efficiency of mobility by increasing traffic flows and reducing travel times as a means to enhance economic competitiveness. Even though total amount of travel miles might remain or increase, the climate impact from mobility will decrease through two means: (1) energy-efficiency of vehicles, and (2) substitution towards less energy-demanding modes of transport (modal-shift) (Xue et al., 2017). To the first measure eco-efficiency technology and innovation plays a crucial part, to reduce the energy-use of current vehicles. At an urban/inter-urban level, implementation of more eco-friendly busses, trams and trains as well as transitioning towards an electrical car fleet help to this end. The second means to reduce energy-use from the transport sector is to limit growth in car-use, and to substitute less ecologically-friendly transport modes for less energy-demanding ones. The main objective is to stimulate a modal shift from personal vehicles to public transport and non-motorised means such as cycling and walking. Facilitating for proximity through compact city strategies are imperative to create an urban environment that invites for cycling and walking. Moreover, creating a road-infrastructure hierarchy that favours and provides sufficient space for non-motorised forms of transport is important to encourage such means of mobility and to discourage car-use. Specific

policies (i.e. road taxes, tolls, limited parking spaces, low speed limits) targeting dirty vehicles, could also be used as disincentives (Albert & Mahalel, 2006).

3.3.3. Buildings

A growing building stock is necessary to accommodate for housing and workplaces for a growing urban population. EM do however intend to decouple this structural growth from climate impact by fostering eco-efficiency. An important measure to reduce energy-consumption from the building sector is by developing energy-efficient buildings. Energy-efficient buildings rely on novel architectonical techniques, better building materials and installation of smart technologies, and has the potential to drastically reduce energy-demand (D'Agostino, Zangheri, Cuniberti, Paci, & Bertoldi, 2016). Substitution from a fossil-fuel-based energy system to renewable energy systems is also an integral part of reducing energy-demand from the building sector (Wächter, 2013). Technologies can also be used to retrofit existing buildings, and thus make them more energy-efficient. In terms of housing EM advocates for development of apartment complexes and row houses, as opposed to detached single houses. Detached single-houses normally consume more energy due to their spaciousness but also due to their multiple external surfaces (Xue et al., 2017).

3.4. Degrowth – an alternative pathway

Starting around 1945 and intensifying up until today, growth has been the guiding principle for the global economy, nations, cities and individuals. Although, sustainable growth proponents argue that technological developments and enhanced efficiency will allow continued growth and ecological sustainability to be reconciled, this is yet to be observed, with a growing economy correlating with increased emission levels (source). In addition, socio-economic inequalities keep on increasing, questioning the capitalistic economy's assertion that increased wealth will "trickle-down" to less financially privileged people. From this dual ecological and social crisis, driven by the hegemonic growth paradigm, the concept of degrowth emerged (Demaria et al., 2013; Schneider et al., 2010). Degrowth stems from the French word 'décroissance' (meaning degrowth) and was first used in 2001 by activists condemning the capitalistic ideals and institutions. The concept entered the international field of science after the first degrowth conference in Paris in 2008 and has since then received considerable attention from a multitude of actors concerned with urban planning, finance, food

systems, international trade, alternative energy systems, education, and climate policy, to mention a few.

Because degrowth draws from many domains and different streams of thought, a clear demarcation and definition is required to grasp the concept. Degrowth is according to Demaria et al. (2013) not an ideology nor a paradigm, but rather an 'interpretative frame' to classify/understand social movements that share a similar 'diagnosis' and 'prognosis' of the dual social and ecological crisis. The common diagnosis of the dual crisis is (as mentioned) the capitalistic growth-oriented system with its institutions and values. The prognoses to remedy this 'disease' often take a utopian character and include anti-growth-oriented, anti-capitalistic and post-capitalistic solutions. From a degrowth perspective human progress is possible without economic growth, because progress does not necessarily equate with growth (Schneider et al., 2010). Progress can occur in different ways than by accumulating more capital and increasing GDP. Therefore, degrowth advocates contend that increased human well-being, equity and enhanced ecological conditions require a societal downscaling in large-scale production and consumption systems (Schneider et al., 2010), implying radical changes to the current economic system, societal institutions and ideals, as well as individual consumption patterns and values. Although, degrowth promotes an economic decline, this does not apply to absolutely. Some sectors such as renewable energy production and public transport systems should see growth (Schneider et al., 2010). In addition, poor people in global north societies and the global south should be allowed to grow to some extent. However, (sustainable) degrowth must be distinguished from unsustainable degrowth (i.e. recession), which is an uncontrolled decline in the economy that simultaneously deprave social conditions. In contrast to a depression, degrowth is a voluntary and democratically led reduction of growth, which emphasise that there are other values in life than capital accumulation. A decline in GDP is not an issue from a degrowth perspective, as economic wealth considered unimportant drawing to the Easterlin paradox, which explains that increased GDP does not correlate with well-being above the satisfaction gained from having basic needs (Schneider et al., 2010). Instead of a prime focus on utility-maximization, which in mainstream economics is the driving force of human behaviour and action, we should back a model that emphasise economic relations based on reciprocity, kindness and sharing. The degrowth stream highlight the need to rethink the meaning of life: we should pursue happiness based on simplicity and non-materialistic values (Brinkmann, 2017).

Ecosystems have an intrinsic value, not merely as providers of services and resources for humans. We need to go beyond decoupling of growth and energy use, through efficiency

enhancements because this is yet to be observed and is unlikely to happen. Efficiency measures are not sufficient and might even be counterproductive (Demaria et al., 2013; Schneider et al., 2010). Thus, degrowth is not only a response to growth, but also to green growth and ecological modernisation. Nonetheless, degrowth remains open for technological improvements, like innovations aimed at reduction of consumption. However, the improvements should not happen as described by Jevons Paradox (Alcott, 2005), so that we can consume more, thus potentially offsetting the benefits from applying the technology in the first place. The focus should be on better rather than more technology (Schneider et al., 2010).

3.5. Degrowth in an urban context

Having demarcated and defined what degrowth entail at an ideological level, this section delves into how a degrowth perspective is incorporated in a planning context. Spatial planning institutions hold an important role in transitioning towards a degrowth society as they have authority to determine by whom, how and for what land can be used. Through design and structuring of our landscapes planning can affect several ecological aspects such as energy consumption, resource use, space consumption and impact of human activity on ecosystems and amenity services. In addition, planning can potentially play an essential part towards social-oriented aspects of degrowth like equity and democracy. Following the topic of the research, this section will primarily focus on how urban planning contribute to the ecological aspect of degrowth, with a quick mention of the social dimension. Like the green growth section, this section will elaborate on urban spatial structure, housing and mobility.

3.5.2. Urban spatial structure

The arrangement of our settlements influences energy and resource consumption and could therefore contribute to a downscaling in production and consumption. To pursue a reduction in energy and resource consumption, degrowth proponents tend to support a decentralised, low-density settlement pattern that allows for high degree of self-sufficiency. Such settlements are often referred to as eco-villages. However, there is an ongoing debate on the resource efficiency and plausibility of establishing such settlements on a large-scale without revamping society and its institutions as we currently know them. Establishing dispersed small-scale settlements would for instance require abandonment of already existing urban building stock and construction of new decentralised houses and an accompanying resource-demanding

infrastructure network. A sparse and scattered population make also services dependent on population density like hospitals, universities and libraries uneconomical (Xue, 2014). Moreover, the low population density makes an adequate variation in jobs and educations unfeasible, severely limiting people's freedom of choice and individual preferences, thus making large-scale establishment of eco-villages an unrealistic enterprise. Consequently, Xue et al. (2017) defend a compact city as the settlement structure also for a degrowth society. A compact city model enables for a sufficient freedom of choice while enhancing resource efficiency, hence curbing GHG emissions. A dense urban development will also prevent encroachment of surrounding natural areas, food production sites and landscape qualities, if growth in the building stock is limited (Høyer & Næss, 2001).

The same urban land-use principles mentioned in the green growth to reduce energy consumption also apply to degrowth. Thus, measures such as mixed land-uses around transport nodes section should be pursued (Wächter, 2013; Xue et al., 2017). Moreover, new development should ideally occur in brownfields, such as abandoned docklands, industrial areas or parking lots (Høyer & Næss, 2001).

3.5.3. Housing

Eco-efficiency as well as moderation and sufficiency are keywords in the planning of housing and other buildings from a degrowth perspective. In a similar manner, but with a different rationale to EM, degrowth intend to reduce energy consumption of both residential and commercial buildings through the means of enhanced eco-efficiency. Therefore, degrowth also endorse state of the art innovations in insulation, water conservation, lighting, building materials, orientation and heating/cooling systems to improve the energy- and resource-efficiency of buildings. Buildings should also too the largest extent possible consume electricity and heat from renewable resources, produced either on-site or locally (Wächter, 2013). If the degrowth society manifest in compact cities, the demand for the city regions to establish renewable energy production increases, because density lowers the potential for renewable energy production (Xue, 2014). Retrofitting practices to limit the ecological impact of the current building mass is also an imperative. However, contrary to EM, degrowth does not apply eco-efficiency measures to create room for growth in other sectors, but rather to cutback energy-use to reduce the total ecosystem impact from human activity.

In addition to eco-efficiency measures, degrowth goes a step further than EM, and advocate for moderation in the size of the building stock. A moderation in the building stock

matters because a larger building stock demands more resources and energy for construction and operation (Høyer & Næss, 2001; Næss & Xue, 2016; Pérez-Lombard, Ortiz, & Pout, 2008), thus leading to increased GHG emissions. Since the period after WWII, the spatial footprint of cities in most of the developed world has seen a steady increase, partially due to population growth, but more significantly due to growth in per capita consumption of housing (Høyer & Næss, 2001). Norway is also following this trend and has experienced an increase from xxx in xxx to 56,8 m^2 in 2016 (Xue et al., 2017), which is among the highest in the world. To downscale energy consumption there is a need to moderate per capita consumption of floor space. One way limit growth of the housing stock could be to incorporate a capping system on floor space consumed per capita (Høyer & Næss, 2001; Næss & Xue, 2016; Xue et al., 2017). Such a scheme implies that future growth in the building stock are attributed to population growth rather than increased consumption of floor space per capita. When the population grows, new housing should also respect the maximum standards. Because people have different preferences and needs, some variation in dwelling sizes is necessary. Therefore, the construction of spacious dwellings, presupposes an equivalent reduction in size of other dwellings. Yet, the gap between the largest and smallest dwellings should not be too broad, as this might cause housing inequality (Xue et al., 2017). With regards to existing housing, degrowth advance the notion of small dwellings as the new social norm. Hence, it supports sub-dividing of current overly-spacious dwellings and co-housing concepts, to fit more people into less space.

3.5.4. Mobility

As opposed to the EM discourse, the degrowth discourse advocate for a stabilisation or decline in mobility. The approach argues that freedom of choice is sufficient as it is, and that enlarged and improved transport plans might induce more transport and commuting, thus offsetting environmental benefits gained from implementing efficiency measures in the first place (Xue et al., 2017). Degrowth similarly to EM emphasise compact city principles as a means to encourage local activity, and a walking and cycling environment. Quite importantly degrowth advocates that road expansions should stop, as it will induce more traffic. Instead, roads should be replaced by bike infrastructure, walkable neighbourhoods and public transit.

4. Analysis

4.2. Background of the case

Bjørvika is Oslo's largest urban development project this century and will upon completion compose a new urban district. The urban development project here referred to as "the Bjørvika development", is located downtown next to Oslo Central Station (Oslo S) and the waterfront, and include the following areas: Bjørvika, Bispevika, Lohavn and Middelalderparken (see **Error! Reference source not found.**). As the largest urban development project along the waterfront, the Bjørvika is also a major constituent of the

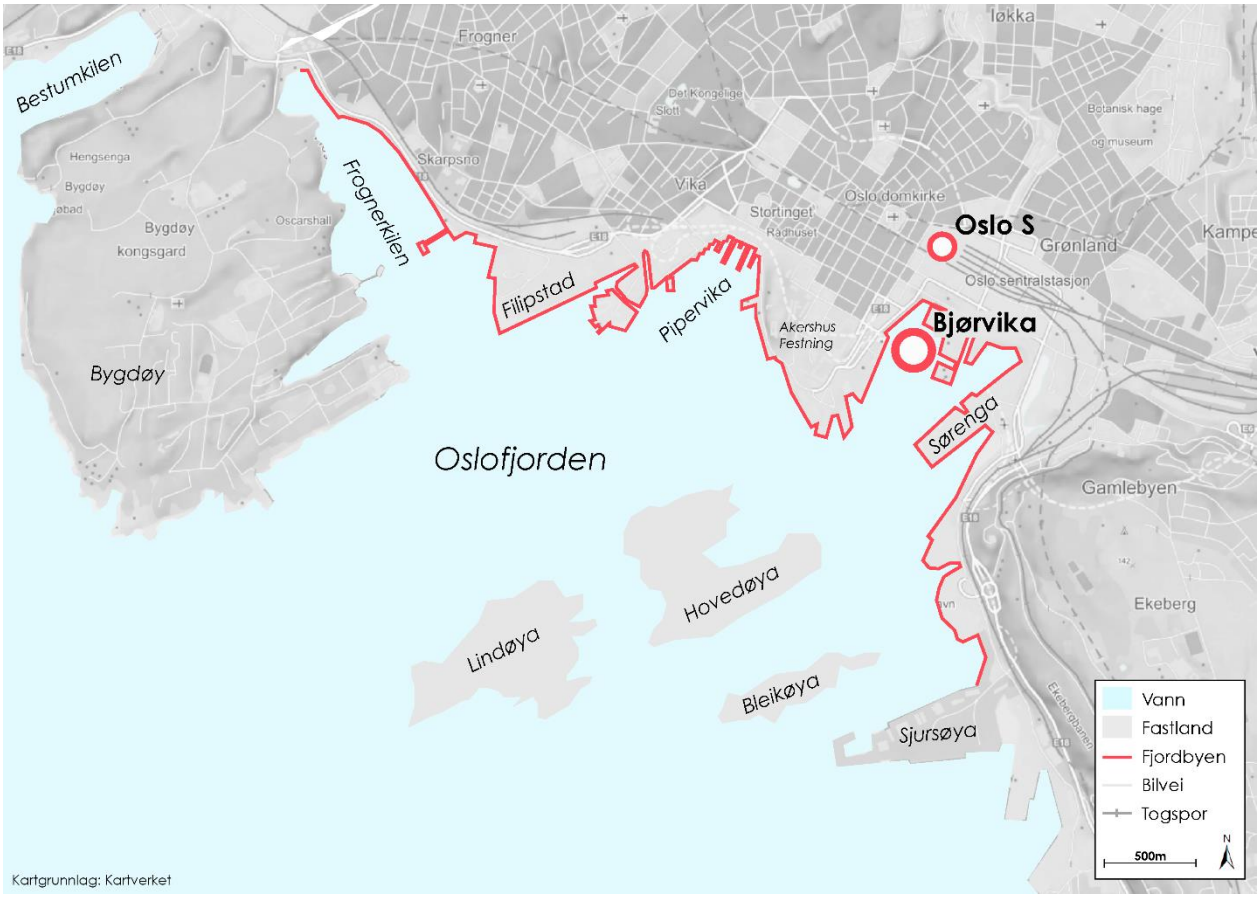

Figure 1: Bjørvika's location in Oslo and Fjordbyen. Source: Edited map from Kartverket.no

Fjordby-project, a comprehensive initiative to reconnect Oslo with its Fjord.

The Bjørvika development officially began in 2003 with the approval Bjørvika-plan and is scheduled for completion around 2035. The long-time frame of the development reflects the scale of the project as well as its diverse content. In total, around 5000 houses and 15 000 - 20 000 workplaces will be established in Bjørvika. In addition, the new urban district will

include several acclaimed culture institutions including the Norwegian Opera, and the relocated Munch-Museum and Deichmanske Library. Plenty of public spaces and a continuous promenade along the waterfront is planned to pleasantly bind Bjørvika together. Per 2018 about 35% of the development have been realised. Completed projects include the Opera, Barcode and Sørenga. Barcode with its location right next to Oslo S is a site mainly occupied by large office buildings housing successful ompanies such as DNB, Deloitte, KLP, PWC, Visma, Ernst & Young and Cermac, and is currently a vital part of Oslo's central business district (CBD). Sørenga, located on an artificial peninsula, is on the other hand predominantly a housing area. Ongoing projects, that will be finalised over the next couple of years, are located on the southside of Dronning Eufemias gate and constitute 25% of the total development. The remaining 40% of the development will be carried out from around 2020 and onwards in the more peripheral areas of the plan.

Throughout Oslo's history Bjørvika has served as an important site for harbour activity and production. Bjørvika remained an essential harbour and production site, until the 1960s where Oslo's economy changed from being production- and export-based to a service- and import-based (Plan- og bygningsetaten, 2017a). As the demand for harbour areas declined, and the automobile became commonplace for household, the Norwegian authorities decided to situate E18, a four-eight lane wide motorway, through Bjørvika. From 1967, when the motorway was established, and until the millennium when the Norwegian government decided to transform Bjørvika into a new urban centre, Bjørvika remained occupied by harbour and infrastructure. As the development of the Opera (prior to the Bjørvika-plan) began, harbour activity was gradually phased out, and relocated at Sydhavna some kilometres south of Bjørvika. E18, was submerged in a tunnel in 2010, and allowed for new areas of the Bjørvika-plan to be developed.

Bjørvika and Fjordbyen is in every guiding document both promised and depicted as a "green" development. The Fjordby-plan (Plan- og bygningsetaten, 2008), which sets out general principles for the entire waterfront development, for instance describes the development as "climate friendly" and "large sustainable project" (p. 6). Moreover, the Fjordby-plan emphasises that its urban development projects make important contributions to realise the municipality's vision of making Oslo one of the most climate friendly and sustainable capitals in the world. In the same line, the Bjørvika-plan (Plan- og bygningsetaten, 2017a) declares "environmental consciousness" as a central aspect of the planning and development efforts. Each of the interviewees also confirmed environmental efforts to be at the core of the development.

Centremost to the environmental strategies in Bjørvika is the OMOP (overarching environmental monitoring program) (Bjørvika Utvikling, 2012). The OMOP was formed by the private and the semi-public developers in Bjørvika as a supplementary document to the Bjørvika-plan created in 2003, a time when such quality-oriented programs were non-statutory (i.e. voluntary). Together, the developers established Bjørvika Utvikling (BU) and its daughter company Bjørvika Infrastruktur (BI) to monitor, supervise and develop the OMOP. In 2012, the developers (through BI) voluntarily revised the OMOP to reflect advancements towards more stringent environmental regulation and heightened ambitions in the construction industry with regards to energy, GHG emissions, node-oriented development, and building materials. The content of the OMOP is itself guiding as opposed to legislative. However, although the guidelines are not legally binding, they are informing the planning authorities on what they should emphasise when detailed zoning plans are created and general permissions are issued. Therefore, the developers are strongly encouraged to comply with the standards if they intend to carry out their development.

4.3. Environmentalism in Bjørvika

The sustainability of Bjørvika will considerably depend on the environmental discourse confining the development. While the green growth discourse remains naive to persistent pursue of growth, and thus risk offsetting eventual environmental benefits maintained through structural and technological efficiency measures, a degrowth discourse combines eco-efficiency measures with actions to reduce gross consumption to approach strong sustainability. The Bjørvika development's position on growth and its consistency with ecological sustainability is therefore of particular interest. The environmental discourse is not only of interest because a strong commitment to growth is an oxymoron intrinsically, but also because a growth ideology typically affects the type of environmental actions that are implemented. More radical environmental measures that are required to achieve real sustainability, but that conflict with a growth agenda are not likely to be prioritised. Urban environmentalism will mainly prioritise strategies that can be reconciled or promote growth. This section attempts to trace the underlying environmental discourse encompassing the Bjørvika development to comprehend the projects potential for sustainability. Moreover, it scrutinises the emission reduction measures, and relates them to the overarching discourse.

4.3.2. Trails of growth and environmental rationale

The Bjørvika project exhibit several cues suggesting that local, regional, and national growth is a principal driver for the urban regeneration process. The clearest cue indicating that the Bjørvika development is found on a growth ideology are found in Oslo's municipal plan, which undeniably also applies to Bjørvika. The municipal plan of 2015 (Oslo kommune, 2015) for instance stipulate four goals (see fig. 2) that crystallise Oslo's desire to enhance its competitiveness and attractiveness. The importance of Oslo to be a "dynamic" and "competitive" city was also emphasised by the representative from the Commission for Urban Development (Interview: 3).

Oslo municipality's goals to become an attractive city nationally and internationally.

- **Goal 1**: Norway shall attract knowledge-workers and talents from the whole world.
- **Goal 2**: The Oslo region's wealth creation capacity and international competitiveness shall be strengthened.
- **Goal 3**: Oslo shall be an internationally leading city for sports and culture.
- **Goal 4**: The Oslo region should be profiled *offensively* regionally, nationally and internationally.

Figure 2: Oslo municipality's goal aimed at enhanced competitiveness

Competitiveness is a keyword that immediately trigger associations to the growth ideology. The creation of a competitive edge is in the post-Fordist and globalised economy a requirement for a city to gain attention and recognition, which is decisive to attract business, capital investment, the creative class and tourism (Brand, 2007; Harvey, 1989). Therefore, Oslo's strive for competitiveness implies that Bjørvika serves as a catalyst for economic growth.

The public and private sector's commercialist approach to develop and promote Bjørvika as a "product", also imply that Oslo has a powerful desire to accumulate capital and bolster its position on the hierarchy of world cities. Central to promotion of Bjørvika is image-building. The importance of image-building was also emphasised in the interview with the municipal planner (Interview: 4), who expressed that "Bjørvika should be developed into the new face of Oslo … it should represent a picture of the modern Norway". This statement accentuates that Bjørvika hold a particular role in renewing both Oslo and Norway external image. Part of the image building of Bjørvika is branding. Bjørvika will for instance as the most extensive and eye-catching development along Oslo's waterfront be associated with "Fjordbyen", a positive-sounding label that embodies one of Norway's most internationally recognised natural qualities. An even more substantial means to Bjørvika's image-building is architecture. The development in Bjørvika has ever since the construction of the Opera produced one signature building after another, where many of the buildings are realised on the back of architectural competitions. Even today, while the development is still ongoing, taking

a walk through Bjørvika is like visiting an exhibition of modern building architecture. Besides the Opera, which already is a well-established and recognised tourist destination, the neighbouring “Barcode” buildings have become a trademark symbol for both Oslo and Norway. The Barcode concept is a so-called “logo-architecture” where the buildings (see fig. 3) are meant to resemble a barcode found at the back of commodities. Barcode exemplifies how both branding and architecture are utilised in combination to construct a memorable image and name for Bjørvika. Statement buildings that through their size and design express, wealth, power, innovation, modernity, creativeness, values that successful companies want to be associated with. The image building efforts of the planners and politicians in concert with the private sector indicates an entrepreneurial approach to urban development, where international recognition and manifestation of capital in Bjørvika are the goals.

The underlying growth ideology also shines through with multiple measures to make Bjørvika a vibrant and attractive urban environment. Within a globalised economy where cities compete to acquire flexible capital and tax bases, the development of a pleasing, aesthetic and appealing urban environment is paramount (source). Bjørvika approached the attractiveness challenge by removing “undesirable” land-uses and replacing them with economically desirable, intensive and marketable land-uses. Through the means of spatial fixes harbour activity were relocated to Sydhavna, while the heavy road infrastructure was submerged in a

Figure 3: The picture showcases some of the diverse and modern architecture in "Barcode". The caption on the picture also illustrates how name-branding is utilised to provide the buildings with an identity that the sum of the individual buildings could not provide individually. Source: https://kampanje.com/byraguiden/byraer/anti/works/barcode/

tunnel. These were deliberate actions financed by the government to replace low-value land-uses with high-value land-uses (Interview: 1), such as high-end apartments, conspicuous business localities, well-acknowledged cultural institutions and delicate public spaces.

The unforeseen rise of Bjørvika as cultural hotspot also perfectly exemplifies a strong growth agenda permeates the development. Prior to the official Bjørvika-plans the Norwegian Government (seemingly) impulsively decided to locate the Norwegian Opera in an area then occupied by harbour and infrastructure. Reportedly, the Opera was located in Bjørvika as a catalyst for development and investment (Interview: 1 & 2). This indicates that the entire revitalisation of Bjørvika was a calculated governmental plan to achieve economic growth from the outset. The subsequent relocations of Deichmanske library and the Munch-museum, were also actions to further strengthen Bjørvika's role as a new economic and cultural hub. According to the interviewed politician the creation of a culture cluster in Bjørvika was an intentional strategy inspired from the success-stories of cities such as Barcelona and Marseilles to establish a "cultural-axis" along the waterfront (Interview: 3).

While there are many trails connecting the Bjørvika development to a growth ideology, the evidence suggesting a degrowth rationale is slim. One could possibly argue that the facilitation of plenty of quality public spaces, as a strategy to provide the people with non-materialistic 'public goods', which in turn could lessen the need to satisfy recreational needs with increased consumption of material goods (Brinkmann, 2017). Even though this contention might be true, a Degrowth rationale is certainly not the reason for provision of public spaces and amenities in Bjørvika, as it never surfaces in any planning document. Moreover, a moderative discursive use of public goods appear inconsistent with the mounting evidence suggesting a growth ideology.

Although the Bjørvika development occurs within the context of a growth ideology, it still holds a prominent environmental dimension, visible through the developers' proclamation of environmental sustainability as "a trademark of the project", and the general pleas for environmental sustainability. The uncritical dual pursue of growth and environmental agendas reveals a firm belief in the possibility to fully decouple ecological impacts from growth. This should however not come as a surprise considering that the rhetoric in the Norwegians Environmental Agency's report, which state that "the scenarios does not consider negative economic growth as an alternative to resolve the climate crisis" (Miljødirektoratet, 2014), a clear indication that green growth/EM is the path Norway and Bjørvika will pursue to attain ecological sustainability.

But environmental sustainability in Bjørvika is not pursued strictly from an ecological rationale. The OMOP (2012) clearly expresses the potential for environmental sustainability to serve as a catalyst for growth, through the following statement:

"Development of the new urban district provide great opportunities for wealth creation and profiling of Oslo generally and Bjørvika specifically for many years to come. The environmental ambitions in other words also represent a potential income in a wide sense" (p. 10).

The strategic use of environmentalism to further an economic agenda also surfaced in two of the interviews. The representative from BI stated that "it [environmental efforts] can be a good business strategy" (Interview: 1). In a similar fashion, the representative from Hav Eiendom in response to a question inquiring about the motivation for their environmental efforts affirmed that "being in the front seat with regards to the environment is a part of the commercial" (Interview: 2). These quotes from the OMOP and the interviewees substantiates Brand's (2007) assertion that environmentalism in a neo-liberal context must be considered as an integrated part of growth policies. The quotes also suggest that Holgersen & Malm's (2015) 'green fix' concept could be relevant in Bjørvika. The case of Oslo and Malmö does however distinguish on the financial situation for when the strategy was applied. While Malmö was struck rather hard from the financial crisis, and thus used environmentalism to revitalise slow economic growth, Oslo was not affected that hard and rather use it as a strategy to further strengthen economic growth. Still, both cases actively use environmental sustainability to promote growth.

4.3.3. Environmental strategies

While the previous section investigated Bjørvika's relationship to growth by scrutinising the project rationale in a holistic manner, this section analyses the environmental strategies aimed at emission reductions to disclose the underlying environmental discourse. Each environmental strategy will be analysed with regards to how it approaches GHG reduction. An EM approach will mainly seek to achieve sustainability through 'efficiency of consumption' and 'substitution of consumption'. A degrowth approach also utilises efficiency and substitution measures but will additionally stress the importance of 'reduction of

consumption'. The environmental strategies are divided into three categories: urban from, mobility and buildings.

4.3.3.1. Urban spatial structure

Bjørvika strives for emission reduction through spatial structural strategies aimed at densification around transportation hubs. The initiative to build compact around a transportation hub, is not decided within the context of the Bjørvika development, but at a municipal level. Oslo municipality has in their overarching plans decided the general trends for future urban growth within their jurisdiction. Oslo's node-oriented development strategy stems from the municipal plan of 2000 and aims to densify from the "inside and out" along public transportation infrastructures, with the purpose of accommodating a growing population/ regional labour market as well as their transportation demands in a 'sustainable' and 'energy-efficient' manner (Oslo kommune, 2015). On a municipal level Oslo also have a strong desire to constrain urban sprawl especially into the "sacred" forest called 'Marka' laying to the north. Urban planning in the municipality therefore seeks to build within the existing urban zone, by the means of densification and brownfield development. Land-conservation is therefore also a central argument for the node-oriented densification.

The Bjørvika project is as a compact development around Norway's most active transportation hub (Oslo S), very much an embodiment of these municipal structural strategies. The compact city model is supported by both EM and Degrowth advocates and is preferred to a dispersed and car-dependent development. It is preferred because a denser building mass require less energy than a dispersed one, while also reducing physical distances and encouraging a modal shift from cars to public transport, cycling and walking. Therefore, Bjørvika's spatial structure contributes to emission reduction by enhancing efficiency and promoting substitution. In addition, to the morphological strategies of compactness and proximity to public transportation, Bjørvika also incorporates a wide functional diversity (Bjørvika Utvikling, 2012). Together compactness and a functional-mix could potentially reduce the need to travel elsewhere as most everyday services and needs will be closer in a physical sense. Although, reduced distances potentially could lead to reduced overall travel, it does not necessarily do so. In the case of Bjørvika, the intention to use compactness to reduce overall travel demand did not surface. Although the municipality primarily present the node-oriented densification as a strategy for environmental protection, its usefulness for growth is also recognised. The municipal plan of 2015 considers node-oriented densification as a

resource to strengthen Oslo's urban character and to establish urban qualities. Specifically, the municipality mentions that it will benefit the creation attractive public spaces and more retail, culture and services, and thus competitiveness. This is an illustrative example of how environmental sustainability is utilised strategically to serve both economic and ecological agendas through win-win policies.

4.3.3.2. Mobility

The morphological measures of node-orientation and compactness as well as functional measures of diverse and fine-grain land-uses, are central strategies to increase proximity, and thereby encourage modal-shifts to more sustainable means of transport. To capitalise on the opportunities a dense urban environment provides for a positive modal-shift, the planners and politicians supply several other specific strategies in support of sustainable mobility. The strategies are mainly focussed at incentivising sustainable modes of transport and disincentivising car-use.

Firstly, measures have been put in place to discourage car-use. The regulatory provisions of the zoning plan for Bjørvika operates with low parking norms compared to other parts of Oslo and Norway. For housing purposes, the parking norm allows a maximum of 0.6-0.8 parking spots per 100 m2 and 1.6 per 1000 m2 for office purposes (Plan- og bygningsetaten, 2004b). A low parking norm is a direct way to limit the possibility for car-ownership in housing areas and a measure to complicate car-use to work. Besides the parking norm, Bjørvika's surface road network is dimensioned to limit its car-capacity. Dronning Eufemias gate (the interstate road going through Bjørvika), do for instance only have two lanes in each direction, whereof one of them is designated for public transport. Moreover, a low speed limit and frequent traffic lights discourage car-use and to emphasise that non-motorised mobility hold priority (Interview: 1). The development also strategizes to stimulate EV-ownership/usage by ensuring sufficient charging opportunities and by offering financial incentives with regards to parking. Another, interesting strategy mentioned in the OMOP is to incorporate an EV car-sharing scheme (Bjørvika Utvikling, 2012).

In the same manner car-use was discouraged by a strict parking norm, biking is promoted with a high parking norm. Here, instead of placing a maximum limit to parking spots, a minimum parking limit is enforced. The regulatory provisions also ensure that 50% of bike parking spots are sheltered. Some of the office buildings in Barcode even offer bike repairs and facilities for showering (with free towels), to make biking a practical and pleasant undertaking

for their employees (Interview: 1). New bike roads are also being constructed and will connect to the steadily improving bike infrastructure network in Oslo. Stands with rental bikes are already established. Cycling and walking is further promoted by a strong focus on creating shortcuts and allowing for permeability through physical barriers such as roads and buildings, and the maintenance of such accessibility throughout the long, busy and sometimes obtrusive construction period.

As a group the aforementioned strategies to disincentivise car-use/ownership and to promote public transport and non-motorised transport must primarily be considered as strategies to achieve emission reduction through substitution. The idea is to change a less environmentally mode of transport with a more sustainable mode of transport. The idea of establishing an EV car-sharing scheme does however lessen the demand for households to own their own car and would in that way reduce consumption.

4.3.3.3. Buildings

The Bjørvika development contain several strategies to reduce emissions, materials and energy arising from construction and operation of houses and other buildings. As mentioned, Bjørvika aims for a compact city development. Following logically from Bjørvika's compact city strategy, the preferred typology for housing units are apartments. Opting for apartment units rather than other housing types such as row-houses or detached single houses, is a positive measure to reduce climate impact from the housing sector because apartment units on average are less spacious, while consuming less energy per m^2 than other housing types. As an apartment-based development opens the possibility for people to move from a less energy-efficient housing types to more energy-efficient housing types, the strategy approaches emission reduction through substitution of consumption.

Besides facilitating for people to substitute energy-demanding housing typologies to less energy demanding apartments the developers in Bjørvika also intend to reduce climate-impact from the building stock by balancing energy-demand and local renewable energy-supply as far as possible (Bjørvika Utvikling, 2012). On one side of the scale, energy-balance requires reductions to the amount of energy that a building consume: buildings must enhance their energy-efficiency. To achieve energy-efficiency in the building stock, the developers have opted to pursue certain technical standards that place maximum requirements on energy-use. While the buildings granted their general permissions before 2014 are required to comply with TEK07/TEK10 (technical building standards) standards, buildings that received their general

permission in 2014 or later should aim for passive house standards. In addition, most of the newer buildings in Bjørvika are BREEM certified. BREEM is a certification scheme, provided to buildings that fulfil a bunch of requirements related to environmental sustainability, whereof energy-efficiency is one aspect. In Bjørvika energy-efficiency is enhanced by the means of technological solutions such as energy-efficient lighting and appliances, energy smart-meters and good insulation, as well as architectonical to reduce the need for heating/cooling and lighting (Bjørvika Utvikling, 2012).

Such eco-efficiency measures are welcomed in both degrowth and EM. They do however resonate very well with a growth ideology because the passive nature of the measures allows for the occupants to maintain their high consumptive habits. Construction of energy-efficient buildings can also today quite easily be reconciled with economic goals of developers as the cost for materials and expertise has sunk with the increasing demand from cities pursuing "environmental sustainability". Environmental certification of buildings also seems to have an important role for developers to attract companies. This was at least the impression given by the representative from Hav Eiendom who experienced that environmental certifications often are important to attract large companies, as they themselves request as an "insurance" for a proper building to paint a picture of a responsible and environmentally conscious business (Interview: 2). Environmental friendly buildings showcase how environmentalism is utilised for economic agendas, as they in one instance are constructed in order to attract prosperous companies, and in a second instance for the company to bolster its image and thus competitiveness.

On the other side of the scale, energy-balance in buildings require local renewable energy supply. The main concept the developers advocate for is a sea-based energy central, which supposedly should supply Bjørvika with heating and cooling extracted from water in the Oslofjord by the use of heat pumps. Ideally, this solution should cover most of the heating and cooling demand in Bjørvika. A similar solution has been suggested to extract heat from the sewage water in from a nearby wastewater treatment plan. Moreover, integrated solar and wind have been suggested. Such technologies to generate renewable energy are considered to reduce emissions through substitution. This is because fossil fuels and other less sustainable energy-sources are swapped for more sustainable and renewable ones.

4.4. Critique on environmental strategies in Bjørvika

Although all evidence indicates that a strong growth ideology entrenches and drives the Bjørvika development, it cannot abruptly be dismissed as an impediment to ecological sustainability. A degrowth advocate would argue that the fact that a development fosters economic growth, which in turn enhances consumption, and thus emissions, is unsustainable. While this might be true, ecological sustainability is not a matter of black and white. An urban development can be 'more' or 'less' sustainable even if confined within a growth paradigm. The development might apply eco-efficiency measures to a various degree or have a stronger or weaker focus on certain environmental aspects, affecting its emission reduction potential. This section will look deeper into the environmental efforts in Bjørvika to evaluate to what extent its sustainability claims are legitimate/genuine.

4.4.2. Energy-use of buildings and renewable energy supply

Although the Fjordby development has brought about many passive houses and BREEM certified buildings, which are more energy efficient than the average Norwegian building, and therefore relatively speaking more sustainable, the legitimacy of the project's claim to sustainability could be questioned on the grounds of unrealised potential, lacking ambitions and broken promises with regards to stationary energy-use and local renewable energy supply. What I observe as lacking environmental ambitions and broken promises translates into gaps between visions, goals and realised measures. I argue that there are inconsistencies on two levels: firstly, between the ambitions and visions on the one hand, and concrete goals on the other hand, and secondly, between the concrete goals and the performance of the finished product. Together the dual inconsistencies create a substantial sustainability gap between ideals and reality (see Figure 4).

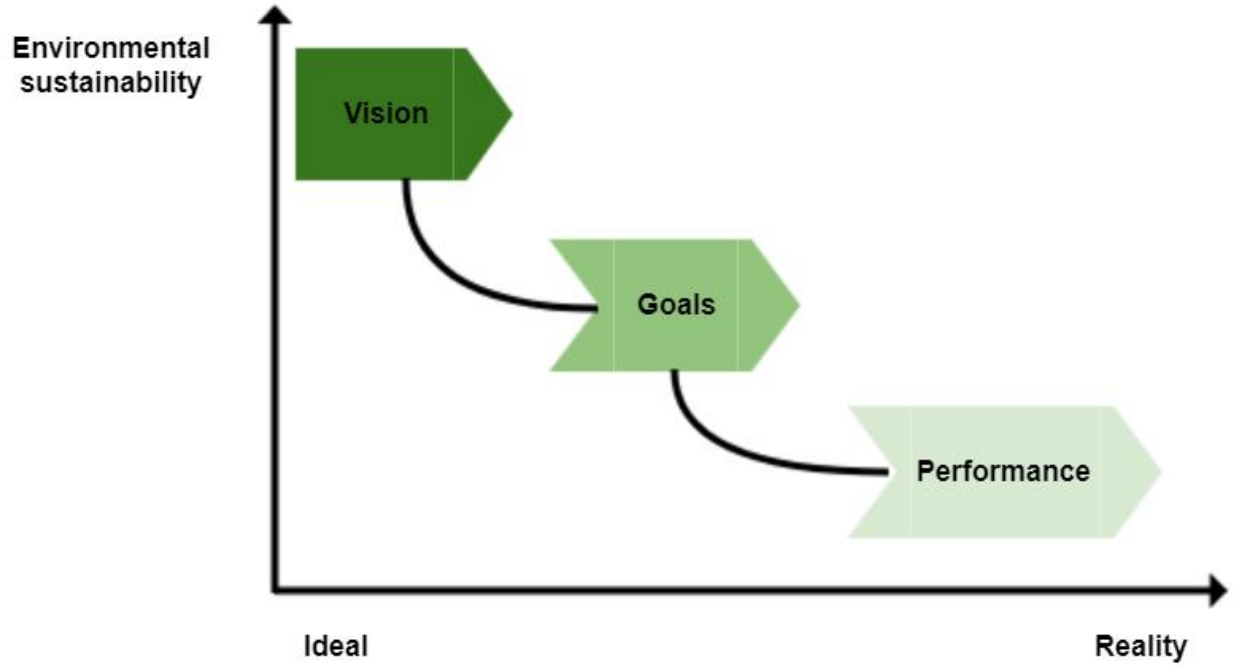

Figure 4: The figure illustrates how visions of energy-use are inconsistent with concrete numerical targets, which the buildings often fail to meet.

The first example of a sustainability gap I will present is related to renewable energy supply and includes a disconnect between both visions and specific goals, and specific goals and realised measures. Part of Bjørvika's vision to become a recognised pioneer in environmental-friendly urban development is to utilise local renewable resources for clean energy production, with the aim of balancing energy-demand and renewable energy-supply as far as possible (Bjørvika Utvikling, 2012). Although, the OMOP mention solar- and wind-energy as "possibilities that could be considered", the main emphasis for local renewable energy production is on the adjoining seawater from the Oslofjord. The concept that has been backed ever since the original plans of 2003 is a seawater-based energy central, the purpose of which was to generate energy for heating and cooling. In addition to cover the energy-supply in Bjørvika, the energy central was intended to provide its excess energy to the district heating system of Oslo, thus being a net-positive producer of 'renewable' energy. While it is true that the heat from seawater is considered a renewable energy source, the generation process requires water pumps, which in turn require high-value energy (i.e. electricity) for operation. The sustainability of a seawater energy central will therefore depend on where the electricity driving the water pump comes from. Although Norway produces enough renewable electricity from water to supply the country, about 75% is exported to other EU-countries who have negotiated agreements to import clean electricity. To cover domestic energy demand, Norway imports an

"European attribute mix", consisting of 61% fossil fuels, 38% nuclear energy and the rest renewables (NVE, 2015). Considering that substantial amounts of Norwegian electricity use come from fossil fuels, generating heat from seawater will still indirectly induce GHG emissions from the localities of the electricity production. Therefore, I argue that translating the sustainable vision of balancing energy-demand and renewable energy-supply into the operational measure of establishing an energy-central based on seawater is somewhat flawed, thus causing a sustainability gap.

Despite long-standing plans of supplying Bjørvika with heating and cooling from the seawater-based energy central, negotiations between Hafslund and the developers recently fell short, resulting in shelving of the idea (Interview: 1). Instead of being supplied with heating/cooling from the seawater-based energy central, Bjørvika now solely will receive heat from the general district heating system in Oslo. Although district heating is considered a more energy-efficient alternative than individual electrical or fossil heating systems (source), they are not entirely clean as is the case in Oslo. Oslo's district heating system consists of several energy-centrals that generate heat through different sources. The base load in Oslo is mainly covered by waste heat from waste incineration, water pumps, electricity, including some gas, oil and bio-oil (Fortum, 2018). However, the peak load, which is demanded especially during the cold Norwegian seasons, is mainly supplied by fossil fuels and electricity.

The mix of energy sources used for heat production in Oslo's district heating system range from unsustainable to more sustainable. Bio-oil is a renewable energy source, but merely constitute a slight part of the input. Heat-pumps do as mentioned utilise renewable energy, but require electricity, which at the moment mostly is generated from European attribute mix. Heat pumps are however, more energy-efficient in generating heat than electric boilers. Making use of waste heat generated from incineration of leftover municipal solid waste, is considered a more circular waste-treatment method than dumping in landfills. Over-dependence on leftover waste to generate heat, could however hamper emphasis on recycling and recovery initiatives as well as waste reduction measures. Although incineration of waste serves a purpose, the emphasis in Bjørvika and Oslo should be on waste reduction and waste recycling: measures at the top of the waste hierarchy. The combustion of fossil fuels for heating does however directly contribute to GHG emissions and local pollution. For a development that intends to thrive on environmental sustainability, the partial use of fossil fuels for heating is a serious scratch in the paint. Moreover, the failure to establish the energy-central as planned and implementation of an inferior solution in environmental terms represents a broken promise and a blow to the legitimacy of claims to environmental sustainability. A sustainability void is also created as no

equal or better solution for renewable energy-supply have been implemented. None of the current buildings (except the Opera) have for instance incorporated any form of renewable energy systems such as solar PVs and wind-turbines. Hence, Bjørvika did not only fail to meet the operational goal of implementing the energy-central, but also to attain the visions of becoming a pilot-project for alternative energy-production, and balancing energy-supply and energy-demand.

The divide between sustainability ideals and reality, caused by the inability to translate and materialise the visions for local renewable energy-supply, widens when you consider stationary energy-use of buildings. Comparatively speaking Bjørvika has a significantly lower stationary energy-use than the Norwegian averages. Energy-use for apartments in Bjørvika do for instance range between 77 and 124 annual KWh per m2. Hence, the apartments in Bjørvika consume 50-20% less energy than an average Norwegian apartment. Two-thirds of the apartments are however located at Sørenga, meaning that most of the apartments have energy-efficiency reductions closer to the 20% mark. Energy-use in business and office buildings in Bjørvika contrast the Norwegian average even stronger. Evidently, the enhanced energy-efficiency of buildings in Bjørvika has been a step in the right direction. Notwithstanding the improvements, the Norwegian average is probably not a good yardstick as the reference values are extremely high, reflecting Norway's position as a world leader in per capita energy-consumption. Thus, the legitimacy of the project's sustainability claim should rather be assessed based on the ambitiousness of the vision and goals, the consistency between vision, and goals, and whether it managed to achieve its goals.

In the case of stationary energy-use (energy demand), there is an evident inconsistency between the numeric goals in set forth in the OMOP and the measured performance of some buildings reported in the annual environmental assessments. These targets have been upgraded with time as the expectations to sustainable buildings in the construction industry advanced. Therefore, the buildings also conform to different standards, where the earlier developments typically follow less sustainable standards, and the later projects more stringent standards. Table 2 provides an overview of various building standards that are aimed for in Bjørvika. The table also include the stationary energy-use of a conventional Norwegian apartment as well as state of the art sustainable buildings for reference. The subsequent table (table 3) indicates the actual values for stationary-energy use and target standards of the completed buildings in Bjørvika, as well as whether they exceed the energy limits or not.

As the colour-coding on the values for energy-use indicate, just about a lion's share of the buildings successfully met the targets in their standard, while the rest failed to meet the

Table 2: Netto stationary energy-use of different building types and building standards. All energy values are given in annual KWh per m^2. Sources: (Bjørvika Infrastruktur, 2014; Bjørvika Utvikling, 2012; Rambøll & Link Arkitektur, 2013)

	Mandatory when general permission is granted	Energy-use housing	Energy-use business	Energy-use Office
Standards Bjørvika				
TEK07	Before 07.09.2011	120	235	165
TEK10	07.09.2011 - 31.12.2012	115	210	150
Low-energy building	01.01.2013 - 31.12.2013	100	156	102
Passive building	01.01.2014 -->	83	119	78
References				
NZEB	Gov. Goal from 2020	35-40	-	-
Avg. Norwegian apartment	-	156	259	246

Table 3: The table provides an overview of the reported energy-use and building standard/type of finalised buildings in Bjørvika. The table distinguishes between energy-use to housing, business and office purposes, as they have different energy-demands, and therefore follow different standards. Buildings that meet the stationary energy-use requirements are marked in green while the ones that failed to meet their requirements are marked with red. All values signify annual KWh per m2. Sources: (Bjørvika Infrastruktur, 2010, 2012, 2013, 2014, 2015, 2016, 2017).

Building field	General permission	Goals for energy-use + environmental certifications	Energy use (housing)	Energy use (business)	Energy use (office)
A8 (Deichmann)	2013	Passive house + Future Built	x	x	75
A9	2014	Passive house + BREEM	94	136	88
A14	2014	Passive house + BREEM	x	106	77
B1	2015	Passive house + BREEM	79	104	x
B2	2016	Passive house + BREEM	83	178	x
B3	2016	Passive house + BREEM	83	168	x
B4	2016	Passive house	80	115	x
B5 (Munch)	2015	Passive house + Futute Built	x	72	x
B6a	2016	Passive house + BREEM	90	177	x
B7 (Vestbygget)	2016	Passive house + BREEM	77-83	132-153	77
B10 (PWC)	Before 07.09.2011	TEK07	x	x	173
B10 (KLP)	Before 07.09.2011	TEK07	x	x	138
B10 (Deloitte)	2009	TEK07	x	x	141
B11 (boligbygget)	Before 07.09.2011	TEK07	115	177-218	153
B11 (VISMA)	Before 07.09.2011	TEK07		x	153
B11 (DNB C)	2010	TEK07	x	x	137
B12 (DNB-A+B)	2010	TEK07	119	x	125-129
B13 (a-e)	Before 07.09.2011	TEK07	90-95	202-226	x
B13 (f)	17.06.2011	TEK07	x	x	82(?)
D1a	2012	TEK10	115	156	x
D1b (1,2,5,6)	2009-2010	TEK07	118-124	200-233	
D1b (3,4,7,8)	2012	TEK10	109-117	171-184	
Opera		TEK97	x	225	x

standard requirements. Most of the buildings that fell short of their ambitions are the business

sections of passive houses. Out of the ten passive buildings containing business seven exceed the limits in the guideline: some more significantly than others. While the least exceeding building (B7) surpasses the limit by 11% the worst examples (B2 and B6a) overstep the standards by 50%. When the building stock in Bjørvika consume more energy than it is expected to do, it is also having a larger ecological impact than what it ideally should. The fact that buildings fall short of their expectations indicate one out of two issues: (1) that the developers and construction companies lack the competence and knowledge on how to build energy-efficient business buildings, or (2) that their dedication to construct energy-efficient buildings are insufficient. Whatever the reason for non-compliance is, the result is the same: reduced validity to pleas towards environmental sustainability.

Although, many of the passive buildings failed to meet their targets, they are still more energy-efficient than the ones that succeeded in meeting the limits for energy-use in TEK07. This gives ground to question the ambitions of settling on TEK07 in the first place.

Considering that 40% of European (and Norwegian) energy-use stems from construction, operation and demolition of buildings (Kolokotsa, Rovas, Kosmatopoulos, & Kalaitzakis, 2010), enhancing the energy-efficiency of buildings has the potential to drastically reduce our GHG emissions and should therefore be a top priority in urban development projects. Because Bjørvika intends to be both future-oriented and a forerunner for stationary energy-use, one could expect for the project to set highly ambitious goals to pursue them enthusiastically throughout the development. The ambitiousness of settling on the TEK07 and TEK10 standards then be questioned. TEK standards are technical regulations that among other things specify minimum requirements for stationary energy-use of buildings constructed from the corresponding year. Hence, TEK07 applies for all buildings constructed after 2007 and the somewhat improved standard TEK10 applies for all buildings constructed after 2010. Therefore, when the Barcode buildings, which were granted general permissions between 2007 and 2010, aim for TEK07 standards, it means that the developers merely have a goal to comply with the contemporary legal minimum requirements that also every other development in the country must achieve. The same is also the case with the Sørenga development, which received its general permission in 2012, and pursue the minimum requirements in TEK10. Together the Barcode and Sørenga development, make up a great part of the Bjørvika development: that is a great part that does nothing to stand out as a forerunner with regards to energy-efficient buildings. The buildings in Barcode and Sørenga could undoubtedly have pushed for a higher energy-efficiency than the legal minimum requirements as low-energy and passive building techniques have existed for a long period of time. The first modern passive residential house

was for instance built in Germany in 1991. Multistory commercial passive buildings have also been constructed significantly more cost-efficiently back in 2002 in a climate like the Norwegian, than commercial TEK07 buildings in Bjørvika such as the PWC building[1]. When the Bjørvika development for its early projects opted for legal minimum requirements with cost-efficient and considerably more energy-efficient alternatives available, one can really question to what extent the sustainability claims are genuine.

Although the developments initiated after 2014 aim for a passive house standard, which is positive, they can hardly be considered as pioneering anymore as energy-efficient building technology has advanced prominently over the past years. Passive houses might be considered an innovation in Norway, but is in the context of Europe, which Oslo wants to compete against, typical for many constructions over the past 10-15 years. Today, the technology to create highly energy efficient buildings like "nearly zero-emission buildings" (NZEBs) that with renewable energy supply can become "net zero-emission buildings" or "positive energy buildings" exist. NZEBs have a total energy-demand of about 35-40 KWh/m^2 and are proposed as the standard for new buildings in Europe by 2020 (D'Agostino et al., 2016). These plans are also advocated by the Norwegian Government. Still, no current building in Bjørvika, nor the buildings scheduled for completion around 2020 are nowhere close to the energy-efficiency of NZEBs. (Concluding sentence) Gap between goal of becoming a pioneer and opting for TEK minimum requirements and passive houses when better alternatives has been commonplace all along.

4.4.3. Housing sizes and life-style of residents

The sustainability of the Fjordby project is currently limited by an excessive consumption of housing or floor space per capita. Consumption of housing per capita is a product of two factors: housing size and household size. In Fjordbyen, the elevated consumption of floor space per capita is to some extent an issue of large housing units, but more significantly an issue of modest household sizes.

[1] Passive commercial buildings were already back in 2002 constructed for about 1400€/m2 or 11 650 NOK (http://www.passivhausprojekte.de/index.php?lang=en#d_902). In comparison, the PWC building constructed in 2006 had a square meter cost of about 20 000 NOK (https://no.wikipedia.org/wiki/PWC-bygget).

Table 2: The table highlights average housing sizes as well as floor space consumption per capita in three areas in Fjordbyen and juxtaposes them with other contemporary apartment-based development projects in Oslo.

	Fjordbyen			Other regeneration developments in Oslo			
Area	*Sørenga*	*Barcode*	*Tjuvholmen*	*Nydalen*	*Ensjø*	*Kværnerbyen*	*Løren*
Housing units	622	397	888	1681	1757	868	2378
Avg. apartment size	77	63	79	65	70	63	65
Smallest apartment	41	36	30	20	30	26	26
Largest apartment	192	233	782	166	156	116	148
Residents per unit	1.2	0.8	1	1.6	2.1	1.8	2
Floor space per capita	64.2	78.8	79.0	40.6	33.3	35.0	32.5

Table 4 shows the average housing size and per capita floor space consumption of three housing areas in Fjordbyen and juxtaposes these with some other recent apartment-based, urban regeneration projects in Oslo. With regards to average size of the housing units, two of the Fjordby-projects: Tjuvholmen and Sørenga, have notably larger apartments than the reference projects. The average apartment at Sørenga is for instance approximately 18% larger than an average apartment in Nydalen and Løren. From an environmental perspective this implies that on average each housing unit in Sørenga and Tjuvholmen require considerable more amounts of energy and material resources to operate the surplus space (considering that the buildings have a similar stationary energy-use efficiency). The housing units in Barcode are however more like the ones in the reference projects.

More striking than the differences in housing size is the disparity in floor space per capita, where the residents in the Fjordby projects at large consume about twice the amount of the residents in the reference projects. The gaps in consumption of floor space per capita is driven by the (reportedly) low household sizes in Fjordbyen. However, these numbers do, most likely not reflect the actual figures quite precisely. The actual average household sizes are probably somewhat higher, thus reducing the gap in floor space per capita. One possible reason for the modest household sizes could be that some residents failed to register in the Cadastre, perhaps due to short-term rentals and similar. Although, the figures might be somewhat lower than the actual numbers, they are certainly still lower than the average because the Fjordby residential areas mostly are inhabited by a wealthy citizens (Plan- og bygningsetaten, 2017b) that statistically consume more housing than citizens with normal income-levels. An immoderate floor space consumption is unsustainable because it limits the amount of people that a fixed amount of housing can accommodate. If the residences in Fjordbyen accommodate fewer citizens than it potentially could, the demand for housing will increase elsewhere, leading to unnecessary stationary energy-use from a larger building stock. In this sense, a soaring consumption of floor space puts a constraint to area-efficiency. Moreover, the purpose of

densification is partly defeated as the densified land will host less people, thus not utilising the Fjordby's (sustainable) central location optimally. A reduction in per capita housing consumption would allow for more people to: reside in housing complexes with lower energy-use per m^2 than average Norwegian homes, and through its centrality foster sustainable mobility and decrease travel demand. The fact that Bjørvika's strategies pursue a high land-use efficiency through densification while simultaneously attracting a demographic with high per capita floor consumption is also *ironic*, as the residents in reality occupy more floor space than the Norwegian average of 56,8 m2 (Xue et al., 2017). One could also view the excessive housing consumption in Fjordbyen as partially counterproductive to emission-reduction targets because it offsets climate-benefits gained by reductions in motorised travel and construction of less energy-demanding buildings. Hence, it presents a good example of Jevons Paradox, where environmental benefits attained through eco-efficiency measures partially are cancelled out by increased housing consumption.

4.4.4. Critique on mobility

As mentioned Bjørvika attempts to spur a modal shift through the means of restrictive parking norms for cars and enabling parking norms for bikes. Bjørvika incorporates the same parking norms that applies for the rest of the inner city (Plan- og bygningsetaten, 2003, 2004a). Therefore, it does not stand out from any other development in central parts of Oslo with regards to stringency of the parking norm. This is however not that big of a problem considering that Oslo's parking norms for the inner city are quite restrictive, even compared to cities famously known for their 'sustainable' mobility systems and habits such as Amsterdam and Copenhagen (see fig X). Whereas the three cities have quite similar car parking norms for housing purposes, Oslo enforces a significantly more stringent one with regards to office purposes. This is positive in the context of Bjørvika because substantial parts are regulated for offices, which becomes less accessible by car. Even though the parking norm is low, several privately-owned parking facilities offer parking spots that companies often rent for their employees, thereby enhancing the opportunity for commuting by car.

While Bjørvika relatively speaking enforces a strict parking norm for cars, the minimum requirements for bike parking spots appear low compared with the reference cities. With regards to both housing and office workplaces, Amsterdam and Copenhagen have a minimum requirement that outshine Bjørvika's. Bike parking spots are easier and cheap to establish with time. The huge disparity in the bike parking norms, still be seen as an indication

of the actual ambitions to become a 'bike-city'. The cities of Amsterdam and Copenhagen maintain a high parking norm for bikes because the demand is so huge. When Bjørvika operate with so much lower norms it shows that the ambitions to become a bike city on the same level as the reference cites are lacking. If Oslo and Bjørvika ever want to become a bike-city like Amsterdam or Copenhagen, it must facilitate for enough infrastructure. The difference is especially big with regards to offices, where the reference cities accommodate for four to six times as many bike spots. This highlights that the culture of bike commuting in these cities is large. In comparison, Bjørvika is far behind. If they want growth in bike use they need to facilitate proper infrastructure both to stimulate growth and to handle growth.

Table 3: Parking norms for cars and bikes in Bjøvika and two reference cities. Sources: (Gemente Amsterdam, 2018) (Gemente Amsterdam, 2017) (Københavns Kommune, 2018b) (Plan- og bygningsetaten, 2004b) (Københavns Kommune, 2018a)

	Car	Bike	Car	Bike
Bjørvika				
Sørenga (and other peripheral building sites)	max 0.8 per 100m2 GFA (max 0.6 per house)	2 per 100m2 GFA	1.6 per 1000m2 GFA	7 per 1000m2 GFA
Barcode (and other central building sites)	max 0.6 per 100m2 GFA (max 0.4 per house)	2 per 100m2 GFA	1.6 per 1000m2 GFA	7 per 1000m2 GFA
Reference				
Copenhagen	0.4 - 1.0 per 100m	4 per 100m2 GFA	6,7 per 1000m2 GFA	40 per 1000m2 GFA
Amsterdam	0 - 1 per house	4 per 100m2 GFA	4 per 1000m2 GFA	29 per 1000m2 GFA

The reorganisation of the road system in Bjørvika and the submerging of E18 has had both negative and positive environmental effects. While E18 were channelled through Bjørvika on a surface level, the location was inadequate for urban development due to noise and air pollution and land consumption. The relocation of E18 was therefore very much a prerequisite for development in Bjørvika, as it provided room for construction, but also a liveable environment with tolerable noise-levels and acceptable air-quality. Notwithstanding the positive effects on the local climate in Bjørvika, submerging of the E18 represent a hinderance with regards to emission reduction targets, as the measure increased the total road capacity through a bottleneck in the centre of Oslo. The road capacity increased because the submerging of E18 were accompanied by the establishment of a new road system in/through Bjørvika. Even though the surface road network has a considerably lower capacity than the E18, the total road capacity through Bjørvika increased because the sum of the current over- and underground road capacity surpasses the capacity of the preceding E18. A greater road capacity is likely to

induce more traffic, and thus more emissions, potentially offsetting benefits gained from encouraging public transport in Bjørvika. Considering that E18 has maintained its function as the main thoroughfare through Bjørvika, and the high traffic volume on the surface road network (Bjørvika Utvikling, 2012), the increased road capacity has certainly led to more car-use.

As argued above, submerging of E18 and establishment of a surface road network have induced more traffic. Therefore, in the context of this induced traffic, strategies initialised to reduce car-use, such as the strict parking norm and low road capacity, must be considered as 'repairs' as opposed to actual 'reductions' or preventive measures. If the growth rationale was questioned and the planners and politicians aimed for zero-growth or reductions in car-traffic more radical strategies could have been implemented. The most radical measure to prevent Bjørvika to induce more car-use would be a car-free zone. A car-free zone, would hinder both car-ownership and car-commuting, and push people towards public transit or non-motorised travel. Alternatively, and less radically, some of the road capacity of the old E18 could have been compromised to enable an equal capacity increase on the surface. Restrictions on car-use in Bjørvika would probably have been considered an invasion on freedom of choice. Highlights how neo-liberal and growth-oriented values impede an effective environmental transition.

4.5. Legitimacy of Bjørvika's claim to sustainability

When the validity of Bjørvika's sustainability claims are assessed, a distinction must be made between the various environmental 'agendas', which focus on different urban sustainability issues. Urban environmental sustainability issues are often divided into "brown", "gray" and "green" agenda (Marcotullio, 2003; McGranahan & Satterthwaite, 2002). Brown agenda issues are local in scale and immediate in impact, and typically relate to poor waste management, sanitation and pollution control. The gray agenda refers to local/regional issues that arise as a consequence of industrialisation, motorisation and urbanisation processes. Air- and water pollution are examples of gray agenda problems. Problems in the green agenda are global in scale with delayed impacts, and relate to issues of climate change, ecosystem health and waste generation. Although all the agendas relate to environmental sustainability, interventions within the various agendas handle different problems that serve quite different purposes. Therefore, when Bjørvika claims to be an "environmentally friendly" development one must distinguish between the various agendas as the sustainability proclamation might be more valid in terms of one agenda than another agenda.

Environmentalism in Bjørvika has mainly been devoted to gray and green agenda issues. With regards to the gray agenda, the government, Oslo municipality and the private developers have initiated several interventions to improve the local and regional climate conditions. Submerging of E18 and establishment of a less trafficked surface road network, has significantly improved the air quality in Bjørvika to an extent where most of the areas comply with air quality standards. Green public spaces, green roofs and other vegetation as well as conscious use of building layout to foster proper air circulation have also assisted in enhancing local air quality. The Ren Oslofjord initiative has cleaned the fjord for hazardous pollutants stored at the seafloor after harbour activity. Moreover, the municipality have prevented polluted water from Akerselva and Alnaelva to be released in Bjørvika by redirecting it to Bekkelaget treatment plant. The actions to enhance the water quality have for instance been decisive to allow for recreational water-activities at Sørenga (Interview: 1 & 2). All of these gray agenda interventions to reduce air and water pollution have been essential to transform Bjørvika from a polluted and uninhabitable area into an inhabitable and healthy urban environment. Thus, from a gray agenda perspective Bjørvika's sustainability claims appear quite legitimate.

As the previous criticism on GHG-emissions, energy-use, and consumption indicates, there are several moments that speaks against the legitimacy of Bjørvika's sustainability contentions. One could therefore question the validity of sustainability claims from a green agenda perspective. From a degrowth perspective Bjørvika's green agenda sustainability assertions are fundamentally illegitimate because the project is confined by a growth ideology (see section 4.2.1.). The waterfront regeneration in Bjørvika was by origin a governmental and municipal initiative to enhance Oslo's position as a world city and to promote municipal and national economic growth. The sole fact that Bjørvika serves as a catalyst for economic growth is in the degrowth discourse considered as a hinderance to strong ecological sustainability because growth triggers increased consumption, which currently is partially coupled (i.e. not fully decoupled) with increased GHG-emissions. Degrowth advocates would also consider the active (and ironic) use of environmentalism to further an economic agenda to deprave the authenticity of Bjørvika's proclamations of environmental sustainability. The immoderate housing consumption per capita that partially counteracts the purpose of densification, will also be viewed with scepticism because Bjørvika, if developed like other contemporary projects in Oslo could have accommodated about twice the amount of people it currently does. With regards to mobility, Bjørvika's environmental sustainability contentions also legitimacy as the increased road capacity, is likely to induce more traffic.

But the validity of Bjørvika's green agenda sustainability contentions could also be criticised from an EM perspective[2]. The aforementioned criticism highlighted several instances where actual implementation: were inconsistent with an EM approach to the ecological crisis, and fell short of operational goals. Due to shortcomings in implementation of strategies to reduce emissions through *eco-efficiency* and *substitution*, decoupling of growth and ecological impact did not happen to the extent that was promised or that could be expected from a development intending to become a pioneer in urban environmental sustainability. With regards to energy-use of the building stock, Bjørvika is far away from aims of approaching balance between stationary energy demand and local renewable energy supply. On the demand side, most of the current building stock merely resorts to comply with legal minimum requirements (TEK07 and TEK10), thus losing out on potential emission reduction that could have been achieved by applying cutting-edge technology and building techniques to achieve energy-efficiency. On the supply side, Bjørvika failed to reduce emissions through substitution as no noteworthy solutions for renewable energy has been incorporated, and the area instead depends on energy where fossil fuels are used for generation. The unrealised potential in terms of energy-efficiency of the building stock indicates that EM strategies lack thorough implementation. A non-reliance on renewable energy, and partial dependence on fossil fuels for energy supply, is also directly inconsistent to the EM discourse, and thus a strong argument against the validity of Bjørvika's sustainability claims. The failure to implement the vacuum waste suction system and EV car sharing scheme as promised, also brings doubts to how genuine the green agenda of the development really is.

Even though Bjørvika development has placed the "green agenda" on the agenda, the validity of the sustainability claims could be condemned both from a degrowth and EM perspective. While the project's green agenda sustainability claims lack legitimacy from an EM perspective due to improper implementation of eco-efficiency- and substitution-measures as well as underachievement of goals, the degrowth discourse would advocate the same criticisms as EM, and additionally argue against the unquestioned growth tendencies of the project. However, because Bjørvika is an ongoing development, it might with time implement more eco-efficiency measures. New sub-projects might incorporate state-of-the-art eco-efficiency measures more extensively, and current building stock might improve through

[2] The critiques to the legitimacy of Bjørvika's sustainability assertions from an EM perspective are equally relevant from a degrowth perspective.

retrofits. Therefore, an extensive implementation of EM is still feasible, but probably at a higher financial cost than what it initially was.

5. Barriers to ecological sustainability

Chapter 4.4 addressed several critiques of green agenda environmentalism in Bjørvika and concluded that neither a degrowth nor an EM approach to combat the climate crisis is fully implemented. As a step to conceive how to approach environmental sustainability, this chapter discusses barriers to fully implement the EM approach, and barriers to transition towards degrowth. Firstly, barriers to full implementation of EM will be discussed. This discussion regards obstacles hindering extensive application eco-efficiency- and substitution-measures. Subsequently, barriers to transition towards degrowth are discussed. This discussion necessitates consideration of ideological and structural aspects of the society.

5.2. Barriers to full implementation of Ecological Modernisation

If the climate crisis is to be resolved through an EM approach, eco-efficiency- and substitution measures must be applied thoroughly in new developments. As a modern development with highly ambitious environmental visions, that arguably takes place on the most valuable land in the capital of one of the wealthiest countries in the world, Bjørvika could be expected to extensively apply green growth strategies. However, the analysis revealed multiple EM measures that was either: implemented in a partial manner, or not implemented at all. Energy-efficient buildings has up until now only been partially implemented. Substitution from the current (partially dirty) energy system to renewable energy system, and incorporation of WVSs has also merely been actualised to a miniscule degree. Strategies such as a fossil-free building site and an EV car-sharing scheme remains unimplemented. Questions that then emerges are, “why is not eco-efficiency and substitution-measures implemented more extensively?” or “what is hindering a more comprehensive implementation of EM?”.

5.2.2. Costs, risks and innovation

A comprehensive survey of drivers and barriers for sustainable building ranked *affordability* as the most impactful obstacle to adaptation of state-of-the-art environmental technologies (Pitt, Tucker, Riley, & Longden, 2009). Affordability represents a natural concern for privately operating developers because they work with budgetary constraints and seek to maximise return on their investments. By opting for less affordable elements, total construction costs will increase, which pressures the developers to acquire higher loans with additional rents.

While costly features might equally increase the building value, the extra investment might also only be partially reflected in the building value. The perception of environmental technology as 'expensive' compared to standard alternatives is however a truth with modifications. While it is true that some environmental technologies are expensive in the development stage, their cost rapidly drops as adoption increases, making them more affordable. As exemplified in the previous chapter energy-efficient buildings could, as early as 2003, be constructed with similar cost-efficiency as regular buildings, while over time saving energy and thus costs. In a similar way, integrated renewable energy technologies will despite their added initial cost, on a long-term repay through free energy-production. Hence, Hydes & Creech (2000) claim that the real barrier to sustainable buildings is the misconception that sustainable technologies induce higher costs. In other words, extensive adaptation of cutting-edge eco-efficiency technologies might be hindered because actors fail to appreciate their long-term cost-effectiveness.

Although, sustainable building technologies might be cost-efficient on a long-term, they are not necessarily from a short-term perspective. Privately operating developers tend to prioritise a short-term agenda, thus neglecting the long-term benefits. Often private developers depend on investors or other capital providing actors, who enforce a short-term mindset on the developers as they want a quick return on their money. In other situations, long-term benefits are irrelevant for developers because they immediately after construction sell the buildings. In this case, a barrier is created as life-cycle thinking is ignored because those who pay the costs upfront do not receive the long-term benefits (Bordass, 2000). This temporal mismatch between costs and benefits could very likely be a reason as to why no building in Bjørvika (except the Opera) has implemented any form of integrated renewable energy systems. Because the main development companies in Bjørvika, Hav Eiendom, OSU and Sørenga Utvikling, were established with the sole purpose of carrying out the Bjørvika development, they will also be disbanded upon completion of the project. As the developers in Bjørvika are short-lived as collective units, their agendas are unlikely to focus on the long-term. Moreover, many of the developers promptly sell their projects after completion, providing them with no incentive to generate long-term benefits for future owners.

With regards to sustainable buildings a major barrier to implementation of cutting-edge eco-efficiency technologies is the capacity of developers to transition to innovations. This issue surfaced in the interview with Hav Eiendom where the respondent emphasised that the construction- and development industry is 'conservative': the industry values proven solutions

over innovation. Further the interviewee mentioned that proven solutions are preferred because construction errors easily occurs if new developments are not based on earlier experiences.

"It is not always smart to be innovative … you have so many experiences that make you build the way you do … So, it feels safe to apply solutions that has been tested, and that has existed not only for one year, but that have existed for ten years … You cannot always predict the outcome, you sometimes have to construct the building to gain the experience. And if the experience is 'bad', you will be left with a large costly building" (Interview: 2).

These quotes indicate that developers hesitate to implement innovative environmental solutions because a conservative building approach, based on established techniques, involves lower risks to end up with dissatisfactory buildings and financial deficits.

Similar results was found by Häkkinen & Belloni (2011) in their study about barriers and drivers to sustainable building in Finland. The study questioned why full benefits and effective implementation of energy-efficient building concepts was not achieved despite the availability of sustainable technologies. The study found that sustainable building is not hindered by a lack of technologies, but rather because of organisational and procedural difficulties in adopting new methods (Häkkinen & Belloni, 2011). New technologies and methods are repelled because their adoption require processual alterations, which evoke risks and unforeseen costs. Findings from the UK also found that 'traditional' attitudes in the building sector restricts the uptake of innovations in sustainable housing (Williams & Adair, 2007). The results from the Finish and UK studies substantiate the remarks from the Hav Eiendom representative, as all sources emphasise that developers' reluctance to adopt new technologies/innovations stem from the economic risks of diverging from familiar processes/experiences. Moreover, the findings provide a plausible explanation as to why the developers in Bjørvika refrained from incorporating cutting-edge technologies with regards to energy-efficiency and renewable energy supply when they were available.

In addition to the perceived risk related to adoption of new technologies, building innovation in Bjørvika seems to be hindered by some developers' lack of incentive gain new experience. As mentioned in the previous paragraph, the process of transitioning to new technologies and new methods presents a risky and potentially costly enterprise for the developers. In the case of transitioning, the representative from Hav Eiendom expressed that a precondition would be that they possess a series of future projects to which they can apply their newly acquired experiences (Interview: 2). Due to the relatively limited lifespan and purpose

of development companies such as Hav Eiendom and Sørenga Utvikling, they are not likely to innovate because gained experiences will have limited future applicability for themselves as a collective unit. Together this barrier and the barrier presented in the previous paragraph produce somewhat of a vicious cycle. On one hand, the developers are reluctant to innovate because they lack know-how and experience requires potentially costly and risky processual changes. Simultaneously, the developers are hesitant to gain new experience that comes through undergoing necessary processual changes because they as companies are too short-lived to make use of the gained knowledge to an extent that justifies the initial processual 'upgrade'. Therefore, the developers are likely to maintain their traditional working-regime.

5.2.3. Lack of environmental nudging and regulation

If barriers related to financial risks and lack of know-how erode the developers' incentive to voluntarily implement avant-garde eco-efficiency measures, thorough implementation of EM could necessitate intensively pushing the developers through more environmental nudging or stricter regulation. Because the environmental efforts of the developers in Bjørvika mainly lean on the 'commitments' in the OMOP (Interview: 1 & 2), shortcomings to extensive implementation of EM might be a consequence of insufficient environmental nudging and regulation in this very program.

Even though the OMOP includes visions and suggested measures consistent with EM, they are however not sufficiently translated into specific operational goals that reflects an extensive implementation of EM. The vision of 'approaching energy balance' is for instance not further specified with operational numeric goals. Likewise, integrated solar- and wind technologies are suggested measures, but without clear targets. With regards to renewable energy the OMOP clearly lacks specific and ambitious targets that can encourage and challenge the developers. In the case of building energy-efficiency, clear operational goals are specified. The ambitiousness of the goals (especially regarding the TEK standards) are however inconsistent with a thorough implementation of EM. However, by elaborating clear and more ambitious goals the development could take a more environmentally sustainable turn. This was observed in Bjørvika, where the energy-efficiency of new buildings increased after the developers decided to aim for passive house energy-standards. Thus, it seems like clear and ambitious operational goals that nudge cutting-edge eco-efficiency could promote a more far-reaching implementation of EM.

But formulating clear and ambitious goals does not ensure that the developers go all the way to comply. As witnessed in Bjørvika, despite advancing the improved passive house standard, many of the new buildings fell short of the targets. The shortcomings are probably partly due to the passive house standard being 'voluntary' as opposed to 'mandatory', thereby creating a leeway for the developers to excuse a lack of accomplishment without being sanctioned. The buildings in Bjørvika that are subjected to TEK standards, which are mandatory by law, do however in all except one instance comply with their energy-targets. Thus, it seems that by switching the legality-status of the principles in the OMOP from 'voluntary' to 'mandatory', the developers are more likely to comply. Heightening of environmental ambitions as well as mandatory goals will individually likely stimulate a more extensive implementation of EM. A combination of highly ambitious and mandatory environmental targets would however be ideal.

While lack of environmental nudging and regulation are surface barriers to EM, one could reveal deeper barriers by asking why the OMOP is not already formulating specific goals that enforce the developers to implement cutting-edge eco-efficiency solutions. To contemplate why the OMOP does not go further, one need to understand how it is constituted, and by whom. Put simply, the OMOP is a creation of the Council of Bjørvika, which include municipal, governmental and private actors. Representing the municipality is Oslo Port Authority, PBE and the property- and urban development agency. Statsbygg and State Highway Authority are represented from the Government. OSU is a private sector representative. Additionally, Oslo Harbour Authority/Hav Eiendom also have direct profit-motives as it autonomous in financial-matters and does therefore operate in private-like manner. As these actors belong to different sectors with different interests, decisions on the content of the OMOP must be a product of a co-creation or negotiation process. Because environmental concerns traditionally have been a public responsibility with little private incentive, it is to assume that the municipal and state representatives are the ones pushing the environmental agenda, while the profit-seeking actors (OSU and Hav Eiendom) resist (because environmental efforts are associated with elevated costs). The lack of specific, highly ambitious and mandatory goals and implementation of eco-efficiency must therefore be a result of: (1) lack of municipal ambition and nudging to incorporate cutting-edge eco-efficiency measures, and/or (2) a skewed power balance between environmental advocates and profit-driven actors.

On one hand, the partial implementation of EM could be a result of insufficient nudging from the parties who hold the role of advocating the environment, or lack of dedicated environmental advocates in the negotiation process. In a negotiation process, the length of

environmental efforts will never go further than what is suggested. Therefore, if the parties of the bargaining process refrain from pushing environmental ambitions extensively, the outcome will neither reflect ambitious environmental goals. Without knowing the specific interests, expertise and roles of the municipal and governmental stakeholders, it is judging by their organisational responsibilities uncertain whether any strong environmental advocates are even included in the negotiation process. The shortcomings in EM implementation could be consequence insufficient environmental nudging or environmental advocates in the negotiation process.

On the other hand, however, it could also be the case that strong environmental advocates were present in the negotiation process, but that their agenda is being supressed by alternative agendas of more powerful stakeholders. In contemporary Norwegian urban governance characterised by PPPs, private developers often have an 'active' role in realisation of urban development as they typically possess the capital and property (Bowitz & Høegh, 2005). Conversely, Norwegian municipalities have adopted a passive role in urban development due to a lack of financial assets, and negative experiences related to the position as a development actor (Nordahl, 2012). As a result of the financial imbalances the privately-operating developers are likely to maintain a powerful position in a negotiation process. A high demand for urban development in the Oslo region, combined with public reluctance to develop, strengthens the power of the private developers. In the face of environmental nudging or pressure, it is therefore likely that the developers will exert their power to shift the policy outcome towards their own terms. Such power could be utilised to reduce potentially costly environmental ambitions, but also to formulate the vague and non-mandatory goals that selectively can be pursued.

5.2.4. Path-dependency

Transition to a real renewable energy system in Bjørvika seems to be hindered by a strong political commitment to the current district heating system in Oslo. Over the past 30 years Oslo municipality has invested heavily to establish and later expand a district heating system, which mostly is governed by Hafslund Fjernvarme AS (100% owned by Oslo Municipality). The district heating system is considered to play a central role in achieving the municipality's goal of phasing out heating by oil and fossil fuels by 2020 (Oslo kommune, 2016). Most of the municipality of Oslo (including Bjørvika) is located within Hafslund's concession area for district heating. Within this area the municipality holds authority to impose

new developments to connect to the district heating system. Due to its location, Bjørvika was therefore, almost by default, required to connect to the district heating system. The fact that the main system for heating and cooling in Bjørvika more or less is predetermined, seems to have deterred the motivation to pursue alternative energy solutions. A profound focus on the district heating system is evident in the OMOP and the annual environmental assessments, where establishment of the seawater-based energy-central (that would connect to the district heating system) always was the focal point of attention, while 'real' renewable energy technologies (solar-, wind-, wave- and tidal-energy) briefly were suggested as potential solutions. It is almost like prearrangement of the main energy concept has shifted the focus away from alternative and more environmentally sound energy solutions. Considering the lack of renewable energy systems in Bjørvika, it is possible that the large municipal investments and belief in the district heating system has created a lock-in situation or path-dependency, where today's solutions are constrained by yesterday's choices, thus hindering a transition to a more eco-friendly infrastructure system and extensive implementation of EM (Corvellec, Campos, & Zapata, 2013).

5.2.5. Institutional barriers

Although the purpose of long-term plans is to steer development in a desired direction, they can often due to their legal certainty also be rigid, inflexible and less responsive to changing circumstances (Albrechts, 2004). In the rapidly developing field of environmental technology, such rigidness of long-term planning might be a hinderance to implementation of eco-friendly solutions and infrastructures. Such conflicts between long-term planning and flexibility have also materialised in Bjørvika.

One example relates to the establishment of bike infrastructure. When the plans for Bjørvika were created and approved back in 2003, an overarching plan for infrastructure network was also created. This infrastructure plan allocated space and placement of car-roads, sidewalks and bike-paths as well as their dimensioning. At that time, biking in Oslo was more uncommon than what it is today. Therefore, the planners dimensioned the width of bike-paths according to what seemed like a rational development at that time. Today, however, the demand for bike-paths surpasses the initial prediction, thus resulting in certain streets with underwhelming bike capacity. The interviewee from PBE put it this way:

"*Dronning Eufemia's Gate is 42 meters wide, and when it was discussed in its time, it seemed absurd to make such a wide street. Today, we cannot have wide enough bike-lanes because it was not wide enough. The needs have changed substantially." (Interview: 4).*

The quote precisely captures the potential issue of making long-term plans in the face of changing demands and circumstances. In Bjørvika, the inflexibility of the plan resulted in narrower bike-lanes than what is demanded today. Because sufficient and high-quality bike infrastructures are central to promote a modal-shift towards more environmentally sustainable means of transport, the inability to create bike-lanes with satisfactory capacity could therefore hinder such a modal shift. Hence, in this example long-term planning could represent a barrier to sustainable mobility.

Another example of where long-term planning has prevented implementation of eco-efficiency measures is with regards to waste vacuum system (WVS). A WVS is according to Bjørvika's regulatory provisions a concept that shall be reviewed as a common waste management concept for the district (Plan- og bygningsetaten, 2004b). Although, the private developers reviewed WVSs during the early stages of the development, serious commitment to realise seemingly lacked. In recent years with the new City Council, municipal ambitions of actualising an overarching WVS in Bjørvika have increased (Interview: 4). Now, however, time has passed, buildings has been constructed and detail plans created. WVSs are technical infrastructure measures that reaches beyond property borders, and ideally should be established at a larger scale prior to completion of development and plans. According to the planner, it is 'extremely difficult' to incorporate transboundary infrastructure solutions, after the completion of detail plans (Interview: 4). This 'extreme difficulty' is probably down to processual, technical and financial complexities of redoing the negotiation- and planning process, while bearing heightened costs of an establishing an underground infrastructure network in a partially developed urban area. This example highlights a difficulty of implementing transboundary infrastructures in a project based on a long-term plan, which is already underway.

Notwithstanding the difficulties of incorporating cross-property eco-solutions such as a WVS in a settled area, the planner still emphasised the importance of long-term and holistic planning in tackling issues that must be solved across property borders (Interview: 4). If one considers the planner's remark in combination with the above critique on long-term planning, a dilemma arises. On one hand, long-term planning can represent a rigid framework hindering implementation of new eco-solutions in the face of changing circumstances. On the other hand,

as the planner contended, long-term and holistic planning is a necessity to actually realise certain eco-solutions that transcends property borders.

5.2.6. Neo-liberal setting

Many of the above described barriers could be considered as products of the underlying neoliberal ideology. From this perspective, the neoliberal ideology represents a barrier to extensive implementation of EM. The lack of environmental innovation in sustainable buildings, is for instance fundamentally an issue of the neoliberal shift towards *dependence upon the private sector* in urban development. Dependence upon the private sector is troublesome because ecological concerns are incorporated into a market logic, which functions differently. Following a market logic, private developers adopt a conservative approach to their practices in order to minimise risks while maximising profits. A risk-averse and profit-maximising rationale (market logic) is however intrinsically conflicting with environmental innovation, which is advocated in EM. When a thorough implementation of EM in urban development requires environmental innovation, it is therefore an oxymoron to place the responsibility for such in the hands of a profit-seeking private sector that seeks to reduce risks and costs. As long as private developers perceive environmental innovation as a financial risk, the most cutting-edge eco-efficiency technologies are not going to be implemented. Therefore, an overwhelming private responsibility for urban development hinders extensive implementation of EM. When private developers are in a position of power, they are unlikely to innovate unless environmental technologies become very affordable or can be done without risk.

Privatisation also represents a barrier to incorporation of cutting-edge eco-efficiency solutions in the sense that is invites developers who prioritises short-term economical agendas, and therefore downplay eco-efficiency solutions where benefits are generated on a long-term and possibly by others than themselves (depending on if they sell, rent or own the building). Moreover, privatisation could potentially be troublesome if inclusion of powerful private sector stakeholders in a multilateral PPP negotiation process will manipulate the outcome towards sub-optimal environmental solutions.

Since many barriers to a thorough implementation of EM in Bjørvika seemingly relate to the powerful position of private sector in the development process, one might raise the question if more responsibility for realisation of urban development should be transferred to the public sector. Whether such a transfer of responsibility is feasible in the context of Oslo,

considering the municipality's reluctance to engage in potentially risky urban development – with limited funds – and a non-profit-oriented motive, is however another question outside the scope of this research. If Oslo municipality want to avoid the financial risks of undertaking urban development and simultaneously overcome the cost barriers hindering private developers' from extensively implementing eco-efficiency solutions, they could alternatively increase subsidisation. Through the means of direct subsidies, rebates, favourable tax treatment or feed-in tariffs, the public can incentivise private developers to incorporate eco-efficiency to a larger degree (Badcock & Lenzen, 2010). Alternatively, the public could stimulate price reductions through subsidies in research and development (R&D). To overcome the perceived risk to innovation (related to unforeseen costs of procedural changes), public subsidies could also be a means to provide development companies with funds to advance their know-how, skill-sets and tool-kits.

As criticised earlier, the OMOP in some instances fail to specify clear and committing operational goals, which could be a consequence of the inclusion of multiple stakeholders and powerful private interests. Therefore, the neoliberal focus on PPPs and governance in Norwegian urban development could potentially serve as a barrier to extensive EM implementation, as the OMOP is created through such a process. When many interests are involved in a collaborative decision-making process the outcome is typically a consensus (Ansell & Gash, 2007). This consensus is however unlikely to arrive at optimal environmental solutions when private developers are present. The consensus-building nature of the policy-creation process is also unlikely to produce specific, ambitious and legally-binding goals if certain parties involved have doubts of their capability to comply. The process can be compared to the ones taking place on an international level, where certain powerful nations are hesitant to commit to binding environmental treaties in fear of the costs of mitigation and potential sanctions that might follow if they fail to meet their obligations (Adger, 2001). A governance process might be more diplomatic, but diplomacy might be achieved on the expense of specificity and ambitiousness of environmental goals, which seems to be the case in Bjørvika. The lack of specific and binding environmental goals might suggest that the decision-making process regarding should be more authoritarian.

5.3. Barriers to implementation of Degrowth

The previously mentioned barriers to extensive implementation of EM are also barriers to degrowth because it too advocates for *efficiency and substitution of consumption*. Degrowth

must however, also overcome barriers to achieve *reduction of consumption* through actual downscaling of economic activity. In a global political economy fixated on growth, transitioning towards a shrinking economy is challenging, and will require overcoming ideological and structural barriers at a political and individual level in society.

5.3.2. Ideological barriers to degrowth

Since degrowth advances a downscaling of the economy (i.e. negative growth), and the current capitalistic economic system is a pro-growth one, the growth ideology is itself the most pressing barrier to a degrowth transition. Likewise, support of EM or green growth are barriers. When I say that EM and green growth represent barriers to degrowth, I do not refer to the ideas of efficiency- and substitution of consumption, but rather to the belief that such measures can fully decouple growth and ecological impact, and thereby allow for indefinite growth. As long as economic growth is the main driving force behind policies, economic activity and individual decisions, incorporating a directly conflicting ideology is perplexing. Oslo's political goals of stimulating growth and competitiveness through attraction of the creative class, business and tourism would for instance need a turnover for a degrowth discourse to manifest. While the growth ideology transpires as the obvious barrier to degrowth, one can disclose deeper barriers by considering 'why a growth discourse dominates' and 'why we pursue growth endlessly'. Economic growth is generally a means to 'achieve something', whether it is financially, politically or socially. Thus, if achievement of this 'something' could be approached in a different manner than through growth, a degrowth society could emerge. In this respect, the current way of achieving or resolving this 'something' - through growth - is a barrier to degrowth.

In the current neoliberal and capitalistic economic system, the goal is to pursue the highest rate of monetary return. With a system designed to endlessly chase profit, growth is the unitary means for achievement. Hence, the ideology and institutions of the current financial system is a barrier to degrowth. Call for a new economic system that is not designed to grow.

From a political economy perspective growth represents a means to improve social conditions and manage distributive issues (Strunz & Schindler, 2017). The idea is that everybody in society can have more by "making the cake bigger" through growth. Instead of acquiring and distributing wealth by steadily increasing taxes, it is considered more politically acceptable for the public sector to accumulate capital through persistent economic growth that will trickle-down. In the pursuit of growth, GDP is the dominant metric for economic

performance in mainstream economics. Although GDP merely measure the economic value of all final products and services in a country over time, is generally presented as the most important indicator of a nation's 'success'. Due to GDP status as an 'success-indicator', politicians pursue it endlessly as their political efforts will be assessed on the basis of their ability to enhance national GDP (Raworth, 2012). Therefore, failure to stimulate GDP-growth, will certainly have consequences for their employment and political legacy. If, however, a nation's success was measured in a different way than through economic performance (GDP), politicians could possibly stop the persistent chase of growth and focus on essential ecological and social challenges, that does not require growth to be resolved. The dominance of GDP, which provoke growth, is therefore a hindrance to implementation of degrowth.

On an individual and social level growth or increased consumption is perceived as a means for consumers to satisfy personal and existential needs. In the modern consumerist society, the notion that increased consumption more or less is synonymous with well-being, and that "more is better" is widespread. According to Jackson (2005), a frequently cited psychologist, the modern consumer is "locked into a kind of 'social pathology' – driven to consume by a mixture of greed, social norms and the persuasive power of unscrupulous producers" (p. 21). From this perspective we pursue consumption partially due to human nature (greed) but also because the surrounding value system has indoctrinated consumption into our lives as a 'goal'. By consuming the products or services we desire we can attain the "good life". In this regard, consumerist habits are very much related to neoliberalism because we through consumption according to individual taste preferences are expected to attain happiness. Growth is internalised as a road to happiness. For a degrowth to manifest we must socially move away from consumption as a social norm, and individually transition adopt a different perspective on consumption's influence on well-being.

5.3.3. Spatial structural barriers to degrowth

On a spatial structural level, the Bjørvika development lack legitimacy from a degrowth perspective because it accommodates for a growth in road capacity (likely inducing more traffic) and an excessive consumption of floor space per capita. Hence, the inability to constrain growth in road traffic and limiting housing consumption could be considered as a barrier to degrowth.

The planners and politicians inability to hinder a growth in road capacity/traffic could also be explained in terms of a lock-in. The Norwegian government and Oslo municipality has

ever since automobiles became commonplace invested heavily in road infrastructure. More roads induce more traffic, and more traffic stimulates authorities to expand road capacity. It is like a self-perpetuating cycle, where the outcome is increased numbers of cars and roads (Hills, 1996). After many decades of such a cycle, the value of the road network increases as people can reach more destinations and it becomes rational from a public perspective to reproduce the network (Unruh, 2000). Moreover, after many decades locked into a road traffic system, people grow dependent on cars. Therefore, to satisfy people's 'transportation needs' and allow them to make use of their investments, new developments must almost by default 'required' to incorporate a road network. Additionally, when Oslo municipality strives to grow through attraction of wealthy residents, it is economically rational to develop an area that aligns with their desires.

Establishment of the surface road network can also be considered as an expression of the liberal value of *freedom of choice*. Cars hold a symbol of freedom as they provide freedom for the owners to access a vast amount of destinations on a steadily expanding road network, in a different way than public transport can. Therefore, production of a road network in Bjørvika ensures that people can maintain their habits of car-use, and thereby satisfy their 'needs'. If the municipality opted to make Bjørvika car-free, the decision would probably be deemed as 'too interfering' with people's habits, desires and possibility to choose mode of transport. In a neoliberal value system, such restraining policies, could easily reminisce of communism (a clashing value system), and will most likely on this basis be rejected. A political commitment to maintain people's freedom of choice by supplying road infrastructure therefore represent a barrier to ecological sustainability because it contributes to reproduction of a less sustainable mobility system and hinders transition towards a more sustainable one.

If we are to transition towards a degrowth society, planners and politicians need to be willing to make decisions that goes against public opinion and their freedom of choice. Bjørvika could because of its centrality, solid public transport coverage and facilitation for soft trafficants very possibly have been car-free, and thereby not contribute to traffic growth. Instead of focussing on accommodating for popular infrastructures, planners should be focussed on establishing the more environmentally friendly infrastructures. This might indicate that certain planning decisions regarding ecological matters should take a more authoritarian turn and overrule public opinion.

If we are to combat the climate crisis effectively adapting to a denser living presents a valuable opportunity. To accommodate for a reduced per capita housing consumption planners need to push smaller living as a new social norm. A reduced housing consumption could be

pushed by using restrictive covenants to foster development on smaller housing units. Subdivisions of housing units into more and smaller rooms can also be a tool to emphasise that a housing unit is designed for larger households. Alternatively, a regulatory mechanism that caps housing consumption could be implemented.

6. Conclusion

The world is entangled in a climate crisis that requires dedicated and collective efforts to resolve. In this endeavour, industrialised nations hold a particular responsibility due to their high material- and energy consumption. As an industrialised nation, Norway acknowledges its responsibility and now embarks on becoming a low-emission society by 2050 (Miljødirektoratet, 2014). With the climate crisis and Norway's commitments as a point of departure, this thesis has from a planners' perspective explored environmental sustainability in the case of Bjørvika: a large-scale urban waterfront development in the centre of Oslo, with high promises for environmental sustainability.

Environmental sustainability in Bjørvika was scrutinised through the theoretical perspectives of green growth and degrowth – two opposing discourses to resolve the ecological crisis. Green growth is the dominant discourse on environmentalism and upholds that current consumption- and growth-rates can be reconciled with environmental sustainability, by advancing an ecological modernisation of the economy (i.e. high degrees of eco-efficiency). Degrowth is, on the other hand, an alternative approach of environmentalism and maintains that eco-efficiency measures must be coupled with a decline in the scale of production- and consumption systems. Based on these theoretical notions, I have in this thesis sought to accomplish three objectives regarding the case: (1) to trace the underlying environmental discourse in Bjørvika, (2) to assess the legitimacy of Bjørvika's claims to environmental sustainability, and (3) to shed light on barriers hindering the project from being more environmentally sustainable. To approach these objectives, I have acquired data through interviews with key stakeholders in the Bjørvika development, study of secondary sources and observation.

In response to the first objective, the analysis revealed that the Bjørvika development is confined by the green growth discourse. The development is driven by a strong growth-ideology, strategically embedded in the municipal plan, which emphasises Oslo's intention to enhance its competitiveness, and attract the creative class, business, tourism and international recognition. Such objectives are dead giveaways for a city that desire to strengthen its capital base and grow. As the largest urban development project in Oslo this century, Bjørvika plays a principal role in realising the municipal and national visions of growth. To transform Bjørvika into an attractive and competitive location that can serve as a catalyst for growth, planning efforts has been aimed at image-building and replacement of 'undesirable' land-uses with

attractive, intensive and marketable land-uses. An area earlier characterised by harbour activity and highway-infrastructure was transformed into a new urban district containing high-end apartments, competitive business localities, known culture institutions and pleasant public spaces.

Bjørvika's focus on growth is however accompanied by environmental strategies to facilitate the growth in a green manner. Accordingly, the OMOP places emphasis on environmental strategies that can be unified or even advance a growth agenda. Therefore, Holgersen & Malm's (2015) "green fix" concept, signifying a deliberate strategic use of environmentalism to promote growth, also applies in Bjørvika – not as a fix of stagnant growth, but to further strengthen growth. Many strategies are for instance aimed at enhancing attractiveness of the local environment, which is important for Bjørvika to assert itself in the inter-urban competition for capital (Harvey, 1989). With regards to the green agenda the relevant strategies are all aimed at efficiency- and substitution of consumption, and not actual reduction of consumption. Endorsed strategies to enhance energy-efficiency from the building and transport sector include: building density, mixed-land uses, energy-efficient buildings, and WVSs. Bjørvika's strategies also target sustainable substitution by encouraging: a shift from car-use to public transit, cycling and walking, and transition from dirty energy-system to cleaner energy-system.

Since Bjørvika serves as a catalyst for growth, and strategically utilise environmental sustainability in a manner that can promote a growth agenda, the project ideologically clashes with a degrowth discourse, and will therefore from this perspective lack legitimacy. Structurally, Bjørvika also lack legitimacy from a degrowth perspective because the project likely has induced growth in road traffic and accommodated for an excessive consumption of housing (floor space per capita). In terms of road traffic, the tunnelling of E18 and subsequent establishment of a surface road network, has substantially increased the road capacity as opposed to what it was prior to the development. Although, measures have been taken to discourage car-use (e.g. low parking norms, and limited car-lanes), such measures must in the context of the initial road capacity expansion be considered a 'repair' instead of 'prevention'. In terms of housing consumption, Bjørvika's residents showcase significantly higher values compared to other contemporary urban development projects in Oslo. In Barcode, the high housing consumption is mainly down to small household sizes. At Sørenga, the excessive consumption of floor space per capita seems to be a combined consequence of low household sizes and somewhat large apartment sizes. Both areas most likely display low household sizes because a high property demand along the waterfront and high square meter prices, means the

area will attract a wealthy demographic, who can afford to consume more housing. Because Bjørvika accommodates for both economic and structural growth, strong sustainability seems unattainable, and the project's sustainability proclamations can therefore not be considered valid from a degrowth perspective.

When Bjørvika desires to be a pioneer in urban environmental sustainability, and do not correspond with a degrowth approach, one could expect the project to extensively implement EM. My analysis did however suggest that Bjørvika's environmental sustainability claims partially lack legitimacy from an EM perspective, as the project failed to extensively foster efficiency- and substitution of consumption. At the core of this argument is Bjørvika's inability to sufficiently reduce ecological impact from buildings considering ambitions and available technologies. The development is for instance far away from attaining an energy-balance, which the OMOP states will be pursued. On the supply side, no building (except the Opera) has incorporated real renewable energy solutions. For heating Bjørvika instead depend on the current district heating system in Oslo that partially generates heat from fossil fuels. For electricity Bjørvika also depend on the conventional electricity system in Oslo, where the electricity originates from an "European attribute mix" consisting of 61% fossil fuels. On the demand side, the majority of the current buildings merely achieve energy-efficiency equivalent to the legal minimum requirements in TEK, while much higher energy-efficient building techniques are feasible in a cost-efficient manner. While the construction of passive houses represents a significant improvement to the TEK, they are still far away from energy-performance of state-of-the-art building concepts such as NZEBs and PEBs. The lack of accomplishment to realise an overarching waste management concept, also widens the sustainability gap between ideals and reality, and reduces the validity of legitimacy claims from an EM perspective.

After suggesting that Bjørvika's environmental sustainability contentions lack legitimacy *fully* from a degrowth perspective and *partially* from an EM perspective, I delved into a discussion of potential barriers to achieve ecological sustainability within the two discourses. The discussion on barriers to a fuller implementation of EM discussed hinderances to extensive incorporation of eco-efficiency solutions. One likely barrier as to why developers voluntarily refrain from incorporating cutting-edge energy-efficiency solutions in their projects relates to costs. Even though energy-saving innovations are cost-efficient on a long-term, private developers typically operate with short-term agendas as they often sell buildings promptly after completion, or have short-term obligations to repay investors and similar. In Bjørvika the short lifespan of many of the central developers could also amplify a short-term

focus. A perhaps more significant as to why private developers in Bjørvika opted not to implement environmental innovations relate to the unforeseen costs and risks that arise when a company need to undergo procedural changes to incorporate the innovation into their working-scheme. A lack of implementation of eco-efficiency solutions could also be a result of insufficient operational, mandatory and ambitious goals in the OMOP. Moreover, I suggested a lock-in situation might hinder commitment to develop a new and cleaner energy system. The inflexibility of long-term also hindered the extent to which WVSs and bike-infrastructure could be implemented.

The most prominent barrier to degrowth is however the hegemonic growth ideology that entrenches politics and planning. On a spatial level, barriers to degrowth is the inability to limit growth in road-traffic and per capita housing consumption.

The study suggests that neoliberal tenets of privatisation, profit-orientation and governance serves as a partial barrier to implementation of ecological modernisation, and that embracement of growth and freedom of choice serves as a fundamental barrier to degrowth. While it might be difficult to abandon a growth ideology financially, politically and individually on a short-term, as it requires radical changes to our value systems, degrowth can be pursued at an urban level if planners and politicians takes a strong stance against growth in unsustainable mobility and building stock. This might require more authoritarian decision-making that goes against popular public opinion. On a short-term, the mutual interest points of EM and degrowth – efficiency- and substitution of consumption – should be embraced to achieve a more extensive implementation of EM, but also to simplify a transition towards degrowth. In order to achieve a more extensive implementation of eco-efficiency solutions, my results suggest that the public sector might need to take more responsibility: either as a developer themselves or by increasing subsidies.

So, while Bjørvika up until now could be criticised both from a degrowth and EM perspective, environmental sustainability might receive more attention in the future as the current political agglomeration consists of significantly more green party representatives that earlier. Hopefully, this will lead to higher environmental ambitions and more successful implementation of GHG-reduction measures in upcoming projects in Bjørvika, Fjordbyen and Oslo at large.

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Attachement 1: Interview guide

Bjørvika Utvikling

Topics discussed:

- Ownership-structure, environmental strategies and measures in Bjørvika, renewable energy, sustainability as a business strategy, importance of Bjørvika for Oslo.

Hav Eiendom

Topics discussed:

- Bjørvika's history and foundations, private sectors role in Bjørvika, relationship between Hav Eiendom, planners and politicians, private sector's social responsibility, importance of environmental sustainability, commercial potential of environmentalism.

Byråd for Byutvikling

Topics discussed:

- The commission for urban development's role in Bjørvika and urban planning, overarching goals, environmental goals, understanding of environmental sustainability, Oslo's position on growth, Bjørvika's contribution to growth, unachieved environmental ambitions, environmental weaknesses in Bjørvika.

Plan- og bygningsetaten

Topics discussed:

- Goals of the development, role of OMOP, weaknesses of OMOP, long-term planning and the environment, unachieved environmental strategies, planners' role in Bjørvika.

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