

# Ordering Power from Shore

*An STS analysis of electrification of the  
Norwegian Continental Shelf*

Kristoffer Lorentsen



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Kristoffer Lorentsen

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IV

# Abstract

Power from shore is a Norwegian climate mitigation strategy that is situated in the middle of the Norwegian paradox of being both a climate-nation and an oil-nation. In physical terms, power from shore, or electrification, is the use of electrical energy from the Norwegian mainland to replace emission-intensive gas turbines that are producing electricity on the continental shelf. The ambition is to mitigate emissions from the extraction process. This thesis is a qualitative study of bureaucratic documents that seeks to answer the question: What is power from shore? Drawing on resources and insights from Science and Technology Studies, this open question is answered by studying the *ordering* of power from shore within Norwegian climate politics. The materials studied is a report series from the Norwegian public administration that includes three reports spanning from 1997 to 2008, as well as a political process from 2014 where the Norwegian parliament demanded electrification of the upcoming oil-fields on the Utsira High, a geological formation in the sea 200 km off the west coast of Norway. This was the first time such a demand had happened. The study shows that power from shore is ordered as solution to the climate problem, defined as carbon emissions from the production facilities, and that the emissions from the exported fuels are not taken into account. It also becomes a solution to a political problem; meeting the Norwegian domestic emission goals. Local, domestic, international and global spatial orderings are identified, and through the points in time, power from shore has moved from the global through the international, to the domestic. As such, it has followed a bigger trend in Norwegian climate politics. Economic expertise and calculations play a large role in ordering power from shore. Calculation of abatement cost has been used to make power from shore comparable to other measures, which in turn hide the peculiarities that are part of it. It becomes evident that continued extraction of oil is a premise, and is not discussed. However, at the last point in time, there are some evidence of small shift towards seeing the extraction as problematic, but this is largely seen as a separate discussion from power from shore.



# Preface

This thesis is the end-product of my 14-month master program in European Studies of Society, Science, and Technology at the University of Oslo. Through working with this thesis I have learned a lot about power from shore and about Norwegian climate politics. I hope that you will learn some of this by reading it. It is my sincere belief that the insights that can be found within this thesis are important, so please share it with anyone you might think finds it interesting.

I would like to thank all the great people at the TIK-centre for a fantastic year-or-so, and a lot of bad coffee and good conversations in the break room. Special thanks go to my supervisor Helge Ryggvik for great input along the way, and to Martin and Bjørnar for help with proof-reading and comments on a draft. Your help has made this thesis even better than I could have managed on my own. Any misspellings or other errors that are left in this final product are of course only mine.

Kristoffer Lorentsen, Oslo, 30.09.2015





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# Abbreviations

Use this list as a reference when reading the thesis. In addition to this list, each abbreviation is written out in full the first time it is used in the thesis. Some of the abbreviations are abbreviated from the Norwegian version of the term or name.

- AP - The Labour Party (political party)
- CO<sub>2</sub> - Carbon Dioxide (emission gas)
- CCS - Carbon Capture and Storage/Sequestration
- ENGO - environmental non-governmental organization
- EU ETS - European Union Emission Trading System
- FrP - The Progress Party (political party)
- H - The Conservative party (political party)
- HSE - Health, Safety and Environment
- KrF - The Christian Democrats (political party)
- MD - Norwegian Environment Agency
- MDG - The Norwegian Green Party
- MoF - Ministry of Finance
- NVE - The Norwegian Water Resources and Energy Directorate
- NPD - The Norwegian Petroleum Directorate
- NOK - Norwegian Krone
- NTB - Norwegian News Agency
- NU - Young Friends of the Earth Norway
- OED - The Ministry of Oil and Energy
- PDO - Plan for Development and Operations
- Ptil - Petroleum Safety Authority Norway
- SCEE - Standing Committee on Energy and the Environment
- SP - The Centre Party (political party)
- SSK - Sociology of Scientific Knowledge
- STS - Science and Technology Studies
- SV - The Socialist Left (political party)
- UHPH - Utsira High Power Hub
- V - The Liberal Party (political party)



# 1 Introduction

Norway has been an oil-extracting country since the discovery of the Ekofisk oil field in 1969. At its peak, Norway was the world's third largest oil-exporter, and the endeavors on the Norwegian continental shelf have resulted in substantial incomes to the Nation. As of August 2015, the market value of the Government Pension Fund Global (commonly referred to as the Oil-fund), is well over 7 000 billion NOK<sup>1</sup> - almost 1.5 million per inhabitant. This financial instrument was established in the early nineties to secure long term use of the income from the petroleum sector, and has only been able to become so large due to a significant increase in the oil-extraction rate. Norway can rightfully be called an oil-nation.

At the same time, Norway is often recognized as a forerunner in environmental and climate politics. In 1989, Norway set a stabilization target for carbon dioxide (CO<sub>2</sub>) emissions, as the first country in the world. Norway is currently the largest donor to REDD+, a global initiative that aims to reduce greenhouse gas emissions resulting from deforestation and forest degradation. Due to large hydropower reserves, the Norwegian energy mix is much “cleaner” than the European, where much of the energy is derived from coal. The Norwegians like to think of their country as a climate-nation.

The paradox or dilemma of being both an oil- and climate-nation has been noticed and studied by scholars and students alike (Andresen & Butenschøn, 2001; Haug, 2010; Hovden & Lindseth, 2004; Nilsen, 2001; H. Ryggvik & Kristoffersen, 2015; Sydnes, 1996; Tellmann, 2012). This master thesis will study a climate mitigation measure that is situated in the middle of this paradox, namely *power from shore* to Norwegian oil fields. According to official accounting systems, approximately one fourth of the Norwegian domestic greenhouse gas emissions today are from the petroleum industry (SSB, 2015). This number has risen significantly in the last three decades, and the local emissions from petroleum extraction have hence become an area of political and environmental interest.

Power from shore to, or *electrification*<sup>2</sup> of, the oil and gas platforms on the Norwegian continental shelf has been discussed in Norwegian politics for more than two decades. It has

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<sup>1</sup> As of August 2015, one Euro (€) is worth about 9 NOK.

<sup>2</sup> In this thesis, power from shore and electrification will be used as synonyms. This is not always given, as electrification could just as well be done from e.g. offshore wind farms. In this thesis the terms will be used interchangeably, and both seen as using electricity from the mainland to power oil- and gas-installations at sea.

been seen as a way to reduce the emissions from the extraction facilities. Gas turbines installed on the platforms have low efficiency and relatively high emissions. In comparison, electricity from the mainland can be said to have low emissions. Electricity production in land-based power plants has higher efficiency and much of (at least the Norwegian) power comes from renewable energy sources such as hydro.

The paradoxical is that only a small amount of the emissions from fossil fuels stems from the extraction phase, most of it is from burning or using the fuel. The Norwegian oil industry themselves report that the facilities on the continental shelf emit on average 8 kg CO<sub>2</sub> per barrel of oil produced (KonKraft, 2009). This is very little compared to the emissions from consuming the fossil fuels that is 400 kg CO<sub>2</sub> per barrel or more (Ryggvik & Kristoffersen, 2015). This means that power from shore is on one side aimed at an emission source that is a large portion of the total Norwegian domestic emissions. Compared to the potential emissions from the fossil fuels that are exported, however, power from shore is aimed at what can be said to be the minor source of emissions.

Research has shown that the known oil, gas and coal resources in the world are more than what can be burned if we are to reach the internationally accepted goal of a maximum 2°C increase in global mean temperature, and that because of this, fossil fuels must stay in the ground (McGlade & Ekins, 2015).

This master thesis goes beyond this presentation of power from shore to understand what it is. To do that, I argue that one have to understand what it is *made to be*. This means that we have to study how it is *done* - how it is talked about, defined, made and made sense of. Science and technology studies (STS) scholars has shown that what something is and ways of knowing, is tightly linked to ways of doing (Latour & Woolgar, 1979; Law, 2008). This study will investigate what power from shore is and has been in Norwegian climate politics.

Power from shore is the practical and technical solution of using electrical power from the Norwegian mainland to power oil and gas platforms and installations<sup>3</sup>. A common term for this practice is *electrification*, and it renders a platform or field *electrified*. As of 2015, five Norwegian oil-fields have power from shore, with the first being the Troll field in 1996. Five additional fields are planned for power from shore - four of these are part of this study.

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<sup>3</sup> The extent to which an oil rig is electrified can vary. One can cover only the electrical demand with electricity from the mainland (part-electrification), or one can include the energy demand for heat and for large pumps and compressors (full-electrification). This study does not make any difference between these two.

Since 1996, when starting up new oil fields, the oil-companies on the Norwegian continental shelf has to assess the energy demand and cost of utilizing power from shore as opposed to using gas turbines on the platforms (Innst. S. nr. 114 (1995-1996)). The main incentive for doing so is currently the cost of emitting CO<sub>2</sub> (Innst. S. nr. 390 (2011–2012)), that is made up of a CO<sub>2</sub> tax and the price of an emission quota in the European Union Emission Trading System (EU ETS).

Electrification of the four upcoming oil and gas fields on the Utsira High - a geological formation on the seabed 200 km off the west coast of Norway – has been said to be an important climate issue (Bellona, 2014; Ropstad, 2014; Holmås, 2014). This recent political debate and controversial decision making process in the spring of 2014 is the starting point for this study. I will dive into the official documents, letters and transcripts from the process to understand what electrification became in the process. In addition, I will use media sources and supplementary interviews with key actors to gain further understanding. In the end, the Norwegian parliament, the Storting, ended up ordering the oil companies to use power from shore, despite the companies' claims about high costs. This was the first time that this had happened in Norway.

To further understand the Utsira process and power from shore, I will study electrification since its first appearance on the Norwegian continental shelf and political landscape. I will go back to three additional points in time. These points are when reports in a report series on electrification were published by the Norwegian Petroleum Directorate (NPD) and The Norwegian Water Resources and Energy Directorate (NVE). These bureaucratic documents from the public administration were commissioned by the government and presented in 1997, 2002 and 2008. These expert documents and bureaucratic knowledge sources are studied together with the Utsira process to understand what electrification has been in the past two decades. Public administration is an often used site for knowledge production and the NPD and NVE are the expertise on power from shore in the political landscape. In politics in general science and other types of knowledge and expertise has become very important and are given a very important role. Sheila Jasanoff has argued that expertise should be seen as a form of delegated authority (2003) and following this line of thought, it seems both right and important to study these reports.

These four points in time will be studied to find answers to the main research question in this thesis: *What is power from shore?* As seen from the above sections, this will be

answered by studying what it has become in Norwegian climate politics. I will draw on resources from the field of Science and Technology Studies. Inspired by John Law (1994), I will investigate the *ordering* of electrification. Here, ordering is not what the Storting did in the Utsira-case - to command or instruct. Rather, it is about patterns and practices of making something appear neat, simple and ordered. It is about patterns of simplifications and sensemaking. Based on the material and literature review I have chosen to study the *spatial ordering* of electrification as a climate mitigations strategy. I will also study what *problem* electrification becomes a solution to, and the *expertise* that is part of the ordering. Greenhouse gas emissions can be defined as both an environmental issue and a political problem (Tellmann, 2012). By answering the research question, the focus is shifted from questioning whether electrification is good or bad, necessary or unnecessary, to a focus on the complexities that is part of it and to how it is part of Norwegian climate politics. This, in turn, can inform decision making in the future.

Has electrification of the continental shelf not been studied sufficiently already? I will argue that it has not. There are technical feasibility studies, emission studies and cost analyses (both societal and business economics), amongst others. I will argue that the abundance of studies and reports in itself makes it a subject worth studying. This thesis is written within the field of, and using tools and insights from, STS, and is a detailed study of a specific emission mitigation measure. STS insights tell us that the work and practices that is part of science and knowledge production matters (Latour, 1987; Shapin & Schaffer, 1985). A study of the sensemaking or ordering of power from shore can tell us more about what electrification represents in Norwegian climate politics. It will hence be studied in light of the general climate change mitigation politics in Norway. To do this, I will also review previous studies on the history and discourses in Norwegian climate politics.

There are several reasons why the Utsira High process is interesting to study. The political process and intervention was unusual (Ånestad, Løvås, & Kristian, 2014). Also, electrification has been on the political agenda and incentivized through taxing since 1996, but this was the first time that the Storting ordered the companies to do it. The decision was made in relation to, but not as part of, the concession process for the Johan Sverdrup oil field. Johan Sverdrup is claimed to be *Norway's biggest industrial project* in present time and to be of major importance to the Norwegian economy and workforce in decades to come (Solberg Government, 2015). After many years of falling production on the continental shelf, a big oil



field like Johan Sverdrup will potentially give an increase in production and a boost for the Norwegian supplier industry.

The next chapter in this thesis outlines the reviewed literature and the analytical concept that I will draw upon to find answers to the research question. In chapter 3, the materials and methods used in the study are described in detail. Chapter 4 presents an overview of the reports and political process studied, and puts it in a Norwegian climate-political context to situate the points in time in larger political trends. Chapter 5 presents the analysis and results of the study. In chapter 6, I will take a step back and critically look at what has been done, before drawing the results together in chapter 7 to summarize and suggest further research.

## 2 Analytical concepts and reviewed literature

This study will draw on resources from STS, and starts from an assumption that science and technology are thoroughly social activities (Sismondo, 2010). STS is a field that draws on many different disciplines, but has roots in critiques of the belief that science is a neutral, internally-driven supplier of knowledge and a progressive force (Asdal, Brenna, & Moser, 2007). Admitting that science and technology are social activities turns the focus to the processes and practices it is part of. One can ask both how it is done and what it does.

This chapter outlines the analytical concept used in this study. In the following section, I will present general insights from the STS literature that should be seen as a backdrop and a starting point for the main analytical concept that is presented in the subsequent chapter. I will then turn to a review of previous studies of Norwegian climate-politics. In the last sub-chapter, I will summarize what becomes the analytical framework.

### 2.1 Insights from the STS literature

An everyday assessment of electrification would maybe identify clear separations between the technology, the knowledge or science about it and the politics that surrounds it. STS has shown that these separations are not there. Technology, science and politics are always connected and interwoven (Enebak, 2002). Technoscience is a well-known concept within the field of STS (Asdal, Brenna, & Moser, 2007; Latour & Woolgar, 1979; Latour, 1987), and the concept suggests that there are no pre-determined boundaries for what constitutes technology or science, the social or the technical, science or politic. Within what is known as actor-network theory (ANT), an important framework or theory within STS, there are no *a priori* differences of human and nonhuman actors (e.g. Callon, 1986). In simple terms, it can be said that these STS insights is one way to open up the world for study. It requires an effort to shed oneself of the imprinted boundaries and separations that we usually think of as being there.

The above insights form a base for the work done in this thesis. It starts from an assumption that technology, science and politics are connected and interwoven. Moreover it starts by questioning what is what. The physical cables that connect oil-platforms to power

from shore can just as well be politics, technology and science. Technology is not separate from science, politics is not independent of science and technology and politics is more complex than the social relations between people (Asdal, 2004). As Langdon Winner (1980) once asked: Do artifacts have politics?

These insights and questions enables open and broad investigations of power from shore, and what it is becomes an interesting empirical question. To tease out what electrification is, I will rely on a specific thinking tool - ordering.

## **2.2 Ordering - an analytical tool for imputing patterns**

To guide me in my analysis and to tease out answers to my research question, I have sought to find an analytical concept that is as open as the question itself. Ordering is something we do all the time. It is closely related to simplifying and is a way of making sense of the world. It is sensemaking. We - as humans - are not capable of taking everything into account. We are, to some extent, also limited in our understandings and decisions by the knowledge we already possess. Hence, to make sense of the world, the way in which we know it and the ways we do it, we are ordering. It is a continuous process.

Ways of doing and ways of knowing is tightly coupled (Hermansen & Sundqvist, 2015; Latour & Woolgar, 1979). This means that by investigating how things are done, one can also investigate the knowing of things. In this study, I assume that there are certain patterns to be revealed in the practices of ordering, and that these patterns are distinguishable. Inspired by John Law (1994), I will conceptualize these patterns of sensemaking as *orderings*. The world is complex and of heterogeneous materiality, and John Laws term *modes of ordering* “*is an attempt to create a tool to impute patterns*” (p. 112). John Law has shown how heterogeneous practices and materialities orders the world (1994). In this study, ordering is also somewhat inspired by the concepts of discourse and framing.

Within the material semiotic field, the Foucauldian definition of discourse - a strategy in materials - is used when one investigates what something is by asking what it is made to be and how it emerges (Moser, 2006). John Law has cut it down in size by introducing the term *mode of ordering* and invites us to study how *ordering* is done and how it enacts itself in different material forms (Moser, 2006).

Framing, like ordering, is considered to be a process. Brian Wynne is an STS scholar that has studied the natural scientific framing of the climate problem - making the climate safe and manageable - and has pointed to how this defines the public *meaning* of the problem and what it erases from view (Wynne, 2010). The framing process puts the outside world in brackets, but does not abolish all links to it (Callon, 1998). Framing is a process for creating agreement (Kall & Sundqvist, 2013), and as such, these simplifications are open for challenges from alternative framings (Hermansen & Sundqvist, 2015).

To answer my research question, it is timely to look at what orderings have already been identified by other scholars. The following literature review is a summary of studies where scholars have identified different orderings in Norwegian climate politics.

## 2.3 Previous studies of Norwegian climate politics

To understand what power from shore is in Norwegian climate politics, I have reviewed previous studies of Norwegian climate politics. The emphasis has been on studies of Norwegian climate politics over time and where ordering, discourses and framings are identified. This chapter presents a review of some of the studies.

Eivind Hovden and Gard Lindseth (2004) has identified two main discourses in the Norwegian politics on climate change, and has labeled them *national action* and *thinking globally*. They show how these two discourses act as basic knowledge systems when actors put forward standpoints on the climate change issue, and how this has changed over time. National action seeks reduction in domestic emissions, and says that Norway must demonstrate substantial national action first, and should be a responsible actor in the global arena. This is in contrast to the discourse thinking globally, where international cost-effectiveness of emission reduction is the norm. This limits the need for domestic reductions and is not conflict with continued Norwegian oil and gas activities. According to the authors, this way of thinking globally also rendered possible a line of argument that Norway could contribute to reduce emissions globally by exporting oil and gas to replace coal as a fossil fuel abroad. The national action discourse was strong in the late 1980s after the Brundtland report<sup>4</sup>, and was evident in the 1989 target of stabilizing Norwegian domestic emissions. This target was abandoned in the early 1990s, and in the negotiations over the Kyoto-protocol of

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<sup>4</sup> The report, named "Our Common Future" was published in 1987 by the United Nations World Commission on Environment and Development, led by the Norwegian prime Minister at the time, Gro Harlem Brundtland.

1997, Norway was a promoter of so-called flexible mechanisms where international cost-efficiency was the goal. In other words, thinking globally has gained ground over national action in the timespan that Hovden and Lindseth has studied.

Silje Maria Tellmann (2012) traces Norwegian climate policy from 1989 to 2008. In her study, she shows that domestic reduction target has, once again, been established in relation to a political climate settlement in 2008<sup>5</sup>. Tellman expose the development of three ruling discourses in the period she studied: a *tax* discourse, a *quota* discourse and a *technological* discourse. In the tax discourse, the climate problem is interpreted as an external effect of otherwise rational actions, and emissions must accordingly be priced by introducing taxes as a quasi-market instrument. The quota-discourse originated in the same overall discourse as the tax-discourse, but highlight international, instead of national, cost-efficiency. In both these discourses, the problem is the consumer and producer behavior, the knowledge base is economics, but the solutions are different (tax and quotas). The third discourse, technology, sees the problem as old, emission-intensive technology, and the solution is accordingly climate friendly technology. Its knowledge base is located within engineering. As it is seen, the discourses are named after their solutions to the climate problem, which are interpreted in two different ways.

Erlend Hermansen and Göran Sundqvist (2015) show how the IPCC uses two broad ways to assess policy approaches towards climate change, and that this line of thinking has made its way into the Norwegian political sphere. These two approaches - conceptualized as framings - are *top-down* and *bottom-up*. Typical policy tools for the bottom-up approach are what can be called *push* tools such as command-and-control, technological measures, emissions standards and legal instruments. Within the bottom-up framing, the solution to the problem - carbon emissions - is subsidies and other ways to pick technological losers and winners. The top-down framing sees economy-wide cost-efficient measures as the most ideal solution. Typical tools for the top-down approach are *pull* incentives such as economic policy instruments in the form of taxes and emissions trading. The top-down framing has had, and still has, a dominant position in Norway. The authors argue that electrification of the Utsira High is within the bottom-up framing.

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<sup>5</sup> This settlement is known as The Climate Compromise, and is the first of two such compromises in Norwegian Politics. We will return to this compromise later in the thesis.

Helge Ryggvik and Berit Kristoffersen (2015) have revisited the Norwegian oil (and climate) history to look at how the policies for limiting extraction rates for fossil fuels have changed over time. Their research is a chapter in an anthology (Princen, Manno, & Martin, 2015) that refocus “the climate problem” from only *emissions* from fossil fuel consumption to also including the *extraction* of the fuels – a refocus from carbon to fossil fuels. They tell a story of how Norway has - over the years - abandoned all efforts to moderate the pace of oil extraction. Because of what the authors call a *very advantageous system* for accounting emissions established in the Kyoto protocol, this has not been in conflict with the Norwegian interests of being a “green” nation. This system is based on a narrow focus on the local emissions from the use of fossil fuels, and is opposed to what they call *total contribution to global emissions*, where emissions from extracted and exported fuels are also accounted. The focus on the local emission has been strong, but Ryggvik and Kristoffersen sees an emergent wave of environmentalism, that in the last few years has shifted the focus more towards the extraction and that part of the Norwegian fossil fuel reserves must stay in the ground.

If one tries to draw these studies together, there are many differences, but also similarities. The study that maybe stands out the most from the others is the last, by Ryggvik and Kristoffersen. The two scholars look at how the climate *problem* is understood, while the others are more concerned with the *solutions*. This might be due to when the different studies were published, and the timespan they study. The other studies have identified discourses and framings that can be identified with an ordering of the climate issue as strictly an emission problem. This is maybe not surprising given Ryggvik and Kristofferson's revisited history. This aspect of problem-solution definition is one of three different aspects to Norwegian climate orderings that stand out in the above studies.

The second is the *spatial* ordering. Especially Hovden and Lindseth make this clear with their two discourses termed *national* action and *global* thinking. Accounting schemes for emissions are important for their ordering - as the main instrument within global thinking are the Kyoto mechanisms.

The third aspect that stands out is the knowledge base or *expertise* that is part of the ordering. The knowledge bases are part of what separates the different orderings and the main two bases are economic and technical/engineering. Also, Kristin Asdal (1998) and Werner Christie Mathisen (2003) have shown how economic knowledge and the economists have gotten a hold of the Norwegian environmental politics since the 1970s.

These three aspects, together with the analytical thinking and analyzing tool ordering and the STS insights discussed earlier, forms the basis for the analysis.

## **2.4 Analytical concept - three aspects of ordering power from shore**

This chapter summarizes the analytical framework that has been formed in relation to STS literature, the empirical material and the literature review of Norwegian climate politics. Three aspects of the orderings of power from shore will be analyzed. This is done to understand what power from shore becomes at the four points in time. This is based on an assumption that how ordering of power from shore is done, affects what it is and becomes.

The first part of the analytical challenge is related to the ordering of power from shore as a solution to a problem. As the reviewed literature has shown, it is not given what the problem is made to be and there is a plethora of solutions. To analyze how power from shore has been ordered to fit, or solve, certain problems will be an important part of the analysis.

The second aspect is the ordering of power from shore, spatially. The climate problem, however it is defined, is a global problem. There is one shared atmosphere, albeit the burden or the consequences of our common actions is felt differently at different places on earth. From the studies presented above, however, we learn that the policies and discourses in Norwegian climate politics have e.g. changed between a national focus and a global focus. How is this done in relation to, and what does it do to, power from shore?

The third aspect is related to the questions surrounding expertise. What knowledge is made relevant, and is this knowledge important? We know that expertise has taken or been given the authority to define issues or problems (Wynne, 2010), and that our current democracy relies heavily on knowledge (and its producers) to govern and to make decision. This however is not given. Hence, part of this study is to look at what part expertise takes in ordering power from shore as a climate mitigation strategy. This is based on an assumption that who, or what expertise, is ordering, changes what electrification is and becomes.

### 3 Materials and methods

This thesis studies electrification at four different points in time. The most recent and the starting point for this project is the Utsira High power solution decision making process from 2014. The three other points are 1997, 2002 and 2008, and are all studied through a report series from the NPD and NVE. These four points, or sites, are studied in an open and symmetric way, and using qualitative methods and data. The ways in which they are studied has been chosen based on both practical considerations and methodological interest, but most of all because they are thought to be valuable ways to study the subject at hand. This chapter outlines the materials and methods used in this study.

Qualitative research processes has a cyclical nature and will likely alternate between the process of induction and deductive reasoning (Hennink, Hutter, & Bailey, 2010). In this project, this has proven to be true, and it has also been sought out explicitly. The main methodological philosophy that I have employed is that the empirical material should inform the analytical perspectives. It should be open and emergent. As I have gained deeper insights into the case, the project, methods and analytical resources has changed. I have followed the materials to dead ends and I have experienced the so-called snowball-effect.

To understand what electrification becomes in Norwegian climate politics, one must turn to the main site, to politics. There are many ways to do this, and many possible stones to turn. The focus in this study has been close reading of bureaucratic texts.

Bureaucratic texts and documents are part of the realities that we are interested in approaching and studying (Asdal, 2015), and hence are valuable sites for study. They are not simply instruments of bureaucratic organizations, but rather are constitutive of bureaucratic rules, ideologies, knowledge, practices, subjectivities, objects, outcomes, even the organizations themselves (Hull, 2012). This means that we can turn to these documents to learn more than just the contents of it. By close reading - by looking both *through* and *at* the paperwork (Kafka, 2009) - we can gain insights into the subject we study.

In efforts to contextualize this paperwork, I have included additional material in my study. Even though I believe, and this study shows, that valuable insights can be gained from these documents, it is important to know some more of what these documents are part of. The



additional material is hence not the focus of this study, but rather the means to look into the world that surrounds the main texts.

In the following two subchapters, there is an overview of the both the main and the additional material. The last subchapter will address potential problems and ethical considerations related to the material.

### **3.1 Main materials - Official documents and reports**

Official documents and debates related to the Utsira decision making process in the Storting were used to study power from shore in 2014. This includes a private suggestion from the two representatives from the Socialist Left party (SV) Audun Lysbakken and Heikki Holmås (Doc. 8:58 S (2013-2014)), the following correspondence between the Standing Committee on Energy and the Environment (SCEE) and the Ministry of Petroleum and Energy (OED), the proposition from the SCEE to the Storting (Innst. S. nr. 237 (2013-2014)) and the following debate. In addition to this, 18 questions and answers (both written and oral) from representatives in the Storting to Ministers in the government were included. These questions were identified using the search function at the Storting's website, while limiting the search in time from October 2013 to June 2014.

What electrification has been in Norwegian climate politics over time will be studied through the three official reports spanning over 15 years in time. NPD and NVE are understood to be the main experts on power from shore within the Norwegian public administration. NPD and NVE sorts under the OED. The reports are a series of reports published in 1997, 2002 and 2008, where the latter ones are updates on the previous. These reports attend to electrification of the installations on the continental shelf in general, both existing petroleum fields and fields in planning.

### **3.2 Additional materials - media articles and supplementary interviews**

As discussed, the above main sources of data have been supplemented by other materials and data. A major source of such data has been media and newspaper articles. These have been used to get an overview of the process regarding Utsira, and to understand how the

reports were received. To find relevant articles I have used Atekst Retriever<sup>6</sup>. The most comprehensive retrieval was a query for articles that contained the words "johan sverdrup", "utsira\*" or "elektrifisering"<sup>7</sup> from October 2013 to June 2014. To limit the results, I selected only publications from Teknisk Ukeblad, the Norwegian News Agency (NTB) and Aftenposten. These are national news publications, and especially Teknisk Ukeblad followed the Utsira process closely. The query resulted in 823 results, and after an initial screening, to sort out unrelated articles, 313 articles was left. These were sorted chronologically and exported. For each of the three reports, I have used Atekst Retriever to find articles spanning from one month before release to one month after, querying for "elektrifisering".

Other sources are reports and news articles, blog posts, radio shows, press conferences, visiting open hearings and more. These materials have improved my knowledge of the topic and have mainly been identified through the other material and various web searches.

In addition to the written materials, I have also done four supplementary interviews with actors in the Utsira process. The form of these talks has been un- or semi-structured and has been both phone calls and face to face meetings. I have talked to:

- Ola Elvestuen - The Liberal Party (V) and member of the SCEE
- Heikki Holmås - The Social Left Party (SV), member of the SCEE and driving force in the Utsira process
- Kari Elisabeth Kaski - Environmental Non-Governmental Organization (ENGO) ZERO, now works for the secretariat in SV
- Audun Randen Johnson - Secretariat in ENGO Friends of the Earth Norway

The interviews has been recorded (except the one with Holmås), and notes has been taken from the recordings. The informants have been given the possibility to comment on the thesis. No comments were received.

### **3.3 Potential problems and ethical considerations**

The main materials that have been used in this study are similar because they are all bureaucratic documents, but they are also very different. It ranges from reports to debate

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<sup>6</sup> Atekst Retriever has a comprehensive archive of Norwegian newspaper articles, press releases and other media sources

<sup>7</sup> Norwegian word for electrification

transcripts. Yet, I have studied them using the same method and analytical concept. At first glance, to study sites that are so different using the same tools, can be seen as problematic.

Such concerns are of course important, and I have given them great thought when designing my study. First of all, the choice of sites has been specifically so that they are different. My interest has been exactly this - to study power from shore in different sites - and it has been important for me that the materials differed. In fact, I would have loved to include even more sites and different materials in my study, but due to the time-limitation of the master thesis, it was not possible. The concept of ordering is chosen partly because the materials and sites are so different. I will argue that an open concept such as ordering is a good way to study the materials.

The informants have been selected based on their relation to the Utsira case. Due to summer holidays and the upcoming Norwegian election, politicians have been hard to get in touch with. Combined with a limited time-frame for this study, the result was that no more informants were included. The selection is therefore somewhat biased towards the opposition parties, as no in-government party members has been interviewed. They are however part of the main materials and media articles. I have been aware of this possible bias in the analysis, and to compensate for it I have sought to focus on the official statements from the other parties. The focus in this study is also not on the interviews, but on the documents, and the way their contents make sense of the world. This, and my open and symmetrical approach, makes this possible bias less problematic. A larger and broader selection of informants could possibly give more detailed knowledge of the case, and should be considered if further studies are to be undertaken.

An ethical concern when doing a qualitative study like this one is the identification of the people studied and interviewed. In this thesis, all interview subjects are identified by their name and position. In general, when studying a person's political standings, this might be problematic. After all, what you vote is a private matter. This might suggest that anonymization could be needed. However, the persons interviewed here are “public” persons and politicians, and are part of this study because of their positions.

I have considered this aspect and informed my informants of the possibility of anonymization. I have also reported the study to the Norwegian Data Protection Official for Research, to make sure that I comply with guidelines for storing, keeping and using such data.

In this report, I present quotes from the materials. Many of these are my translations from Norwegian to English. I have sought to make these translations as close and true to the original as possible, but some nuances might have disappeared. Quoting from the texts and other sources is important for this story about ordering power from shore. Any mistranslations or change of meaning due to translation has however not affected the analysis. I am a native speaker of Norwegian, and the analysis is based on the Norwegian versions of the quotes.

# 4 Power from shore at four points in time

Before delving into the analysis, this section will present a summary of both the reports and the Utsira process. We will follow the points in time in chronological order, starting with the 1997 report, and ending with the 2014 Utsira process. Before, after and in-between the time-points, selected events and aspects of Norwegian climate politics will be presented. The summary of the Utsira process is necessarily different from the description of the reports. The descriptions of the reports include *why and when* these reports were commissioned (as presented in the reports themselves), a brief summary of *what* the reports contain, and their main *conclusions*. The overview will also show how the reports were *received*, by pointing to news articles from the time of their release. The summary of the Utsira process is presented as a timeline and will be presented after the reports. The ambition with this chapter is to present an overview, before analyzing the ordering of power from shore at these points in time. Hence, this will not be an extensive presentation.

Now it is time to go back to the late 1980s and follow power from shore, through time and through Norwegian climate politics.

## 4.1 Norwegian climate politics in the 1990s

When Norway became the first nation-state in the world to establish emission reduction goals in 1989, it was in the wake of the Brundtland-report. The Norwegian goal was to stabilize national emissions at 1989 levels by the year 2000, but this target was abandoned by 1995 (Hovden & Lindseth, 2004). In 1991, a tax was put on CO<sub>2</sub> emissions from the oil sector, as an effort to reduce flaring<sup>8</sup>. In 1996, the Sleipner platform was the first offshore installation to utilize carbon capture and storage (CCS) to capture CO<sub>2</sub> and store it under the seabed. This was a technological feat that probably would not have happened without the tax on CO<sub>2</sub> emissions. Throughout the nineties, Norwegian emissions continued to rise. Emissions from the petroleum industry were a large part in this. During the 1990s, extraction and export of oil more than tripled on the Norwegian continental shelf (Ryggvik &

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<sup>8</sup> So-called flaring is the practice of burning gas. It can either be part of a security system where gas is flared when equipment is over-pressured, or it can be the burning of gas that are a byproduct when drilling for oil - where the gas is seen as a waste product.

Kristoffersen, 2015). With the upcoming Kyoto-conference in 1997, where national emissions targets would probably be set, there must have been some unease with these rising emissions. In the planning process for the Troll platform, a solution appeared. The Troll platform was planned for power from shore - and the local emissions from the platforms dropped significantly. The choice of using power from shore was a business decision made by the companies that had a license on the field. In a recommendation to the Storting we can read *“Processing of the Troll-gas on Kolsnes is done with the use of hydropower, and are therefore without emissions of CO<sub>2</sub>. Also the platforms of the Troll-field are electrified. [...] The Majority [of the SCEE] ask the government to prepare an overview of the amount of energy and the cost of electrifying oil and gas fields on the Norwegian continental shelf”* (Innst. S. nr. 114 (1995-1996)). This leads us to the first power from shore report.

## 4.2 1997 - Report number one

The title of the first report is *“Electricity from shore to the oil- and gas business. Possibilities, costs and energy amount”* (NPD & NVE, 1997), and is a part of the follow-up from the recommendation to the Storting from the previous section.

The main body of the text is devoted to the technical aspects of electrification. Energy consumption, power supply possibilities, connection point on shore, cables, transformers and more makes out the bulk of the report. Six geographical areas are selected as suitable for power from shore, and suggest a separate distribution platform for each area. Some platforms and areas are excluded due to *“short remaining production period”* (p.17) and *“limited knowledge of future energy demand”* (p.17). A major aspect of the report is where the power would come from.

The report states that it is assumed that there will not be sufficient electricity production on the mainland to electrify the Norwegian continental shelf and proposes three solutions to cover the rising demand. These three solutions are *increased net import, new gas power plants or new hydropower*. To cover the full demand using only import and new hydropower is presented as less likely than gas power, and more expensive. It would demand reinforcement and new investments on the grid and the time-consuming concession process for hydro is presented as a major problem on its own. The report concludes that the import scenario is an *“undesirable alternative when the goal is to reduce the total CO<sub>2</sub>-emissions”* (p. 28), because the total CO<sub>2</sub>-cuts will be *“zero, or most likely negative”* (p.28). This is due

to the assumption that imported electricity comes from coal power plants in Europe. Gas power, however, would have relatively lower investment costs, and would be located near connection points on shore (which would be close to where the gas-pipes are connected to shore). At the time when the report was written, Naturkraft had been granted a license for two planned gas power plants, but this had been appealed to the OED (Tjernshaugen, 2007). The report states that gas power plants could become “*highly controversial*” (p. 30) and such projects could “*meet considerable resistance*” (p.5).

The general conclusion is that new hydropower becomes the most cost effective way to reduce emissions due to low operating expenses and high reductions of CO<sub>2</sub> emissions, but is seen as less likely than building new gas power plants. The way this is evaluated is through the calculation of *abatement cost*, which “*forms a basis for comparing electrification to other possible measures in the petroleum sector*” (p. 3). The abatement cost is calculated in Norwegian kroner (NOK) per ton CO<sub>2</sub> emissions possibly mitigated.

The report was presented by the Minister of Oil and Energy Ranveig Frøiland, from the Labour Party (AP), on May 16th 1997. Based on the report, Frøiland concluded that it was too expensive and that the oil companies themselves would decide whether or not to invest in power from shore (Olkvam, 1997). In a leading article titled “*Untalented minister*” in the daily newspaper Dagens Næringsliv (1997), it was claimed that she misused the numbers in the report and that the cost would be much less than what she presented. “*When we got the report, it became kind of out of the question to go forward with it*”, Frøiland has later said (Martiniussen & Løvås, 2014).

### **4.3 Kyoto, gas power and CCS**

In December 1997, the so-called Kyoto protocol was adopted. It is an international agreement where nations set binding emission reduction targets. It sets a limit to the increase in the Norwegian emissions. In the international negotiations however, Norway had been a promoter of flexible solutions (Hovden & Lindseth, 2004), where nations could pay for emission cuts in other countries to meet the targets that they had agreed to. The protocol allowed for emission abatement measures abroad to be counted towards a nation's account through tradable quotas, joint implementation and the clean development mechanism (Tellmann, 2012). This is a major development that happened between the first and the second report.

Also, the authors of the first reports had seen a possibility for gas power plants to be a controversial issue. One of the biggest climate and environment-related issues in Norway in the late nineties and early years of the new century was the gas-power issue. Andreas Tjernshaugen (2007) tells a story about the issue, or what he calls *twenty years climate battle*. During the 1990s, there was an increased interest from politicians and industry to industrialize on and use the Norwegian gas *in* Norway. Gas power plants was one of such strategies, but in the month after the first NVE and NPD report was released, in February 1997, a secret alliance called “*The common action against gas power plants*”<sup>9</sup> was formed. The organization was established by seasoned, former members of Young Friends of the Earth Norway (NU) and local gas power protest groups. While there was a huge controversy on the on-shore gas power plants, many new oil fields started operations with small gas-power stations (NPD, 2015). The “problem” on the continental shelf was increasing.

It was not obvious that land-based gas power was bad for the climate. The argument that gas replaced coal and nuclear power abroad had gained footing. “*Degrees of deviltry*”, said the Minister of the Environment at the time, Torbjørn Berntsen (Tjernshaugen, 2007). For the opponents, what became their strategies was both stating just how much a power plant would emit (sometimes compared to how many cars it would equal) and a focus on the Norwegian climate-political commitments. A focus on the local and domestic emissions was their strategy. The gas power issue was important in the years to come, and in 2000, Prime Minister Kjell Magne Bondevik and his government resigned after they got the Storting against them in a gas power dispute.

The promise of “clean” gas power plants based on CCS had also gained traction in Norway, both in the political parties and within ENGO’s. By separating out the carbon, either from the gas prior to burning or from the exhaust, and storing it underneath the ground or seabed, one would eliminate the emissions from the plants. This was not science fiction at the time, as the technology had been in use in the USA since the 1980s and on the Norwegian continental shelf since 1996, where the Sleipner platform was the first offshore installation to utilize CSS. The energy efficiency and how safe the storage was, was of course debated, but the proponents of this technological fix argued that these were surmountable obstacles. When the second report from NPD and NVE was commissioned and released, gas power was still part of the plan, but also with a little twist – CCS.

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<sup>9</sup> Fellesaksjonen mot gasskraftverk



## 4.4 2002 - Report number two

The title of the second report is “*Power supply from shore to the continental shelf. Possibilities, costs and environmental impact*” (NPD & NVE, 2002). Since 1997, there had been “*technological development*” (p.8) and “*change in the general conditions and supply situation*” (p. 8), so OED asked NPD and NVE to make a new report on power from shore.

The report is similar to the 1997 one in many ways. Three selected areas are presented, and the technical aspects and energy demand profiles are laid out. It is also different in many ways. It includes a fourth way of meeting the increased electricity demand from electrification: Gas power plants with CO<sub>2</sub> sequestration. This fourth solution is also concluded to be the most promising, even though there are “*no assessment of the technical aspects [...] or the probability of it being realized [on time]*” (p. 62). It is presented as the most cost effective, compared to the other two. But compared to other abatement projects, they are considered to be “*very costly contributions towards reaching Norway's commitments to the Kyoto- and Gothenburg protocols*” (p.7). Again, this is based on abatement cost calculations.

The results from the reports were presented on November 25th 2002. In a press release from NVE and NPD they conclude explicitly that it “*will be too expensive to supply the continental shelf with power from shore, and the environmental gain from such an electrification is highly uncertain*” (NVE, 2002) under the headline “*NPD and NVE: Do not recommend electrification*”. The conclusion is accepted, but Brit Skjelbred from the Ministry of Oil and Energy admits that while shortage of electricity and high costs are a problem, the government hopes that their support for gas power with CO<sub>2</sub> sequestration might help. “*We want to reduce the emissions from the continental shelf*” (Næss & Rugland, 2002), she stated. The Minister of Oil and Energy at the time, Einar Steensnæs from the Christian Democrats (KrF) has later stated that “*We had ambitious politics, and the politicians had good intentions. But when you receive an expert report that is so clear [...] it becomes hard not to take it into account*” (Martiniussen & Løvås, 2014).

## 4.5 Emission trading and the electricity market

In 2005, between the second and the third report, the EU ETS was launched. It is the first and biggest CO<sub>2</sub> emission trading scheme in the world, and it is a cornerstone in the European Union's policy to combat climate change (European Commission, 2015). The principle behind the scheme is known as "cap and trade". There is a cap, or upper limit, to the total amount of emissions, and this cap is reduced over time to bring down the total emissions. Companies receive or buy allowances, and these quotas can be traded among companies in a carbon market. The European Commission boast that "*The flexibility that trading brings ensures that emissions are cut where it costs least to do so*" (2015). The Norwegian oil and gas sector is part of the trading scheme. This means that oil companies operating in Norway have to obtain and pay for emission quotas for their emissions.

Since the Norwegian government deregulated the market for trading electrical energy in 1991, a Nordic, and later Northern European, power market emerged. In the year 2000, all four<sup>10</sup> Nordic countries were integrated into the market, and after the turn of the century, it expanded further south, both physically through cable connections and as a market. The name of the market, NordPool, is fitting, as the marketplace can be thought of as a *pool* of electricity. Suppliers and producers "pour" their electricity into the market pool, where everything is mixed. The consumers draw their power use from this mix. The origin of the electricity consumed is then not known, unless one buys a separate guarantee of origin. These market mechanisms are abstracted from the physical web of cables and wires, where the electricity flow can be known, because electricity flows from the producer to the "electrically closest" consumer. Sales of guarantees of origin to consumers outside Norway is also one of the reasons why over half of Norwegian electricity consumption is calculated to be based on fossil fuels, while only two percent of the production is based on fossil fuels (NVE, 2015).

Both of these markets make their entrance in the third report.

## 4.6 2008 - Report number three

The third report is titled "*Power from shore to the Norwegian continental shelf*" (NPD, NVE, Ptil & SFT, 2008). After the proposition to the Storting known as the Climate

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<sup>10</sup> Norway, Sweden, Finland and Denmark

Proposition<sup>11</sup>, it was decided that the electrification report from 2002 should be updated. In this study, the Petroleum Safety Authority Norway (Ptil), that was previously a part of NPD, and Norwegian Pollution Control Authority (SFT) was included as part of the project and as authors of the report. It states clearly that “*electrification of the continental shelf is driven by a desire to reduce emissions in Norway*” (p.53).

Four different areas are presented for possible electrification. Like the previous reports, details about the technical and economic aspects are considered for each area.

The report concludes that the increased power demand for electrification has to come from “*new dedicated production*” (p.29) or “*the market*” (p. 29), i.e. “*the existing power system*” (p. 34). With new dedicated production, gas power plants with CO<sub>2</sub> sequestration is considered to be the most realistic and viable option. This is called scenario 1, and it is stated that dedicated production as part the electrification measure makes sense and makes possible reduction CO<sub>2</sub> emission easy to calculate. Wind, hydro and bio are discussed, but are not considered to be viable options.

Electrification using power from the market gives birth to two separate scenarios. Scenario 2 calculates the “*physical effects*” (p. 34), which means calculating “*net CO2 reductions, deducted mean emissions from production in the power market.*” (p. 36). This mean emission is considered to be emission intensity of a modern gas power plant. This scenario is said to be “*hard to predict*” (p. 35). In scenario 3, “*the effect of increased power production abroad is reflected in increased power price rather than through increased emissions*” (p. v). This means that the total emissions cut is equal to the emissions cut from the installations in the sea.

On the 4th of January 2008, the report was given to Minister of Oil and Energy Åslaug Haga. This time, it did not recommend anything to the Government. “*The report is an analysis of the costs and does not give any recommendations to the government. It is the politicians that should decide what measures that should be implemented to reduce the Norwegian emissions of greenhouse gases*”, director of SFT said in a press release (SFT, 2008). While some argued that this was the end of the electrification debate, Haga stated that “*The emissions from the continental shelf will come down. I still think that electrification will*

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<sup>11</sup> In Norwegian Report St. 34 (2006-2007), is known as “Klimameldingen”

*be part of the answer, even though I hoped for other contents in the report. [...] We have to do another round of thinking and assess other additional measures” (Rønning, 2008).*

## **4.7 The climate compromise and the election in 2013**

In the election in the fall of 2013, a new minority government between The Conservative Party (H) and the Progress Party (FrP) and the support parties KrF and V, was formed. In their collaboration agreement, the four parties agreed to “*strengthen the Climate Compromise*” (V, KrF, FrP, & H, 2013). Previously, FrP was the only (major) party outside the compromise, and the new agreement effectively included them in it.

The Climate Compromise is a term for a political settlement that was first made in 2008 in the wake of the climate proposition that was the start for the third report. It was an agreement between the government parties at the time, SV, AP and the Centre Party (SP), and the opposing parties H, KrF and V. The compromise was updated in 2012, and states that  $\frac{2}{3}$  of the emission cuts will be domestic (Innst. S. nr. 390 (2011–2012)). The compromise also deals with power from shore in general and the Utsira High in particular. It states that the licenses “*always should assess power from shore as energy supply for new field and major modifications on existing fields*” (p. 15) and that there is a “*goal for the southern part of the Utsira High to be supplied with power from shore*” (p. 3). This means that all parties on the Storting had agreed on a *goal* to electrify the Utsira High<sup>12</sup>.

In the same election the Norwegian Green Party (MDG), a party that has its main focus on the climate and the environment, made it into the Storting for the first time. The party also has a focus on reducing oil production and in their political program, they explicitly put a focus on the emissions from the fossil fuels exported, not only the production (MDG, 2013). In addition to this, AP, Norway’s biggest party, was in the process of changing their leader to Jonas Gahr Støre. Silje Lundberg (2015) from ENGO Bellona has seen a change where the party has become more climate oriented after this, at least in their rhetoric’s.

According to one of my informants, Ola Elvestuen, the special political situation with the new government was one of the things that made it possible to instruct the oil companies to electrify the whole Utsira High.

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<sup>12</sup> MDG is not a part of the compromise.

## 4.8 2014 - The Utsira electrification process

Johan Sverdrup, Gina Krogh, Ivar Aasen and Edvard Grieg are all famous Norwegians of the past. In contemporary Norway and in the future their names will also be associated with four oil and gas fields in the North Sea. The oil and gas fields are all located on the Utsira High, a geological formation on the seabed 200 km west of Rogaland, a county on the West coast of Norway. In the spring of 2014 the Norwegian Storting decided to order the companies to electrify the Utsira High. This decision was made in connection to, but not as part of, the concession process leading to a plan for development and operation (PDO) and subsequent oil-extraction at the Johan Sverdrup field. This is what I have chosen to name the Utsira process.

Before Johan Sverdrup<sup>13</sup> was discovered, the three oil fields Gina Krogh<sup>14</sup>, Edvard Grieg<sup>15</sup> and Ivar Aasen<sup>16</sup> were planning for start-up on the Utsira High. These fields were discovered ranging from 1974 to 2008, and are a lot smaller than Johan Sverdrup. Edvard Grieg is planned to start operations in 2015 and to supply power and final processing for the Ivar Aasen platform. Start at Ivar Aasen is planned in 2016 and Gina Krogh in 2017.

The three projects did a joint study of power from shore to cover all three fields - a so-called *area solution* and concluded that the abatement cost would be too high to go further with the project (Det Norske, Statoil, & Lundin, 2011). The Johan Sverdrup oil field was discovered in 2010, and once the size of it was known, it was included into a joint study called the Utsira High Power Hub (UHPH) project, together with the three other fields. The power hub was foreseen as a separate platform that would receive power from shore and distribute it to all the fields.

Because Johan Sverdrup is a big (in Norwegian scale) oil field and is located relatively short distances from shore it is a very profitable oil-field for both the oil companies and the Norwegian state (78 percent of the profits are taxed). The elephant<sup>17</sup> Johan Sverdrup thus represents the lion's share of both the petroleum income and the potential local emissions at the Utsira High.

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<sup>13</sup> The Johan Sverdrup oil field is previously known as Avaldsnes or Aldous

<sup>14</sup> The Gina Krogh oil field is previously known as Dagny

<sup>15</sup> The Edvard Grieg oil field is previously known as Luno

<sup>16</sup> The Ivar Aasen oil field is previously known as Draupne

<sup>17</sup> Elephant is a common term for a large oil field.

While the UHPH project was still in process, the PDO's for the three smaller field where being approved by the Norwegian Storting, and all of them was approved with conditions concerning power from shore. In the propositions for all three fields, it is stated that if the OED finds that an area-solution should be realized, the fields would have to connect to it (Lien & OED, 2014). It meant that the platforms would have to be ready to for an electrification area solution and it can be seen as clear indicators of a political wish and intention to electrify the area.

In practice this meant that changes were made to the PDO and the platforms. An example of this is that for the Gina Krog platform, the Storting accepted a solution where two lower-emission turbines were changed to one higher-emission turbine to make room for a transformer that was needed for the electrification. Not only was this supposedly a more emission-intensive solution, it also reduced the reliability of the power supply (using only one turbine) (Ramsdal & Taraldsen, 2014).

The original plan for presenting the so-called *concept choice* - an early stage technical solution - for Johan Sverdrup was by the end of 2013, but got moved to early 2014. On February 13th, the licenses<sup>18</sup> and the operator<sup>19</sup> Statoil released their concept choice for the first phase of the field<sup>20</sup>. Statoil confirmed that it was the electrification aspect that delayed the decision (Taraldsen, 2014). The concept planned for this phase was a field-center consisting of four platforms; a processing platform, a riser platform, a drilling platform and a platform with living areas for workers. In addition, it was planned with three installations on the seabed for injection of water.

More importantly for this study, the concept choice stated that Johan Sverdrup where to have power from shore directly to one of the platforms planned for phase one, and thus effectively ending the UHPH project. No choices where made for the next phases of Johan Sverdrup and regarding the other three platforms. Debates were going in the media and at the Storting - both about the cost and the climate effect. Statoil was forced to release parts of their abatement cost calculations (Statoil, 2014) and other reports claimed that the cost was much lower than what Statoil presented (Add Energy, 2014). In March, the Norwegian Environment

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<sup>18</sup> An oil field on the Norwegian continental shelf usually has several licenses (owner interests).

<sup>19</sup> Among the licenses of the field, an operator is chosen. The operator usually runs the planning process and the practical operations of the platforms.

<sup>20</sup> Johan Sverdrup is planned for a phased planning and building process, meaning that more platforms and installations will be added later on.

Agency (MD) released a report (2014) on the possibilities to reach Norwegian climate goals. Commenting on the report, the director of the MD stated that “*If we are to cut 8 million tons [...] then there is no escaping extensive electrification offshore*” (NTB, 2014a). On top of this two politicians decided to intervene.

On the 24th of April, two representatives from SV presented a private proposal (Doc. 8:58 S (2013-2014)) to the parliament stating that the government should make sure that all four platforms on the Utsira High would have power from shore *from day one*. One of the proposers was Heikki Holmås. In an interview for this thesis he said that he had seen a majority for power from shore in the Storting already before Christmas, and that he had seen no signs in the government's work that signaled that they would demand electrification from the companies. He stated that it seemed clear that the government would let it be up to the oil companies. He especially referred to a statement from the OED where it was stated that the decision would have to be made on business terms (OED, 2014).

The main argument for electrification was that it would have a sizable climate effect, and that the Storting's climate goals (stated in the Climate Compromise) would not be met without it. The private proposal was handed over to the SCEE for assessment. In May, a combined opposition<sup>21</sup> agreed to support a variation of this proposal. Politicians in the parties in government referred to the agreement as a coup (Skårdalsmo & Rønning, 2014). The agreement did not demand electrification from day one - but in the *startup-phase* (NTB, 2014b). On June 4th, the SCEE announced that the opposition and the government had reached consensus and on June 12th, a unanimous parliament voted for the proposal. Now, in the consensus agreement, area electrification was to be done *as soon as possible and not later than 2022* (SCEE, 2014). Who had “turned around” in the process later became contested and debated (Stortinget, 2015).

This intervention from the politicians was unusual mainly for two reasons. First, it was the first time that the Storting actually had *ordered* companies to use power from shore in such a way. Usually the technical power solution is decided on by the licenses, but is incentivized through the CO<sub>2</sub>-tax. Secondly, the decision was not part of the normal process. My informant Holmås stated that the private proposal was an effort to make a decision before it was too late. He saw no way to demand electrification within the normal process, because

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<sup>21</sup> The opposition consisted of AP, SV, V, KrF, SP and MDG. The government consisted of H and FrP.

the Storting usually only process the PDO, and then investments has already been made. Before that, it is the government and the ministries that govern over the process and are in dialog with the companies.

The debate on when it is too late to demand electrification was prominent in the process. While the government parties argued that waiting for the PDO would not be too late and that one would have more knowledge at that time, the opposition arguments was close to that of Holmås.

## **4.9 Trends in contemporary climate debates and politics**

As Ryggvik and Kristoffersen (2015) argue that there is an emergent environmentalist wave and alliance aimed at stopping the uncontrolled rate of extraction of fossil fuels in Norway. An additional example of this is V voting against oil drilling and recovery in the arctic in their 2015 general assembly (Giverholt, 2015). This was based on “traditional” environmental concerns, but also a concern for leaving the fossil fuel resources where they are. Also, MDG has promoted stopping further search and recovery of oil for a while (MDG, 2013), and the Storting has decided that the Government Pension Fund of Norway will divest in coal (Krekling, Norum, & Kolberg, 2015). SV eventually voted against building the Johan Sverdrup platforms stating “*Climate change demands transition, and that oil is left unused*” (SV, 2015).

This trend does not mean that the emissions are not seen as a problem, because in the end, it is the concentration of CO<sub>2</sub> in the atmosphere that causes global warming. It is rather a trend that also recognizes the problem as the production and that producers (such as Norway) should be held responsible. This means that there is a shift from strictly focusing on the emissions, to also focusing on the extraction. The rationale is that if we extract fossil fuels, it will be burned, and that there are more resources than what we can safely use. Therefore, extraction itself is a problem. Producers of fossil fuels can hence become a possible solution to the climate problem by leaving fossil fuels in the ground.

This view is often supported by what I would call the carbon budget argument. It states that if we are to limit the global temperature rise to 2°C, then there is an upper limit, a budget, to how much emissions that we can allow. This is then viewed against the amount of fossil



fuel reserves that we know of, and the conclusion becomes clear: there are too much fossil fuels.

The following chapter will present more of the contents of the main and additional materials, as well as an analysis of the ordering of power from shore.

## 5 Ordering power from shore

The previous chapter outlined the contents of the reports, gave a brief synopsis of the Utsira process, and placed it in a broader climate-political context. In this chapter we turn to the materials in a slightly different, but more challenging and rewarding way. Rather than the contents itself, it is how the contents are ordering power from shore, that becomes the interest. Rather than asking what it says, we try to understand what it means. And following that line of thinking - what electrification becomes.

The reports studied have all failed to predict the future in some way or the other (Martiniussen & Løvås, 2014). This is due to various assumptions about the future and choices made in the studies. Predicting the future is hard, and I would say that it is not that surprising that is not always successful. Looking back, it is easy to pass judgement. In this thesis however, this is not the reason why I study these reports. I am not seeking to understand why some assumption or choice has produced the “wrong” or “right” answer. The key question here is how these assumptions are ordering power from shore.

Kristin Asdal has studied bureaucratic texts (2015) and asked: Who gets to play the main role, to be the main character? She argues that who gets to play this role, matters, and that it does something to the story. In the materials used in this study, there are two apparent main characters: CO<sub>2</sub>-emissions and abatement cost. This is evident in both the reports and the Utsira documents. This might not be surprising, given that I study what is said to be a climate mitigation strategy. However, it does reveal that the technological/material part of power from shore is less important. At the first point in time, the 1997 report, the feasibility and technical challenges are given some space. From 2002 and onwards, this is not always the case. The question is increasingly focused on how much it costs, not if it works. The technology and its feasibility are taken for granted.

From the starting point, then, electrification is a question of emissions and cost. In the following sub-chapters, the three different ordering aspects described earlier will be analyzed. First, we will look at how power from shore becomes a solution to. Second, we will look at the spatial ordering. Third, we will analyze the expertise and the knowledge that is used in the ordering of power from shore. Here, abatement cost becomes an important part.

## 5.1 Solving a problem

This chapter presents an analysis of the orderings of power from shore as a solution to a problem. The materials have shown that there are two main problems that power from shore address; the climate problem narrowly defined as carbon emissions from fossil fuel consumption and a political problem posed by domestic emission targets. These two orderings will be explored in the following subchapters.

### 5.1.1 The climate problem

In the material, power from shore becomes a solution to the climate problem defined only as carbon emissions. This is opposed to also viewing the extraction itself as problematic. This is evident both in the reports, and the Utsira documents. The following quote from the 2002 report shows this well: “*increased extraction leads to increased emissions due to more power consumption*” (p. 51). Here, the potentially increased emissions from the actual fossil fuels extracted are not the problem. The increased emissions are only from the energy consumption and emissions related to the extraction process. The increases in extracted fuels are not seen as problematic.

In the Utsira process a picture is painted of the carbon emissions and how electrification can, or cannot, help bring down these emissions. This fits well with how the Kyoto systems accounting practices where CO<sub>2</sub>-emissions are the only accounted entity. “*Electrification of the Utsira High [...] can stop an increase in emissions toward 2020 of approximately 800 000 tons of CO<sub>2</sub>.*” (Document 8:58 S (2013-2014)). Increased extraction due to lower operating expenses is discussed, but the possible additional climate burden from this increase is not evaluated. Even though there are discussions in the media about the climate effect, i.e. emission reduction, of power from shore to the Utsira High, it is not apparent in the political debate. Apart from a few statements from FrP members, there is not much questioning about the emission abatement potential of electrification.

This one-sided focus on the emissions from the production facilities is clear within the documents. This ordering is well rooted in the Norwegian and international climate politics and power from shore fits neatly with it, its arguments and its accounting practices. The narrow focus on only the emissions from the production seems to be key to the Norwegian image of being a climate-nation, on top of being an oil-nation. Within this ordering, the oil from electrified fields becomes a solution, rather than a problem.

This is a quote from Tina Bru, a H representative, from the last meeting where power from shore was decided for Utsira. *“When we now make sure that the emissions to air related to production at the Utsira High is eliminated due to power from shore, the oil and gas will be very climate-efficient”* (Stortinget, 2015). What she says here is that by eliminating the emissions from the extraction, the oil becomes more climate friendly. The extent to which Norwegian oil and gas is “green” can be contested, and especially considering that the emissions from extraction is only a fraction of the emissions from using the same fossil fuels. This does however not shed the fact that an ordering of, and one-sided focus on the CO<sub>2</sub>-emissions from the extraction process is necessary to make such a claim.

There is no mention of the actual extraction being problematic. It is as though it is taken for granted. A simple and climate friendly solution would be to simply shut down or not start any more extraction. This, however, is not discussed. The exception is a minority suggestion from MDG in the final proposition from the SCEE to the Storting in the Utsira process. *“The Committees member from MDG emphasize that electrification of the Utsira High is only the second best solution. [...] Given that Norway in practice has found more oil and gas than we can produce if we want to take into consideration our part of the global climate-responsibility and our reasonable share of total remaining global greenhouse gas emissions, the most responsible decision is to leave the resources at the Utsira High in the ground. To leave these resources in the ground means that we will refrain from supplying the atmosphere with emissions equivalent to 20 to 50 times more than what the emission abatement achieved by electrification.”* (Innst. S 237 (2013-2014), p. 3). Other than this, the focus is strictly on emissions as the problem. Not even in a section in the second report on *“Alternative measures for emission reduction”* (NVE & NPD, 2002, p.68-69), is the possibility of leaving the fossil fuels in the ground considered.

My informants do however show a nuanced view of this. Friends of the Earth Norway is in general skeptical to electrification, due to an increased pressure on building new hydro- or wind-power and transmission lines, i.e. damaging unspoiled nature. They are also against opening up new oil fields, both due to “traditional” environmental concerns and a concern for the climate. My informant Audun Johnson reflected on the issue of power from shore in relation to climate concerns. If one is against the project and extraction of the oil to begin with, but loses the battle, should one then jump to the secondary argumentation and work to get the field electrified?

My other informants seemed to agree on this subject. There is both a need to limit and slow down oil extraction, *and* secure that emissions from the extraction is as low as possible. This means that while the ordering of electrification is as a solution to limiting emissions, there is no perceived conflict with the ordering of the climate problem also as extraction. As Ola Elvestuen put it when I met him, “*It is another discussion*”.

The informants nuanced view of the problem and the statement from MDG can also be seen as part of a trend towards seeing Norway as responsible also for the exported fuels.

### **5.1.2 Solution to a political problem**

The analysis and close reading of the documents has revealed that power from shore also becomes a solution to a political problem, namely meeting political climate goals and commitments. “[*T*]here is still a gap in 8 million tons between the expected emissions in 2020 and the Climate Compromise goals. If no new measures are put in place, both to limit new emissions and reduce existing emissions, the goal will not be met. Electrification of the Utsira High is one of the measures that can limit emission growth towards 2020” (Doc. 8:58 S (2013-2014), p.1). Electrification of the Utsira High now becomes a solution to meeting the agreed goal. It is more than cutting the emissions; it is also an answer to a *political problem*. As shown in a previous chapter, the election in 2013 effectively included all major parties to the Climate Compromise goals. The importance of political commitments and goals is also evident in the report series. Both the Kyoto-commitments and domestic goals are part of the ordering of power from shore. In the 2002 report, electrification becomes as a very costly contribution to the Kyoto commitment.

As the political emission targets have increasingly become more focused on domestic measures, the possible solutions has been limited. The flexible mechanisms that are part of the Kyoto-protocol and the EU ETS cannot be used. While these mechanisms allow Norway to buy its way out of the problem, the Climate Compromise eliminates this as a possible solution. This strengthens power from shore as a mitigation strategy. In the Utsira process, there is a strong focus on the climate compromise. The presence of the domestic goals and the problems they raise becomes very important. “*It will be very difficult to reach the emission goals if we do not have an area solution on the Utsira High*” (Innst. S. nr. 237 (2013-2014), p.2). Power from shore becomes a solution to the political problem posed by the domestic reduction goals.

My informant Kaski from ZERO supports this view. She told me that she thinks the Climate Compromise was important for the Utsira High and that domestic goals have been a driving force.

This confirms Tellmann's (2000) statement that carbon emissions can be both a political problem and an environmental issue. What the environmental issue or political problem is, has been an empirical question and might be different for other abatement measures.

## 5.2 Spatial orderings

As a point of departure, the climate problem is definitely a global challenge. This is true whether the problem is defined as extraction, emissions, both or something else. Since power from shore is supposedly a solution to this challenge, one should anticipate that this is also how it is ordered; in a global ordering where "the planet's best" is upheld.

The analysis of the materials has identified that in addition to the global ordering; there are three spatial orderings, the local, domestic and international, that can be told apart. While they all rely on and are part of a global ordering, the rationales and their implications are quite different. This will be explored in the following subchapters.

### 5.2.1 Local, domestic and international ordering

The local ordering is where the continental shelf, a petroleum field, a platform or an area in the sea is the limitation. It creates a boundary where everything outside the local is erased from view. The following quotes are examples of this kind of ordering. In the second report from 2002, the authors discuss the potential for "*Reduced emissions at sea*" (NPD & NVE, 2002, p.14). Here, the continental shelf is isolated from everything else. The same ordering is also found in the first report. "*If the continental shelf is evaluated in isolation, the reduction will be between 20 and 40 percent*" (NPD & NVE, 1997, p.9).

This ordering is used by the petroleum companies when calculating abatement cost. While the CO<sub>2</sub>-tax is a domestic tax, and the European emission quotas are international, at the project level they are evaluated within a local ordering. There is a fiscal boundary between the local and what is outside. Within this local ordering of power from shore, where the electrical energy comes from, and the potential emissions from its production, becomes irrelevant - as long as it is outside the local accounting system. It is the point source emissions that are the subject for calculation. If power from shore can eliminate emissions from a

platform, then that is the possible reduction. The possible emissions from the power source are not part of the view. The local ordering creates a clear boundary to what is outside.

This is of course justifiable. Expecting that the oil companies have to assess the “whole picture” seems unreasonable. To make a decision about the mitigation project, the companies compare the local abatement cost to the cost of emissions (Statoil, 2014). If then the abatement cost is lower than the emissions cost, it will be profitable to invest in the mitigation project. The outside world is not important.

This can be seen in the 2002 report that discusses reduced emissions at sea, where “*all scenarios give the same emissions reduction*” (NVE & NPD, 2002, p. 13). This is opposed to “*net emissions reductions*” (p. 62), where the origin of the electrical power leads to different results in different scenarios. The latter one is a global ordering, where there is no difference made as to where emissions occur.

The second spatial ordering of power from shore that is evident in the material is the domestic. In the third report, “*Electrification of the continental shelf is driven by a desire to reduce emissions in Norway*” (p.53), and “*the interface for the calculations is where the gas leaves the Norwegian pipelines*” (p.46). These are but two examples. From the previous chapter, we also remember that power from shore became a solution to the domestic climate goals. These domestic goals are important for the ordering of power from shore as a domestic climate mitigation strategy, where action has to be done inside Norway. This can also be seen in this quote from Terje Aasland, energy-political spokesperson for AP. “*I am happy that a unanimous committee is following up the Climate Compromise that the Storting has made about cutting emissions in Norway*” (AP, 2014).

The 2008 report includes a scenario with a dedicated gas power plant and the platforms. This scenario “*makes it simple to estimate the [...] CO<sub>2</sub>-reductions within Norway’s border*” (NPD et. al., 2008, p. ii), and also the total emission reduction, i.e. the global. There is a distinction made between “*the continental shelf*”, “*within Norway’s boundaries*” and “*abroad*”, when accounting the emissions (p. ii). These can be seen as different orderings, the local, the domestic and the global.

My focus here on the word domestic is important, and it must not be confused with national. The *national* is not always strictly domestic. As shown in the previous chapter, the

Kyoto-protocol is based on national emission accounting systems, but as discussed, it allows for emissions in other countries to count towards a nations emission account, this is what I have identified as the *international* ordering. This is separate from the global in an important way. While in a global ordering of climate change the problem and its solutions are “planetary”, in the international it is international, i.e. among or between nations, and usually accompanied by a focus of cost-efficiency.

In the 2002 report, “*calculations indicate that the abatement cost will be high compared to today’s CO<sub>2</sub>-tax, anticipated international quota price and other measures in SFT’s abatement analyses*” (NPD & NVE, 2002, p.7). The international quota price is part of the international ordering where power from shore to Norwegian oil field becomes a less desirable option for mitigating climate change. The national accounting systems and flexible mechanisms associated with the Kyoto regime puts power from shore in this international ordering.

### **5.2.2 Spatial orderings at the four points in time**

There are multiple ordering logics at play at each of the four points in time. The close reading of the documents has however shown that one of the orderings is stronger than the other at each point. It is the ordering that is used when concluding the reports or the political process.

In the 1997 report, it is the global ordering that is the most important. Yes, power from shore is seen as a measure to bring down domestic emissions, but the calculation premises are global. This is evident in the way the import-scenario is discussed, as emissions from imported electricity are accounted in the same way as the emissions on the continental shelf. No difference is made between the domestic and abroad.

In 2002, this changes a bit. The Kyoto protocol seems to have made an impact, and an international ordering has become more prominent. “*In a Kyoto and Gothenburg context Norway has committed to reducing national emissions, but our neighboring countries will be debited with emissions as a consequence of export to Norway if we import power to the continental shelf*” (p. 13). Here, one can see how the (inter)national accounting systems and ordering has made its way into the sensemaking of power from shore and that the Kyoto protocol of 1997 put an increased focus on the national emissions accounts. This shows that



while the official accounting systems are based on national accounting, the ordering is international, where cost-efficiency between nations is the norm.

In the third report from 2008 the domestic ordering is more prominent. This is especially related to what is known as scenario 3. As shown, this scenario reflects the effect of increased power production abroad in increased power price rather than through increased emissions. By using arguments related to the European cap and trade market, a domestic ordering is strengthened - the focus becomes what happens within Norwegian boundaries.

The scenario based on power from the market and makes for “*computationally simple assumptions and potentially low abatement costs*” (NPD et. al., 2008, p.39). The assumptions are simple because there is no need to understand where the power comes from, and hence include stipulated emissions from it. Every ton of CO<sub>2</sub> removed on the continental shelf counts and the total becomes higher, and hence the abatement cost is lower. This shows that the local ordering can fit well with the domestic ordering. This scenario also strengthens the boundary between “*within Norwegian boundaries*” (p.ii) and “*abroad*” (p. ii).

In the report, the global total emissions for this scenario is only determined by the Kyoto-commitments and the cap-and-trade EU ETS market. In the scenario, one includes “*emissions commitments and trade*” (p. 29). This means that whatever we do in Norway is seen not to affect the global. This ordering of power from shore places it outside a global ordering. The global emissions are seen as constant and power from shore is placed on the side of it. There is evidence of conflicting meanings concerning this scenario. “*There are however a divide in perceptions about if the calculations of abatement cost in scenario 3 is as relevant as the calculations as scenario 1 and scenario 2.*” (p. 54). Supposedly, this was argued by SFT (Martiniussen & Løvås, 2014). Ultimately, in the third report, there is a division between the domestic and the international orderings.

After reading the chapter on problem orderings, it might not come as a surprise that it is a *domestic* ordering that is strongest in the Utsira High debate, because electrification of the Utsira High became a solution to the problem posed by domestic CO<sub>2</sub> reduction targets. Through the Climate Compromise, the Norwegian climate politics are focused on domestic cuts and emission abatement measures. In general in Norway, there can be seen an increased skepticism to the international flexible mechanisms and the effect they have. There are at least raised critical questions and critiques about it (Martiniussen, 2013).

Oskar Grimstad from FrP made an interesting comment about the climate effect of electrifying Utsira where he uses the ordering international to challenge the domestic. This was during the final discussion in the Storting. “*The climate effect, however, will be positive for Norway, but it must be allowed to question the cost-benefit and if this would have greater effect somewhere else, maybe in Europe, that would have reduced the global emissions*” (Stortinget, 2015), he states. Grimstad draws on both the domestic (by claiming that it will be positive for Norway) and international (through international cost-efficiency) ordering, and links this to the global. His statement signals that it is the domestic ordering that has made him agree to the proposal, but at the same time challenges it by drawing on an international ordering.

The local also becomes more important in the Utsira case. There is a focus on the sheer amount of point source emissions, and since Statoil and the business-economic calculations are part of it, the local ordering is strengthened.

These findings connect well with the previous studies of Norwegian climate politics. Hovden and Lindseth (2004) showed how the international cost-efficiency ordering (what they call *global thinking*) became important in Norway through the 1990s, and Tellmann (2012) states that that around and after 2008, there was again a focus on the domestic emission targets. This is also what one sees in power from shore, but that the distinction national/global that Hovden and Lindseth use, is maybe not fine-grained enough for our inquiries about power from shore.

### **5.3 An economic expert ordering**

The economic aspect stands out as one of the main parts of what power from shore becomes in Norwegian climate politics. Even though this is not surprising, it is very evident.

From the first report, cost is seen as very important. When commissioning the first report, the government (on behalf of the Storting) commissioned an “*overview of the energy amount and cost of using power from shore to supply the oil-facilities in the sea*” (NPD & NVE, 1997). The technical aspects included in the reports seems mostly to be the basis for later economic calculations, but also, admittedly, a study of the feasibility to understand what parts of the continental shelf are possible to electrify “*practically and technically*” (p. 3).

This means that the most desired or important expertise is that of those that can calculate the cost of power from shore. The cost calculations that are done are called abatement cost calculations, and the results derived from the assessment are commonly referred to as the *abatement cost*<sup>22</sup>. The abatement cost is usually presented as unit cost of NOK per ton CO<sub>2</sub> emission, by dividing the calculated net cost on the possible emission reductions<sup>23</sup>.

The overall impression from the reports is that the abatement cost is the most important part of power from shore. Most of the content leads up to the calculations, and the reports are concluded with remarks about the abatement cost. Besides the commissioning of cost overview in 1997, the authors of the 2002 report clearly state that “[t]he main goal for this study is to derive the abatement cost of CO<sub>2</sub> and NO<sub>x</sub>” (NPD & NVE, 2002, p. 58). In the third report, the opening sentence in the summary is “*New calculations show that the abatement cost of electrification of existing installations on the continental shelf is from 1600 NOK per ton and up*” (NPD et. al., 2008, p. i), effectively setting the agenda for the report.

In the following two chapters we will investigate how this focus on abatement cost is ordering power from shore and how this ordering is facing challenges. Then, we will turn to the expertise that takes part in this ordering and the mandated power that they have. In the last subchapter, the limits of expert orderings are discussed.

### **5.3.1 Abatement cost as a tool for comparison**

Through the calculation of abatement cost, the CO<sub>2</sub> emissions from installations are made comparable to other abatement measures. Donald MacKenzie (2009) has studied the emergence of carbon markets and how emissions are *made the same* in such markets. Through the calculation of abatement cost, electrification is *made the same* as any other measure, in the name of cost-efficiency. The 1997 reports state that the calculation of abatement cost allows for comparison between both scenarios and to other abatement measures within the oil sector and in other sectors. It is “*to give a better indication of the cost-efficiency*” (NPD & NVE, 1997, p. 3). The report was released in the same year as, but prior to the Kyoto-agreement and protocol. In the second report, electrification is compared to the flexible mechanisms in the Kyoto system, and the conclusion is clear: it is a “*very costly*

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<sup>22</sup> The Norwegian word is *tiltakskostnad* or *tiltakskost*

<sup>23</sup> This is a simple presentation of the abatement cost. The actual calculation is admittedly a bit more complicated.

*measure*” (NPD & NVE, 2002, p.9) to reach Norway's Kyoto commitments, especially when considering the possibilities for using the Kyoto-mechanisms. The third report further state this: “*Calculation of abatement cost is a useful tool for evaluating how national emission obligations can be met*” (NPD et. al., p.38, 2008). In the Utsira process, Statoil compares their calculated abatement cost to the cost of emissions to decide on the investment.

The materials show how abatement cost becomes a tool for comparison where the end goal is cost efficiency. The notion of tool is here is not an unfamiliar notion within the field of STS. The term has been used to describe carbon markets as *tools of abatement* (MacKenzie, 2009) and for *tools of knowledge* (Becker & Clark, 2001) within bureaucracy such as reports, protocols and questionnaires, among others. Kristin Asdal uses the term *tools of democracy*, for *technologies of politics* for public participation - technical and material arrangements that enable and shape politics (Asdal, 2008). I've used this notion to point to the varied assemblage of practices that is used to govern, and how abatement cost is such an assemblage. The notion is related to the art, tactics and techniques of government, from Michel Foucault (2007) famous lecture on *governmentalité*. For power from shore, the use of abatement cost as a tool for comparison usually results in it being cost inefficient and thus not a preferable option to mitigate emissions. For the politicians, it becomes a tool for comparison that lets them evaluate the measure up against other measures.

This is not a sole example in Norwegian climate politics. The abatement cost and cost-efficiency ordering was e.g. also a very important part of ClimateCure2020, a Norwegian governmental white paper (Klimakur, 2010). The report lists a huge amount of possible abatement measures, according to their abatement cost - lowest to highest.

This ordering of power from shore, by making it the same as any other abatement measure, hides all the peculiarities that are part of it. Power from shore is put side-by-side with energy savings in buildings, public transport initiatives and taking the bike to work. But the evaluation criteria become strictly economic, quantitative. The qualitative differences are hidden from view. I would argue that such differences can be important. Power from shore is different than other measures. An example is that it is a measure aimed at the petroleum sector, which is the biggest (and growing) emission sector in Norway and very profitable for both companies and the state. Another example is in the paradox of using “clean” energy to pump up oil. A calculation of and focus abatement cost to some extent seems to hide ethical qualms.

### 5.3.2 Abatement cost under attack

*“It is often claimed that when estimating the abatement cost, the benefit side is harder to quantify than the cost side. [...] It is a fact that not all benefits can be quantified, and this is also the case here”* (NVE et. al., 2008, p. 46). This quote is from the 2008 report, and to handle these limitations, the authors has included a table where “*un-priced*” (p.46) effects are presented. There is an indication as to whether these effects would pull the abatement cost either up or down. “*Compared to the report from NVE/NPD in 2002, the calculations in this report includes more cost and benefit elements.*” (p. v), it is stated.

I read this as a defense of the abatement cost calculations. It is obvious that the calculations has been doubted as a good tool for making a decision about power from shore, and that the authors try to increase its credibility by including more of these so-called cost and benefit elements. This points in a direction of cost-benefit-analysis and it suggest that much, if not everything, can be reflected onto the abatement cost. The authors state that it is hard to *quantify* (i.e. put a price on), but have no problems with relating the consequences to the abatement cost. These consequences include factors such as the alternative value of the project capacities (profitable project might be put on ice), effects on Health, Safety and Environment (HSE), extended production due to lower operating expenses and other environmental effects on flora and fauna. This displays the limitations of the abatement cost calculations, but at the same time try to legitimize them through the reference to how the consequences affect the cost. It suggests that what we should relate to is the economic value of HSE and the flora and fauna.

The difference might seem small, but there is a distinct difference here. In an ordering of power from shore in a cost-effectiveness, or cost-effect<sup>24</sup>, ordering, the qualitative is left outside, and can be dealt with outside the economic valuation. With cost-benefit ordering, where “everything” can be translated from economic externalities to economic realities, this is not the case.

In the official guide from the Ministry of Finance (MoF) on socio-economic analysis (2005) this distinction is presented. Cost-benefit analysis is “*A systematic mapping of the advantages and disadvantages of a given measure. Benefits and costs are evaluated in*

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<sup>24</sup> Cost-effect is understood as a link between cost, and what comes out. Here, it is understood as the relation between how much you have to pay and the outcome (amounts of abated CO<sub>2</sub> emissions), without taking “everything” into account.

*kroners as far as professionally justifiable” (MoF, 2005, p. 10). Cost-effectiveness analysis is “A systematic valuation of the costs related to different measures that could reach the same goal. The costs are valuated in kroners, and one seeks to find the cheapest way to reach a given goal” (p.10).*

It is not given that it can be done, or that it is desirable, to evaluate everything related to power from shore in terms of a monetary cost. Money and economics have become very important in today's society, and it is understandable that we want to get the most out of our shared money, but sometimes other values, that are indeed hard to “price”, should maybe be left out.

Heikki Holmås has told me that one of the strategies he used in the Utsira High process was to attack the abatement numbers that Statoil presented. Expertise from ABB, a supplier of cables and equipment for electrification, was part of this. The internal interest rate, or the discount-rate, was one of the parts that Holmås was skeptical about, because from a societal perspective, the rate that Statoil use in their business calculations might not be valid. He told me that he is concerned with the cost, and that it is right to discuss it, but he sees them as a bit short-sighted. For him personally, there are other concerns that are more important. These are concerns about such things as lock-in of high emission sources, rigging the end user for the renewable society and that for the European and international cap-and-trade regime we need to cut so that the cap can be set even tighter.

This tells me that while the experts and their (economic) orderings are important, other orderings and values are maybe just as important.

### **5.3.3 The experts**

I have argued that abatement cost is one of the main characters in the materials and that expertise is a big part in this ordering. Here, I define expertise as the ones that are considered to have the “right” knowledge, who produce this knowledge and are hence given the authority or mandate for ordering power from shore. The experts are the people or organizations that take part in this ordering. By investigating who the experts are, the ambition is to also investigate how these experts are ordering.

In the report series, the relevant expertise is easy to identify. As noted, the strategy has been both to look *at* and *through* the reports. If we take this quite literally, and basically try to “judge the book by its cover”, we see who the authors are, the trusted expertise.

The logos on the cover of the reports are representing the authors. In the two first reports, NPD and NVE are the (only) authors. This leaves us to think that the relevant expertise within public administration on power from shore is found in these departments. In the 2008 report, two more logos find their ways to the front page. One is from the Petroleum Safety Authority Norway (Ptil) that until 2004 was part of the NPD, and hence was also present in the two prior reports. The fourth logo and author, is new. It is the SFT<sup>25</sup>. This third report, then, adds pollution expertise to the author-list. This leaves the impression that the topic has moved towards that area of expertise. Also, it indicates that the knowledge within might be more “solid” than the two other reports, by including more expertise. On the third time of updating the reports, the ambition might be to produce knowledge that does not need a new update for a few years. Another aspect that points in this direction is the thickness of the reports. The first one totals at 63 pages, the next one at 76 and the last one at 99.

In the Utsira process, the expertise is more diversified. To begin with, the most relevant expertise is the oil companies themselves. In an oil field development, it is the companies that are in charge of evaluating, calculating and provide the needed documentation and plans. This also goes for power from shore. Statoil, as the project leader and operator of Johan Sverdrup, thus are the experts from the start, and power from shore becomes a business decision. For Statoil’s experts it would be naturally to order power from shore as a local abatement measure that has a strict focus on the climate problem as emissions from the extraction, not the extracted fuels themselves.

In early December, KrF representative Kjell Ingolf Ropstad, posed a written question to The Minister of Oil and Energy Tord Lien, asking what he did to “... *signal political impatience [...] include the Storting [...] and [secure] that an overall socio economic assessment was to be done?*” (Document 15 S. 160 (2013-2014)) This signals both the impatience from the Storting towards the Government and the importance of economic calculation, and the trust that is put in those numbers.

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<sup>25</sup> SFT is now known as the Norwegian Environment Agency (MD)

This also suggests that there is unrest with Statoil as a knowledge producer and their ordering of power from shore. The use of the word socioeconomic suggests that the anticipated business-economic calculations from Statoil are not enough for the Storting, or at least Ropstad. In a mid-January press release the OED stated that the expected cost of the UHPH was now “*many billion*” (OED, 2014) more than previously estimated. In the wake of the OED press release and the speculations on the UHPH costs and solution, the opposition was starting to talk about external and independent assessments of the estimated costs. The estimates were doubted. “*Tord Lien must immediately give access to the basis for the decision making*” (Rønning, 2014), said Fredric Hauge leader of ENGO Bellona.

In the end, Statoil released a cost calculation report, but much of the report had been censored (Statoil, 2014). Statoil’s reasons for keeping numbers private are said to be commercial, but in the media, this secrecy is also seen as an indication for that the oil companies and NPD were keeping information from the Storting (Haugstad, 2014).

In April, Add Energy released a study commissioned by Energi Norge, stating that the abatement cost could be as low as 40 NOK per ton (Add Energy, 2014). Statoil commented on the new numbers, claiming that they are old and that they have no reason to doubt their own numbers. Add Energy represents a group of experts that take part in ordering power from shore - the “independent” researchers. These are consultancies and research centers, and are ordering power from shore in the same way as Statoil. Also, public administration and its expertise in the Utsira process, especially through old reports on electrification.

Suppliers of electrification equipment are also experts in the Utsira case, and have amongst other things been invited to the Storting to participate in hearings. The material suggests that, together with the independent researchers, they have been important as a counterweight to the knowledge produced by Statoil. ABB, a company that amongst other things deliver cables and equipment that can be used for power from shore, has been prominent. My informants Holmås and Kaski tells me that ABB has strategically been used as a knowledge resource and expertise to be a corrective or counterforce to Statoil. Kaski from ZERO tells me that it was problematic for ZERO to discuss abatement cost because “*we have no way to verify the numbers that Statoil presents [...] and we don’t have much credibility*”. ABB on the other hand, has this credibility. ABB is a supplier of equipment to the Johan Sverdrup project, and has therefore mostly discussed on cost and other aspects in general terms.



### 5.3.4 Expert power

The quote from Kaski above points us in a direction of the power relation between the oil companies and the Storting. The Storting makes their decision about a petroleum field based on knowledge produced by the oil companies. This gives the companies the power to define the issue at hand. This expert power relation was part of the Utsira debate.

Because the three smaller fields on the Utsira High had to prepare for electrification and the politicians had stated a goal about it in the climate compromise it seemed like the desire for electrification was strong. But was this a demand? At question time in the Storting 5th of February 2014, this question is addressed. *“Does the Minister [Tord Lien] see that it will look like oil companies can pressure the state into dropping environmental demands if the demand for full electrification is waived?”*, Heikki Holmås (2014) from SV, asked. Among other things Lien responded that *“The Storting has not decided, as it is claimed here, that the Utsira High shall have power from shore“* (2014). The question from Holmås is interesting because it shows unease with the power relation between the Storting and the licenses.

*“Now we will see if it is the state or Statoil that controls Norwegian environmental politics”* (Revheim, 2014). This is a statement from ENGO Young Friends of the Earth Norway after the concept choice was presented by Statoil in mid-February. It is an obvious rhetorical move, but yet interesting. Fredric Hauge from ENGO Bellona asks the Storting to show Statoil *“who is in charge”* (Estep, 2015). Of course it is the Storting that has the institutionalized political power, but is it necessarily so that they are the most powerful. The paragraphs above suggest that the oil companies have some power over the Storting. At least, they have the power of setting the ordering of the abatement measure.

Another power-related aspect in the debate on power from shore to Utsira was *when* the Storting could (or should) exercise their power. The normal point of intervention for the Storting is the PDO. In a seminar held by the Standing Committee on Energy and Environment, on the 10th of March, Statoil said that they should have gotten notice from the OED *“a month ago”* (Quale, 2014) if they were to realize full electrification of the Utsira High. The question of whether or not the intervention with the private proposal was timely or indeed necessary was discussed both before and after the decision to demand power from shore was made.

### 5.3.5 Limits to ordering

Compared to power from shore as presented in the report series, electrification is not as neat in the Utsira High process. Where the reports present feasible technical solutions, scenario-based cost calculations and clear conclusions, the Utsira High process is much more complex. This is important to notice. As has been shown, the political situation, cost calculations and power relationships are complex parts of what electrification becomes. Also other concerns, such as employment in the oil sector (which at the time was facing major cuts due to low oil prices) and HSE has been part of the complex picture.

Electrification seems a lot simpler - not to say neat - in the reports. The complexities are hidden behind assumptions and calculations. Brian Wynne has studied the natural scientific framing of the climate problem - making the climate safe and manageable - and how this puts the outside world in brackets (Wynne, 2010). Wynne is concerned about how the framing shapes the public meaning of *the climate problem*, but is also an interesting study of what is left out - what is “*erased from view*” (Wynne, 2010, p. 289).

According to John Law (1994), different ways of ordering might create apparent *pools of order*, which are the product, outcome or effect of a lot of work. I would argue that to some extent, the reports are creating such a pool, by erasing other orderings from view. One must go outside the reports to find orderings that might dissolve them. Following this line of thinking I would argue that there is more ordering, but less order, in the Utsira documents.

*“Many of us have learned to want to cleave to an order. This is a modernist dream. In one way or another, we are attached to the idea that if our lives, our organizations, our social theories or our societies were ‘properly ordered’ then all would be well. And we take it that such ordering is possible, at least some of the time. So when we encounter complexity we tend to treat it as distraction. We treat it as a sign of the limits to order. Or we think of it as evidence of failure [...] The social world is complex and messy [...] this book is about ordering rather than order. And it is about heterogeneity rather than purity”* (Law, 1994, p.4-5). Leaning on this quote, I would argue that the heterogeneity shown in the Utsira process is not problematic, but rather that it is expected and that it is the purity of the reports is the “abnormal”.

STS scholars has stated that the separation and distinctions between the natural and the social (Callon, 1986), human and non-human (Latour, 1993), science and technology (Asdal

et al., 2007), and science and politics (Jasanoff, 1990) are false. Yet, experts are often called upon to help political decisions - to find the “right” or “independent” answer. My research and inquiries into power from shore has shown how there are limits to the ordering that these expert reports bring, and that there are multiple answers, that all can be “right”. I believe that there is indeed room for the experts and the knowledge they produce, but there must also be an awareness of what they, and the work they do, erase from view.

## 6 Reflections on materials and methods

The choice of the main analytical concept in this study, *ordering*, has been an iterative (and somewhat cyclical) process between the materials and the STS literature. In terms of research methods, the analytical method has been part *inductive* and part *deductive*. The end choice of ordering as a governing idea for the thesis was then made in connection to both the STS literature, the reviewed literature on Norwegian climate politics, the materials and the sites. The main research question is an open question, and hence deserves an open concept. I believe that ordering has proven its usefulness in this study. It has worked well as both a thinking tool in the study and as a structuring device for this thesis.

In the previous chapter, one of the findings is that there are limits to the ordering of power from shore that the expert reports do. How is this thesis different then? Have I not tried to impute patterns and orderings - tried to make the world simpler? At first glance, this might seem problematic, and make it challenging for me to state that the results and findings that I have presented here are real, or trustworthy.

I will argue that the results presented in this report are solid, but they are indeed the result of a lot of work. As part of this work I have made choices, and the story I have told is but one of many stories that can be told about power from shore. This is in part also one of the main parts of this thesis work. Electrification can be ordered in many different ways, and the main research question has answers, not an answer.

To meet the challenge, I have been inspired by the strong programme (Bloor, 1973), within Sociology of (Scientific) Knowledge (SSK) and its principle of reflexivity - that the study of knowledge also must be applicable to those who study knowledge. STS researchers has shown how the person that does scientific work is not a modest witness (Haraway, 1997; Shapin & Schaffer, 1985), but all witnesses are human and fallible (Berg, 1998). I am not a modest witness - I am interested and engaged. But I have made an effort to be symmetric, reflexive, open and unbiased in my studies and my accounts of power from shore. But then again, it would be dishonest of me to state that nothing is erased from view.

# 7 Summary and further research

This thesis set out to understand what power from shore is by pulling on resources from the STS field and from STS scholars. In particular, it has been inspired by John Law (1994) by using the term *ordering*. Ordering has been a main concept and a way to impute patterns of sensemaking on the empirical material studied.

The main material used in this thesis has been bureaucratic documents related to power from shore at four points in time. These points are the release of a series of reports from the NPD and NVE, dated in 1997, 2002 and 2008. A political process on electrification of the Utsira High in 2014 is the fourth point. In addition, media sources and supplementary interviews have been used.

The main question of the thesis has been: What is power from shore? This has been answered by studying what it is made to be - the ordering of it. The empirical material and previous studies of Norwegian climate politics has turned the attention to three specific aspects. These are the problem that electrification becomes a solution to, the spatial ordering and the expertise that is involved in the ordering.

Power from shore is found to be a solution to the climate problem, and this problem is defined strictly as the carbon emissions from the extraction facilities. A different view would be to say that the problem is also that there is too much extraction, and that emission from the extracted and exported fuels is a problem. The paradox of cutting emissions from extraction of fuels, while one knows that the emission from use of the extracted and exported fuels are tens of times higher, is avoided by strictly focusing on the emissions. While power from shore is in an ordering with strict focus on the emissions from the extraction, my informants from the Utsira process have shown that they identify the problem also as the extracted fuels, but that the rate of extraction is considered to be a separate discussion. A second problem that power from shore becomes a solution to is a political problem, namely reaching the political goals set for domestic emission cuts.

There no is doubt that the climate problem is global, or “planetary”. This study has identified three additional spatial orderings of power from shore as a climate mitigation strategy. These are termed local, domestic and international.

The CO<sub>2</sub> tax on the continental shelf is important in the local ordering, where the electrification projects are seen in isolation from the world. It is the point-source emissions that become important. Emissions from the potential power source are not part of the account. Because the companies are taxed according to their local emissions, there is a clear boundary set between the platforms and the outside world.

The domestic ordering of electrification as an emission abatement measure orders power from shore especially in accordance to domestic CO<sub>2</sub> emission goals. The reduction goals in the political Climate Compromise of 2008 and 2012 are important in this ordering.

The international ordering is related to the accounting scheme of e.g. the Kyoto-protocol that allows for paying for emission cuts abroad to be counted towards national accounts. The national is not necessarily domestic, because the focus is on international cost-efficiency. Cuts should be done where it is cheapest among or between nations.

Alongside emissions, abatement cost is one of the main characters in the material. The abatement cost is calculated in NOK per ton CO<sub>2</sub>, and becomes a tool for comparing different abatement measures to each other. The goal is cost-efficiency. This ordering of power from shore effectively hides the peculiarity that is part of it. "*Cost-efficiency became, so to say, the gold standard whereby measures were evaluated*", Tellman (2012) states about environmental policy in Norway. Making power from shore the same as any other measures can be problematic, as it disqualifies the quantitative differences and to some extent also its ethical qualms.

There are many experts that take part in ordering power from shore. Public administration, oil companies, independent researchers and equipment suppliers have been identified in this story. The power relation between these is part of what power from shore becomes.

The study has also shown that power from shore is complex and messy, and that the ordering as done in expert reports and, indeed, in this thesis, cannot keep everything within view - it is simplifications. There are limits to ordering. This is not to say that the studies like this one and the reports are useless. They provide valuable insights, but we must be aware of their ordering of the world, and what they "*erase from view*" (Wynne, 2010, p.289). There is not one right answer, but multiple answers to the research question.

So, what is power from shore? My study has shown that at all four points in time it is a measure to solve the problem of excessive emissions of CO<sub>2</sub>. It is also different at all four points. In 1997, it becomes a cost-inefficient abatement measure to mitigate global emissions. In 2002 it becomes a cost-inefficient measure to meet the national commitments in the international Kyoto-regime, especially compared to the flexible mechanisms. In 2008 it becomes a cost-inefficient measure to bring down domestic emissions, but within a European electricity and emission quota market. Finally, in 2014, power from shore becomes a necessary measure to solve the problem posed by domestic emission reduction targets. The Storting ended up ordering the companies to electrify.

In the end, this study of a single abatement measure tells a bigger story about Norwegian climate politics. And what has become evident in this story, is that the underlying premise is continued extraction of fossil fuels from the continental shelf. I have shown how the possibility of stopping or not starting production is not part of the orderings, even though it is a rather simple solution. There are however trends that point to a shift of focus towards also seeing the extraction of fossil fuels itself as problematic.

Further research is needed to fully understand power from shore, and maybe to try and understand what it might become in the future. I suggest that studying the practices of abatement cost calculations can be an interesting entrance into the inner workings of climate politics and power from shore decision making. If drawing on resources from the emerging field of valuation studies (Helgesson & Muniesa, 2013), I believe that this can provide important insights.

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