The future of Energy Investments:
Analyzing the Impact of Climate Policy on Norwegian Energy Companies

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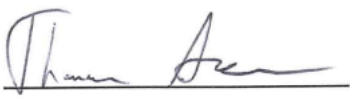
Preface

With this Master´s thesis, I conclude my master´s degree in International Business at the School of Business and Law, University of Agder.

The thesis focuses on how the investment strategies of energy companies in Norway are affected by climate-related regulatory policies. The inspiration for writing a thesis comes from my personal interests in the energy sector and the importance of climate change and its risks. Organizations must adapt to new legislations and show responsibility in the age of decarbonization to save the planet. Collecting, analyzing and utilizing data received from various energy companies and government reports has been complex and challenging but most of all interesting and extremely valuable.

The thesis has provided me with a more comprehensive understanding of the energy sector in Norway. The effects of climate legislations have shown to be incentivizing sustainable activity and investments toward renewable energy sources for Norwegian energy companies. Yet, the research has unveiled that a lot of work remains to be fully adopted toward a sustainable future. Having gained more profound knowledge in the theme will undoubtedly be beneficial for my future professional career moving forward to 2050 and a net-zero planet.

I would like to express a sincere appreciation to my supervisor, Professor Andreas Erich Wald, for his involvement, critical thinking and professional input. I would also like to thank all the informants who contributed their valuable time and expertise, answering all my questions in a professional yet positive manner. Finally, I would like to thank all my friends and family for believing in me and supporting me throughout my Master´s degree and in the writing of this Thesis. Your belief has been an invaluable source for strength and motivation, thank you.



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Kristiansand, 31. May 2024

Abstract

Climate policies have shifted how Norwegian energy companies operate, with climate change mitigation, adaptation and sustainability playing a more central role in daily operations and strategy. Renewable energy sources have emerged in the context of climate change and will continue to persist in the future. Due to the national income from conventional oil and gas production, the Norwegian government is flexible and adaptable to the energy transition. A future of renewable energy sources will help circumvent GHG emissions and biodiversity loss and increase energy security for Norway.

The motivation for the thesis has been developed through the increased focus on sustainability and personal interest in the energy sector. Existing literature delves into the various threats that conventional oil and gas production poses to the climate and how the great responsibility of reversing the environmental effects lies on the sector. Indicators from the EU present that Norway is a great candidate to lead the transitional journey toward net zero, making it a match to explore further in this thesis.

This master thesis aims to identify how the measures implemented by the Norwegian government impact the oil and gas and renewable energy companies and how it has effect on investments and long-term strategies. The thesis is looking to identify this by answering the research question: ***"What are the effects of climate-related regulatory policies on the investment behavior of Norwegian energy companies?".***

The thesis will focus on content analysis with a grounded theory approach, conducting in-depth interviews with informants having substantial responsibilities within the scope of the thesis. Based on various interviews from different companies, the aim is to critically discuss and compare interviews to industry reports and prior literature. Finally, shedding light on improvements and further research, as well as if the implications discovered during this thesis's writing might impact investments in the Norwegian energy sector.

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1.0 Introduction

Climate change and its threat to global prosperity have forced a global shift towards renewable energy sources. Governments emphasize strict climate regulations to minimize the consequences in a world more affected by natural disasters and extreme weather. Sustainable development has become one of the essential terms in the 21st century, and it is critical to gradually eliminate the use of fossil fuels in all stages of the energy supply to ensure a safe and sustainable future. Several national and supranational regulations and climate plans, such as the European Green Deal, REPowerEU, Fit For 55, and Climate Action Plan 2021-2030 have been established to mitigate the overall climate impact and aim to increase the share of renewables in the energy mix. For Norway to reach its goals, a significant change in investment strategies moving from fossil fuels to renewable energy is necessary.

Stricter regulations significantly affect energy companies due to the large share of extensive emissions. For the energy transition in Norway, an upscaling of renewable energy technologies, research and development and infrastructure is paramount. The current shift in the sector brings significant challenges to risk assessment, technological uncertainty and complex regulatory compliance and adaptation measures. In the upcoming decades, Norwegian energy companies have to steer through a shift in the energy mix. Stricter legislation and demands in the dynamic global energy market pose challenges and opportunities for Norwegian energy companies, and establishing sustainable, long-term investment strategies to stay competitive and achieve climate goals is paramount.

The role of energy companies in achieving the goals set by the legislation and achieving the climate goals are predominant. More research is currently needed on how climate-related regulatory policies affect the investment behavior of energy companies, particularly in Norway. Within the energy landscape in Norway, the oil and gas sector is mainly important despite an almost entirely domestic renewable energy supply coming from hydropower. First and foremost, the challenge is how companies can adapt to increasingly stricter national and supranational climate policies while maintaining Norway´s leading role in the global energy market, maintaining financial company positions, and achieving long-term sustainability targets.

EU-27 is currently leading the global race of climate transition among developed countries, responsible for only 6,7% of the global GHG emissions in 2022 (Statista, 2024b). The increased awareness of climate change, its effects, and the potential cost of not reacting in time has pushed governments to impose legislation to tackle the challenges and potential consequences (IPCC, 2022). Furthermore, it is calculated that investments toward energy to tackle the global challenge of climate change mitigation and adaptation will be annual $5 trillion by 2030 (International Energy Agency, 2021).

EU´s adaptation towards a more renewable energy mix has increased steadily since the early 2000s. Legislation and climate policies have ensured that renewable energy now accounts for a 15% average in 2018, up from 6,4% in 2000 (EU,2020). The urgency of the transition is underscored by the Paris Agreement, which was established in 2015 in the hope of reaching the ambitious goal of limiting worldwide temperature rise to under 2 degrees Celsius compared to preindustrial levels (EU,2020). Strong political commitment, stakeholder engagement, and clear organizational targets and adaptation are needed to implement renewable energy sources within Norwegian energy companies successfully. The economic factors that affect the success rate of renewable energy investments are linked to investment, production, operations and maintenance (Vani Mokan et al., 2019).

Norway has achieved its wealth by utilizing energy resources in an efficient way, resulting in the country being in a unique global position to achieve transitional goals. Since the early 1900s, rivers and waterfalls have been used for electricity generation and industrialization through hydropower energy. In 1973, Norway struck oil and developed one of Europe's leading oil and gas supply industries The regulations, market-based system, and strict laws regarding sovereignty ensured safe and efficient resource extraction and value creation for the Norwegian state, a standard evident in energy legislation and transitions for the future (Miljødepartementet, 2021).

The Norwegian government's goal is to reduce emissions by 55% going towards 2030 compared with 1990 levels, with a further reduction to net zero by 2050 (Miljødepartementet, 2021). Ambitious goals are followed by strict legislation, and Norwegian energy companies must embrace themselves for the green shift and how current investment strategies experience a shift moving forward. The EU's energy transition strongly affects Norway's position, becoming more

central in acknowledging the EEA membership (European Economic Area). The collaboration ensures total obligation from Norway to follow the rules set by the EU and includes participation in the EU's internal energy market, working closely with the EU on energy-related matters toward 2030 (NOU,2024).

The Norwegian Climate Action Plan 2021-2030 reveals how the government plans to restructure the framework of Norwegian businesses and industries to incentivize more sustainable technologies and ensure an efficient transition in the future. Accomplishing the climate action targets set by the EU will outweigh the long-term costs, facilitating sectors to collaborate and input one another. Acting reluctantly towards high initial investment costs toward GHG pricing, carbon tax and other transitional measurements by the government must be adopted and accepted as part of the change. Regarding relative profitability, the various energy companies in Norway will experience portfolio changes and new technologies will shift in new directions, unlike in the past (Miljødepartementet, 2021).

In 2020, Norway exported 87% of the produced energy, supplying 3% of the global LNG demand and accounting for 2,3% of the global oil production (Norwegian Petroleum, 2024a). In the later years, Norway played a crucial role in stabilizing and meeting the demand for energy in Europe, especially after Russia´s war on Ukraine (NUPI,2024). Besides exporting large amounts of fossil fuels, Norway has extensive renewable hydropower resources covering 88,2% of the domestic energy demand in 2022. Furthermore, wind energy is annually increasing and will play a significant role in the transitional journey, accounting for 10,2% of the energy mix in 2022 (SSB,2023a).

Norwegian energy companies experience a shift in current investment strategies. More companies commit themselves to sizeable capex investments towards renewable energy sources to support the transition and tackle climate change's effects. This presents both risks and opportunities to the companies. On one side, most energy companies depend on producing and delivering raw materials to cover production costs and profits. On the other hand, investing in and adopting renewable energy sources is necessary as the CO2 tax increases and EU ETS quotas are reduced annually. However, the future presents an uncertain picture of costs, maintenance, and governmental support for companies pursuing up-front investments in renewables. Moreover, the actions and measurements from the government are an essential

factor for risk-reduction and to provide safe, long-term investments for energy companies. As of 2024, there is still uncertainty regarding onshore wind tax, solar incentives, energy prices, grid capacity, and more coming towards 2030.

The research in this master thesis aims to investigate how climate-related regulatory policies influence the investment decisions of Norwegian energy companies during a time of uncertainty and energy transition in Norway. Various research highlights potential solutions and overall measures to achieve the climate goals and stabilize future sustainable energy growth, but not specifically toward how climate-related regulatory policies affect investment strategies in Norway (IEA, 2023). The research in this thesis is unique as the focus is on the Norwegian energy sector. More specifically, factors making the subject unique are the large oil and gas production, the independent energy system of renewable hydroelectricity, and the Norwegian governance system, which is steadily more influenced by the EU.

The motivation for the master thesis comes from the limitless opportunities, incentives, subsidies and drivers for change towards a sustainable future in Norway. The Norwegian development and transitional activities have come far compared to many other European countries. Nonetheless, uncertainty is flourishing coming toward 2030 and 2050 as policies haven't been fully adopted yet. (European Environment Agency, 2023). Based on this, delving into the challenges and opportunities of climate regulations imposed by the Norwegian government on companies in the energy sector gives the potential to uncover how companies change and adapt to improved sector-specific-fit legislation and how it affects their investment strategies. To explore the phenomena, responses from organizations affected by various regulations will be critical.

The approach will help get a more comprehensive overview and a practical, hands-on perspective of how strategies and investment portfolios change as the regulations shift. Analyzing the shift of investments and transitional measures of existing companies operating in mainland Norway and the Norwegian Continental Shelf will uncover valuable information about several critical factors for companies and bring efficiency measures across valuable vital categories. Uncovering how future companies should be embraced to be competitive in the dynamic Norwegian energy market might speed up the transitional journey towards a net zero 2050. The analysis can also help governmental organs adjust climate legislation and narrow transitional measures toward specific activities to accelerate the energy transition.

2.0 Literature

Given that many legislations for climate change mitigation and adaptation are relatively new and in continuous development toward the energy sector in Norway, the literature chapter will introduce the fundamental principles underlying the transitional journey ahead. Subsequently, the thesis will bring up core theories supporting the continuous sustainable development and energy transition in Norway today. Furthermore, a central part of the theory of climate regulations in the Norwegian energy sector is looking at the landscape of political instruments from the EU. This involves reviewing how direct regulations, economic instruments, and information measures have different impacts on companies and their investments, portfolios, and transitional activities. The thesis seeks to showcase the shift happening in Norway within companies and how reallocating investments in the dynamic and changing energy market is developing.

2.1 Norwegian Energy Policy Framework

The Norwegian government´s energy policy is complex, and the current framework consists of various guidelines to achieve the overarching goal of maintaining Norway´s global position as an energy nation. The policy framework is set for governmental purposes and is a roadmap for businesses navigating through the energy transition toward 2030. The multi-purpose framework represents a logical path for strategies that align with the climate objectives. According to the report from "Energy to Work" (Energidepartementet, 2021), the government aims to follow the plan with four standards.

1.Value creation to support employment in Norway
2.Electrification aimed at making Norway greener and better
3.Establishment of new, profitable industries
4.Further development of a forward-looking oil and gas industry within the framework of climate objectives.

Norway´s energy policy framework has been in continuous development since the attention of Oil and gas on the Norwegian Continental Shelf (NCS). In May 1963, the government proclaimed sovereignty over the NCS, which gave exclusive rights to all the resources that had been discovered (And, 2013). Norway has since become one of the wealthiest countries due to accurate regulations, functional legislations, and cooperation in extracting resources for wealth

creation (Regjeringen, 2005). In addition, petroleum activities on the NCS have since the 1970s become the most valuable sector in terms of total added value, revenues to the government, and exports to other countries (And, 2013). Norway's oil and gas sector covers 23% of the GDP and secured 1206,4BNOK of export value in 2023, accounting for 62,1% of total exports. (SSB, 2024).

Norwegian petroleum production and activities are strictly regulated through The Petroleum Act, The CO2 Tax Act on Petroleum Activities, The Sales Tax Act, The Greenhouse Gas Emission Trading Act and The Pollution Control Act. These legislations set standards for the framework of how the production are planned, executed and delivered. According to The Norwegian Petroleum Directorate, the considerations taken in investments regarding environmental and climate impact are highly prioritized and revised to meet the highest standard possible regarding efficiency and emissions (Norwegian Petroleum, 2023).

Strict regulations in the Norwegian Petroleum sector all originate from its enormous carbon footprint. In 2022, Norway´s total CO2 emissions were 48,9 million tons. Consequently, 12 million tones originate from Oil and Gas production. Looking at historic CO2 emission data from 1990-2022 on the NCS, emissions were at their lowest in 1991 at 8,1 million tons of CO2 equivalents and reached peak emissions in 2007 at 15,1 million tons of CO2 equivalents. Comparing the production rate to the emission rate 2007-2022, evidence from (SSB, 2023) shows that the production rate has declined 2% from 238,34 Sm3 million oil equivalents down to 233,58 Sm3 million oil equivalents. In connection with this, the emissions have declined by 24% over the same period (SSB, 2023).

In the later years, the Norwegian government approved many plans for oil and gas development, both old and new installations. In 2022, the total cost was NOK 300 billion. With investments covering 55% of this number, a big focus on exploration, infrastructure, and onshore facilities, the sector can produce oil and gas more cost-effectively, but also making the sector more robust toward fluctuating raw material prices (Norwegian Petroleum, 2024).

Figure 1 below showcases the investment, exploration, operation and decommissioning and disposal and other costs on the Norwegian Continental Shelf, presented in both historical figures and expectations for the future toward 2028. Looking more deeply at the graph, the decline in 2014 comes as a result of the global oil price decrease, showcasing the vulnerability of raw material prices in the sector. The initial start of more investment toward renewable energy sources has shown a steady increase since 2014. Solar energy capacity in Norway has from 2014 to 2023 increased from 13 megawatts to 616 megawatts. Subsequently, wind power increased from 2217 GWh to 14810 GWh in 2022 (Statista, 2024a). By looking at the data and comparing numbers, the factors and vulnerabilities might impact the acceleration toward green investments in the Norwegian energy sector (Norwegian Petroleum, 2024).

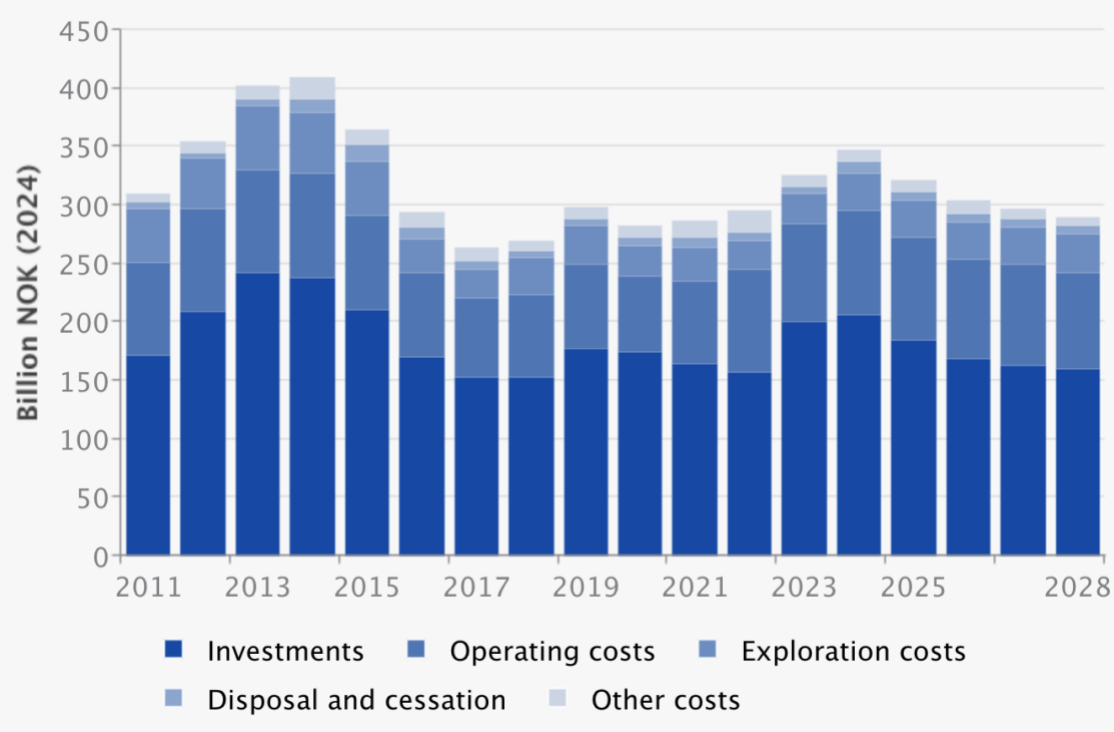

Figure 1: Overall cost by category 2011-2022 and forecast 2023-2028 (Norwegian Petroleum, 2024).

The Norwegian energy sector is subject to significant changes driven by the global shift toward renewable energy sources and a higher commitment to national and supranational climate policies. The resource report from The Norwegian Offshore Directorate (2022) presents three possible scenarios regarding the production development on the NCS toward 2050 (Norwegian Offshore Directorate, 2022).

1.High resource growth with considerable and fast technology development

2.Expectation of moderate growth

3.Low resource growth with little and late technology development

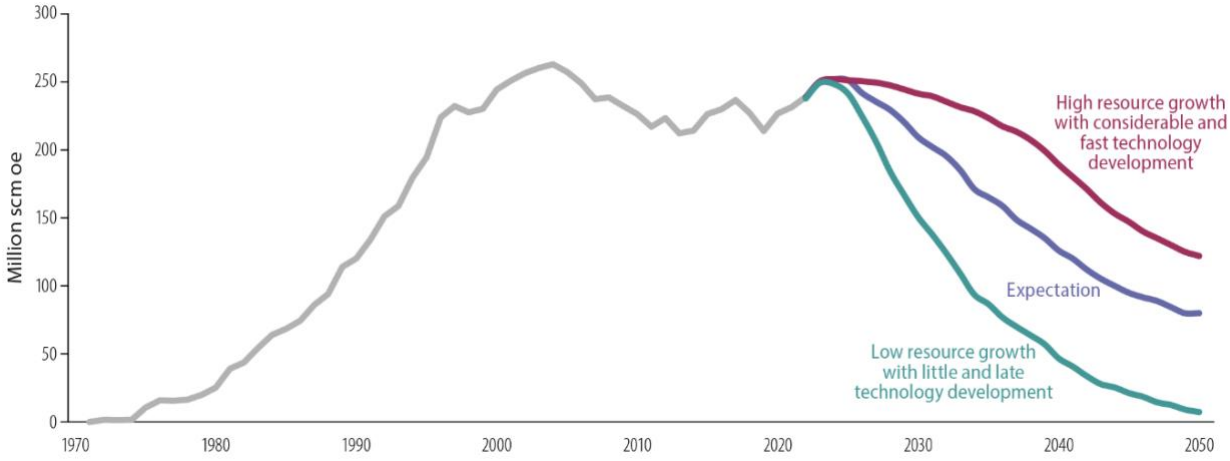

Figure 2: Three scenarios for production development on the NCS 2022-50 (Norwegian Offshore Directorate, 2022)

The first precondition for the continuously evolving development of the petroleum sector in Norway is that oil and gas reserves are localized. Further, roughly half of the resources are expected to remain under the NCS seabed since the oil and gas production started in 1971. Many European countries depend on Norway's balanced natural gas supply, especially since the REPowerEU scheme. From a long-term perspective, Norway can only maintain a steady supply to Europe by improving recovery from existing resource areas, developing more commercial discoveries, and maintaining momentum in exploration initiatives. (Norwegian Offshore Directorate, 2022) More significant investments in NCS will undoubtedly benefit Norwegian society and energy companies operating in Norway across the energy mix and accelerate the energy transition. The scenario that the Norwegian energy sector ultimately steers toward also depends on potential technological advancements, reinforced climate regulations, and evolving market demands (Norwegian Offshore Directorate, 2022).

2.2 Renewable investments and Competitiveness

(Dahl et al., 2022) argue that offshore wind is one of the most abundant and promising segments within renewable energy for Norway. However, the policies to foster the industry in Norway have been small and scarce. This has resulted in a slow-paced environment until Equinor decided in 2019 to develop the largest offshore wind farm in the world, Hywind Tampen. The project ended up with a value of NOK 7.4 billion, up from an estimated NOK 5 billion, with a

total of NOK 2,3 billion funding from ENOVA and the Norwegian Business Sector´s NOx fund (Equinor, 2023). It should be mentioned that Equinor managed to reduce the investment cost per MW installed by 40% in Hywind Tampen by taking learnings from the world's first offshore wind farm, Hywind Scotland. This included design improvements and size of wind turbine generators (EFTA Surveillance Authority, 2020). This evidence establishes context from (Dahl et al., 2022), which argues that vested interests and the fear of investment toward renewable energy sources emerge from the risk of new knowledge and technologies that can substitute current solutions at any given time.

Offshore wind technology has been shown to improve, and the levelized cost of energy (LCOE) is €125/MWh in 2023, with an expected reduction to €70/MWh in 2040. For large-scale floating and bottom-fixed wind technology, these findings present cost-competitive rates for commercialization in Norway coming forward to 2050 (Boston Consulting Group, 2023). Furthermore, the competence inherited in Norway from the Offshore and petroleum sector since the 1970s brings clear advantages in the potential commercialization moving forward.

The cost competitiveness of renewable energy sources has increased exceptionally. In recent years, it has increased so much that some sources can directly compete with fossil fuel energy without financial support (IEA, 2023a). A press release from the International Renewable Energy Agency (IRENA) in 2023 shows data from 2022 that 86% of newly commissioned renewable capacity had lower costs than fossil-fuel-fired electricity generation (IRENA, 2023a). Some energy sources still have gaps to be closed, and incentives are crucial to accelerate the adoption of green energy measures. Governments must intervene with clean energy subsidies, price changes, and stricter tax and subsidy frameworks for fossil fuels. (IEA,2023a). Environmental surcharges in Norway can be identified and set in motion by the Legislative acts. However, specific upfront cost-support by the government, narrow enough to incentivize transition to the goals set to reach in 2030 and 2050, needs to be in order.
The policy interventions being set must be targeted and specifically designed for each energy source, with all factors taken into attention. On the one hand, the industry can only take some of the responsibility for adoption, and households can take the upfront costs without experiencing positive results through reduced taxes or improved benefits.

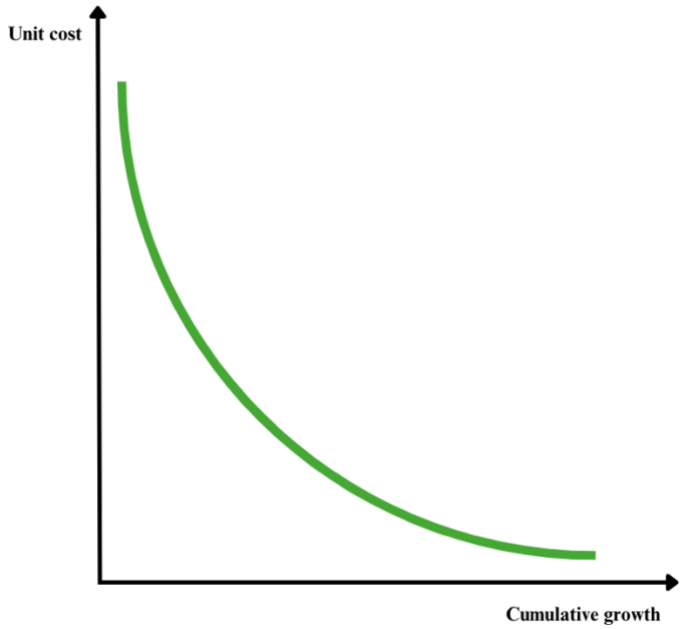

Figure 3: Learning curve illustrating relationship between unit cost and cumulative growth of Renewable energy Sources.

For Norwegian energy companies to adapt toward renewable energy sources, it is critical to bring the cost down. Evidence from (IEA,2023a) explains how these technologies often follow learning curves, resulting in price declines as more renewable energy capacity is installed. On the other hand, energy production from fossil fuels follows a different type of learning curve. The price per kilowatt of solar photovoltaic modules installed has decreased by 99.6% since 1976 coming up to 2019, as well as the utilization and efficiency have increased in the meantime, bringing hope of solar photovoltaic energy being a crucial part of the energy transition in the mix (Roser, 2020).

2.3 EU ETS and Carbon Tax

Norway was one of the first countries in the world to introduce a CO2 tax. The tool has been crucial to National climate policy since 1991. The tax aims to reduce anthropogenic GHG emissions from the use and combustion of oil, fuel, natural gas, and LPG. The tax results in cost-effective emission reductions and incentivizes a more efficient use of resources that overall reduces the general negative effects on the environment coming from the Norwegian Continental Shelf (Finansdepartementet, 2024).

Norway joined the European Economic Area (EEA) in 1992 as a member country of EFTA and has since been committed to a strong collaboration with the EU (Finansdepartementet, 2024). The collaboration has ensured a strong mutual commitment to reducing GHG emissions, battling to limit the global average temperature from exceeding 2°C above preindustrial levels and pursuing efforts to keep it below 1.5°C according to the Paris Climate Agreement (IPCC, 2018).

Norway has been a part of the EU emissions trading system (EU ETS) since 2008, even though it was adopted in 2003 and put into effect in 2005 in EU. This came as a result of the withdrawal of the national trading scheme that was put into effect in 2005. (Finansdepartementet, 2024). The EU ETS has since 2005 gone through four phases: phase 1 (2005-2007), phase 2 (2008-2012), phase (2013-2020), and phase 4 (2021-2030). The phases represent a framework that progressively tightens emissions quotas to incentivize companies to reduce CHG emissions. As each phase progresses, the system's efficiency increases – ultimately giving time to businesses for adaptation and gradual investments toward renewable solutions and circular measures that result in less GHG emissions (European Commission, 2023a). Phase 4 presents the most crucial step towards 2030. The function of phase 4 is having the linear reduction factor of quotas apply to the overall cap, and baseline reductions of the total cap in percentage and allowances are also reduced toward 2030. This will ultimately force energy companies to circumvent further exploration and production of hydrocarbons, incentivizing solutions for green energy.

For Norwegian energy companies, the EU ETS and the carbon tax have played a crucial role in adopting innovation and developing activities to reduce the GHG emissions from oil and gas production. Nearly 85% of Norway´s total domestic emissions are covered by mandatory emissions trading, GHG tax, or both. Moreover, the EU ETS covers 90% of the emissions from the Norwegian petroleum sector. Since 2022, the petroleum sector has been subject to a tax close to 1500 NOK per CO2 tone of emissions, amongst Norway's strictest taxed sectors (Ministry of climate and environment,2023).

2.4 EU taxonomy

The EU taxonomy is one of the most essential regulatory frameworks for the European Union's move toward more sustainable finance. A classification system such as the taxonomy enables investments to be evaluated by set criteria and activity, specifically sector specific. EU's action plan toward achieving a sustainable future includes using the taxonomy framework as it presents clear and consistent definitions of what constitutes "sustainable" in economic conditions. The taxonomy aims to prevent greenwashing, help investors make the right decisions and achieve targets set in the European Green Deal (European Commission, 2023c).

The taxonomy adaptation is expected to impact investment strategies in Europe in various sectors, such as reallocating funds from fossil-fuel-based projects. New funds will be established and allocated in scope with taxonomy-aligned economic activities. An integral part of the EU´s transition towards a low-carbon economy is focusing on the energy sector, which is responsible for 15,5% of GHG emissions in Europe. (European Commission, 2023c). The future of investments must pay off and contribute positively regarding the environmental aspect. The prominence of EU taxonomy will have a prominent role in decision-making processes and impact investment strategies for Norwegian energy companies. The transformational journey toward a carbon-neutral future and achieving sustainable economic goals will be more effective by utilizing the taxonomy framework as a pivotal tool (European Commission, 2023c).

The EU taxonomy alignment steps include substantially contributing to at least one of the six environmental objectives, doing no significant harm to any of the other five environmental objectives, and complying with the minimum safeguards. Furthermore, activities are classified as taxonomy-eligible or aligned. By the overarching objective, the activity is categorized as directly contributing, enabling, or transitional. The EU Taxonomy also includes a technical screening criterion to measure the contribution of each objective and activity; this strengthens the legitimacy of the framework. The threshold is set for companies to contribute substantially and accomplish goals set for 2030. For the energy transition to happen within the timeline, Norwegian Energy Companies must take corporate social responsibility and adapt taxonomy-aligned activities for all stakeholders to ensure the long-term success of investments and operations.

The impact of the EU taxonomy on Norwegian energy companies will play a massive role in the coming years. The (IPCC Special Report,2020) refers to hydropower as one of six renewable energy sources contributing to climate change mitigation. Norway has huge resources to pursue a more efficient use of hydropower energy in the transition. By utilizing renewable hydropower energy in Norway, Oil and gas production can become much less CO2 intensive by reducing GHG emissions through the electrification of the platforms. Evidence from the Johan Sverdrup platform refers to a 755.000 BOE/day production with 80-90% reduced total emissions. Through electrification from shore compared to platforms running on gas turbines, Sverdrups´CO2 equivalent emissions per BOE is 0,67kg, 5% of the global average (Equinor, n.d). Pursuing electrification investments in the NCS through clean, hydropower energy will be in scope with the EU taxonomy of climate change mitigation and mitigate substantial contribution to the energy transition (Royal Ministry of Finance, 2020).

Through looking at the leading energy company in Norway, Equinor, the Annual Report 2023 presents 8,2% capex investment in Taxonomy Eligible & not Aligned activities and 0,8% of investments being Eligible & Aligned. The remaining activities are not compatible with the taxonomy framework. Equinor´s goal is to have a 20% Capex investment toward renewable energy sources by 2030, and the percentage of eligible activities is expected to increase in parallel with increased renewable energy investments (Equinor, 2024). Companies that fall under the scope of the Corporate Sustainability Reporting Directive (CSRD) will be disclosing all of these taxonomy-aligned activities. Smaller companies that do not fall under the scope of CSRD will benefit from reporting on taxonomy either way. With investors able to retrieve this transparent information, long-term alignments and potential investment decisions can be made from this publicly available information. Companies with taxonomy-aligned activities have a higher chance of external investors and banks financing their green investments, accelerating the energy transition toward achieving the climate goals (European Commission, 2021).

2.5 European Green Deal

The EU Green Deal is a comprehensive policy framework initialized in 2019 that sets key targets and goals for dealing with climate change. The main goals are to make the EU the first climate-neutral continent in the world and to reduce net greenhouse gas emissions by 55% by 2030 compared to 1990 levels. (European Commission, 2020) In EU, the production and use of energy account for more than 75% of the total GHG emissions. To reach the climate targets,

strict legislation and goals must be set, and the European Green Deal has the framework to achieve these goals (European Commission, n.d.).

The commission has outlined three fundamental principles for the energy transition: ensuring a secure and affordable EU energy supply, developing a fully integrated, interconnected, and digitalized EU energy market, and prioritizing energy efficiency, improving the energy performance of buildings, and fostering a power sector predominantly reliant on renewable sources. This emphasis on renewable energy technologies underpins the EU's commitment to sustainable energy solutions (European Commission, n.d.).

The EEA agreement obliges Norway to follow EU climate-related regulatory policies, and the EU Green Deal will significantly impact the Norwegian energy sector in the coming years. In 2023, the EU-Norway Green Alliance was officially established to strengthen further cooperation on climate, environment, energy, and clean industry (European Commission, 2023e).

Fischer (2021) provides valuable insights into the EU Green Deal's positive effects on the Norwegian energy sector. The most crucial point is that the EU's import of gas over time is planned to decline and that 60% of the EU's long-term gas-import contracts are due by 2028, and the question of whether these are renewed is still up to be determined in the future. As a concluding remark, Fisher comes up with three factors that impact the Norwegian energy sector as a key gas supplier: Price, relative climate impact, and energy security (Fischer, 2021).

2.6 Fit For 55

The Fit for 55 climate legislation is aimed at reducing the net emissions within the EU by 55% from 1990-2030. The FF55 climate package will significantly impact the Norwegian energy sector as Norway is obliged to follow the legislative climate acts set in the EU. The package maintains various propositions for law changes to reduce emissions and focus primarily on quota-obligatory emissions, meaning Norwegian oil and gas-producing companies will be heavily affected by the changes that are awaited. The FF55 package will directly affect the system for climate quotas, carbon adjustments, energy efficiency measures, renewable energy tax and infrastructure (European Council, 2021).

2.7 RePowerEU

The RePowerEU energy plan results from Russia´s war on Ukraine and aims to provide a strategic framework to ensure affordable, secure, and Sustainable energy for Europe. Set in action in May 2022, the EU aims to become completely independent from Russian energy imports well before 2030. In 2023, the share of EU gas imports from Russia had dropped to 15%, down from 45% in 2021 (European Commission, 2022b).

The plan is well adopted and aims to accelerate the transition toward renewable energy sources. Becoming independent from Russian fossil fuels involves achieving a more resilient energy system, with more renewable energy sources and higher production. The plan set forwards three main measures:

1)Energy saving by reducing consumption in households and industry

2)Diversifying energy sources and finding new suppliers

3)Accelerate the decarbonization by investing toward renewable energy production

Furthermore, the RePowerEU energy plan incorporates a crucial fourth measure: 'smart investments'. This measure is not just an option, it's a necessity in all situations. It's a commitment that must be upheld to significantly contribute to the energy transition and independence. The energy plan's long-term goal is to revolutionize the EU energy system, shifting it towards more renewables and phasing out GHG-intensive energy sources.

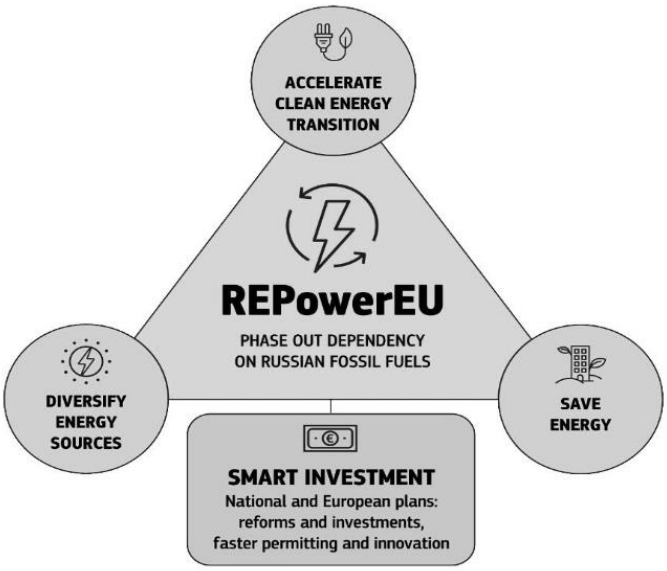

Figure 4: REPowerEU action plan to phase out dependency on Russian Fossil Fuels (European Commission, 2022b)

The REPowerEU plan will continue to impact the Norwegian energy sector. Since the transition started, Norway has been a critical gas supplier for Europe and the UK, covering 20-25% of the total energy demand (Norwegian Petroleum, 2024). Norway is considered a part of EU´s solution to the green shift and transition toward more renewable energy in Europe. For Norwegian energy companies, the aftermath of the RePowerEU is expected to result in more focus on supplying Europe with stable energy and gas to avoid increased use of coal or other more polluting energy sources. The result of Europe being more dependent on Norwegian gas exports spills over to the necessity of increased smart investments toward innovations and technologies such as Carbon Capture Storage & Carbon Capture Storage and Utilization (Fischer,2021).

2.8 Innovation adoption

The diffusion of Innovations Theory by Rogers (1962) provides a framework that can help understand the dynamics of innovation adoption to renewable energy, its scalability and possible advancements in the future Norwegian energy sector. Innovation adoption can significantly impact the long-term success of businesses during an energy transition. New technologies, innovation, and process effectiveness are happening rapidly and continuously. The adoption rate of new technologies can significantly impact whether a company meets regulatory emission reduction expectations and achieves climate goals. Adopting new technologies shapes future investments and long-term strategic decisions as new green solutions often lead to surprising savings in carbon tax and energy production effectiveness.

2.9 Stakeholder Theory

For Norwegian energy companies, understanding the interplay between the organization and its stakeholders is crucial for its long-term strategies, decision-making, and competitive advantage. Freeman´s stakeholder theory (1984) presents the view that companies must consider the interests of all stakeholders in their operations to ensure long-term success (Freeman et al., 2018). During a time when both natural gas and renewable power are a critical need for Europe, companies must find a way to comply and adjust operational strategies toward regulations while maintaining the best interest of all the stakeholders.

In the context of Norwegian energy companies, stakeholder responsibility is crucial. It involves managing the relationship between investor expectations, regulatory policies, and the Norwegian public. In 2024, investors are increasingly expecting Environmental, Social and Governance (ESG) criteria and sustainability reporting in terms of investment. To meet these expectations, companies need to develop strategies that build on Corporate Social Responsibility (CSR) and processes that comply with regulations such as the EU Green deal and EU taxonomy. This not only helps companies to minimize risks but also positions them to leverage future opportunities for sustainable and economic growth.

2.10 Investment theory

The rapidly evolving landscape of the Norwegian energy sector makes it crucial to understand the risks and opportunities for making well-informed, long-term investment decisions to support the energy transition. The Capital Asset Pricing Model (CAPM), a robust economic model, serves as a tool to evaluate expected return relative to the risk the investment inherits (Fama & French, 2004). Norway has huge possibilities in the renewable energy segment due to the vast number of natural resources and offshore expertise. Yet, the transitional shift presents both risks by navigating through the out-phasing of traditional fossil fuels and focusing more on renewable energy sources. The analytical framework of CAPM, can help justify the relationship between risk and expected return of renewable energy investments. There are many external factors impacting the investments of Norwegian energy companies such as the CO2 tax, yet using the framework can enable these companies to optimize investment strategies to align with sustainability and climate goals.

CAPM was first developed by William Sharpe (1964) and John Linter (1965) to “estimate the cost of capital for firms and evaluate the performance of managed portfolios” (Fama & French, 2004). The model considers the systematic and the unsystematic risks of investments, positing that the expected return of an investment is proportional to the risk (βi). The formula is as follows:

$$E(Ri) = Rf + \beta i(E(Rm) - Rf)$$

Where:

$E(Ri)$: $Expected\ return\ on\ investment\ i$

Rf: $Risk\ free\ rate\ (government\ bond\ yields)$

βi: $Beta\ of\ the\ investment\ (sensitivty\ to\ market\ movements)$

$E(Rm)$: $Expected\ return\ of\ the\ market$

$E(Rm) - Rf$: $Market\ risk\ premium$

For Norwegian energy companies listed on the stock exchange, the investment alignment between oil and gas and renewable energy sources must be more balanced to reduce GHG emissions, uphold competitiveness, and achieve the climate goals. Various factors impact the investment decisions of Norwegian energy companies, most importantly the regulations such as Carbon tax, EU ETS, emission targets, and Climate deals such as the EU Green Deal and REPowerEU, which affect the pace of green investments and transitional measures.

The beta coefficient of a typical Norwegian energy company stock can be interpreted as a measure of the sensitivity of the asset´s return to the volatility and variation in the market (Fama & French, 2004). The dynamic and uncertain landscape of the Norwegian regulatory environment toward renewable energy sources, combined with innovation, establishes uncertainty in the coefficient for investments. However, the rapid technological advancements in renewable energy sources, as highlighted by the International Renewable Energy Agency (IRENA) in 2020, bring hope. The cost of generating electricity from onshore wind has decreased by 40% and costs of generating electricity from offshore wind has decreased by 29% since 2010 (IRENA,2020). This progress, coupled with the expertise extracted from the Offshore sector, can help reduce the beta coefficient/risks and bring long-term benefits to the sustainable development and energy transition. Furthermore, the CAPM can help assess the volatile projections and create frameworks for projects to increase expected returns on risk-involved investments, further establishing confidence in the viability of renewable energy investments.

3.0 Methodology

This chapter outlines the methodological approach used and applied in the thesis. First, the chosen research design, data collection method and analysis of data will be discussed. Furthermore, a discussion will follow why a qualitative research method and content analysis with a grounded-theory approach were the best fit for the study. Lastly, the chapter will present the philosophical foundations of research, as well as clarifications and limitations regarding credibility, reliability and ethical considerations.

3.1 Research Design

To investigate the effects of climate-related regulatory policies on the investment behavior of Norwegian energy companies, the research design must facilitate the correct design which uses valid and reliable methods to answer the research question (Bougie & Seceran, 2020). Research papers regarding the effect of climate change on energy companies are flourishing globally, and it has been discovered from various perspectives and angles over the last 40 years (Harichandan et al., 2022). Yet, the landscape of Norwegian energy companies and how they are affected in their strategic investment decision-making due to climate legislation still needs to be discovered.

A qualitative study was the ideal design as the effects from climate-policies vary among companies across the sector, and the data were primarily collected in form of words (Bougie & Sekaran, 2020). The research journey involved delving into the current legislative acts, academic journals, annual reports, and climate plans, ensuring a comprehensive understanding of the subject matter. In addition, conducting in-depth interviews enriched the data collection process. The multiple methods used to extract data in this thesis can be referred to as triangulation, which significantly enhances the credibility and validity of the study (Noble & Heale, 2019).

Furthermore, a critical component in the research design is purposive sampling, which involves selecting participants based on knowledge, relevance, experience, and potential to contribute valuable information to the phenomenon (Palinkas et al., 2015 & Robinson, 2014). The

sampling was planned so that various companies from the Norwegian energy sector were represented, resulting in different points of view on climate legislation. It also gave valuable information regarding how the investment strategies varied across the energy mix.

3.1.1 Unit of Analysis

The unit of analysis refers to "the level at which information is analyzed and conclusions are drawn" (Bougie & Sekaran, 2020). In this thesis, the unit of analysis is Norwegian energy companies and how their investment strategies are affected by climate-related regulatory-policies. The specific unit of analysis was chosen due to the energy companies' responsibility coming forward to 2030 and 2050. Moreover, the complexity, continuous innovation, and new energy sources in the mix make it an exciting sector to discover. The analysis will go through the implications of climate policies on the unique Norwegian energy landscape and the influence on companies' investment decisions, unconstrained from the energy sources the various companies focus on.

3.2 Grounded Theory

Barney Glaser and Anselm Strauss published the book *The Discover of Grounded Theor*y in 1967, which outlined the revolutionary research method of Grounded Theory (Glaser & Strauss, 1967). Grounded theory is referred to as an inductive method that emphasizes theory generation from the empirical data collected and is one of the most utilized contemporary research methodologies within qualitative study (Babchuk & Boswell, 2023). Grounded theory is an appropriate method to utilize in this study since the investment strategies of Norwegian energy companies in reaction to climate policies still need to be explored.

The characteristics of Grounded Theory, as outlined by Strauss and Corbin in 1990, include theoretical sampling, coding, and iterative comparative analysis. The theoretical sampling involves the collection of codes and data analysis within the scope to ensure a substantial contribution to the emerging theory (Glaser & Strauss, 1967, p. 45). The coding process, which can be divided into open, axial, and selective coding, facilitates a systematic research process. The goal is to identify key categories and merge them into a logical, explanatory, and theoretical framework (Strauss & Corbin, 1990).

The semi-structured interviews made it possible to take advantage of the emergence of new information by persistently staying open to new ideas and details, ultimately leading to more complex, refined questions and discussions during the process (Strauss & Corbin, 1990). Theoretical saturations were achieved as the interview participants were observed following a somewhat similar pattern during discussions. Consequently, achieving more candidates across the sector could be beneficial to the extent that the emergence of new ideas and discussions is viewed as highly probable, and it could help develop new themes and generic categories (Charmaz, 2014).

3.3 Content Analysis

Content analysis is "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns (Hsieh & Shannon, 2005, p.1278). The method emphasizes an integrated view of information to the context of the phenomenon, going beyond extraction and interpretation of merely objective content. Consequently, the qualitative content analysis enables a further understanding of the social reality in a subjective yet scientific manner. It is one of the most powerful methodological techniques in the era of big data and can be used with a wide variety of data sources (Stemler, 2015). Content analysis also empowers flexibility and can be managed in either empirical or theorical manner and is viable for numerous methodological approaches.

In this thesis, the coding categories will be derived relational, directly, and inductively from the raw data from the five semi-structured interviews, and according to (Hsieh and Shannon, 2005), this is the same method used for grounded theory development. The research method of data collection in qualitative content analysis is inductive, focusing on the examination of topics, themes and inferences deduced from the data explored (Zhang & Wildemuth, 2015). Conversely to quantitative content analysis that results in statistical number production, qualitative sampling consists of deliberately chosen content that can provide valuable insights and patterns to the research question (Zhang & Wildemuth, 2015). Ultimately, the unique meanings and interpretations of the phenomenon of climate legislation's effect on Norwegian energy companies and their investment strategies will be illustrated.

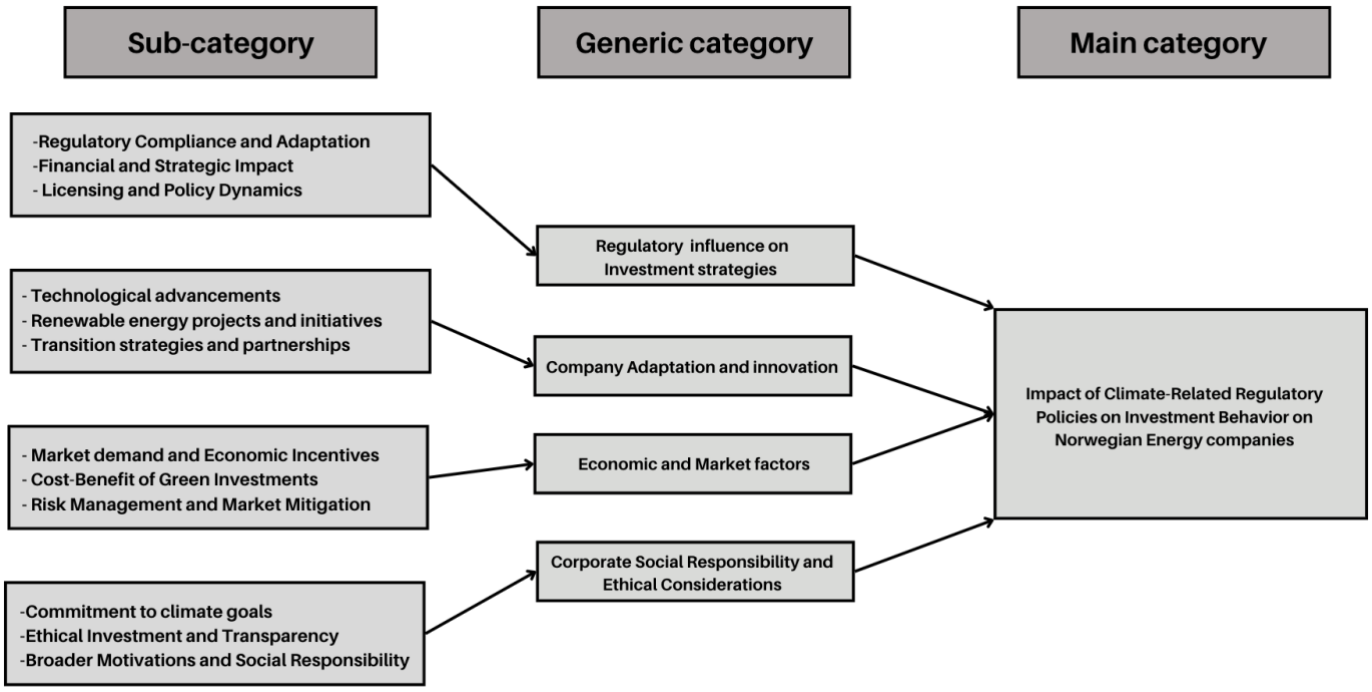

Figure 5: Abstraction process of the thesis.

Inductive Content Analysis is an excellent method to understand the complexity of the environment in the Norwegian energy industry. In the paper published by (Harichandan et al., 2022), it is presented that the energy sector globally in the context of climate change and emerging investment toward renewable energy has been changing for the last 40 years. However, the landscape of Norwegian energy companies and the effect of climate policies on investment strategies still needs to be discovered. The data gathered from the five semi-structured interviews will be used to understand how these companies adjust to the legislation, how it affects their investment strategies, and how the government might adjust the legislation to incentivize renewable energy, mitigate climate change, and boost transitional activities to a net-zero country in 2050.

3.4 Sampling

The sample size and selection of participants were not predetermined but were determined during the development of information and theoretical insights. Initially, the participants were strategically chosen to bring data emergence to the research's specific scope. Conducting an inductive content analysis brings flexibility to the research (Zhang & Wildemuth, 2015), making it possible to acquire depth and relevant data supporting the emerging theory. In

qualitative content analysis, the sample size of participants is not often strictly defined but instead is based on data saturation. Qualitative data collection should continue until a deep understanding of the concept is achieved to ensure the validity and quality of the research (Rahimi & khatooni, 2024). Furthermore, (Hennink & Kaiser, 2022) state that data saturation may be achieved at relatively small sample sizes ranging from 5-24 interviews.

Given the specific scope and nature of the study, the sample was strategically selected to consist of companies that are affected in various degrees by climate-related regulatory policies. As a result, this ensured valuable information from participants who were heavily experienced, involved, and invested in the shift of energy sources and regulatory landscape. The sampling involved strategically sorting out companies based on their operations within the energy sector, focusing explicitly on their primary energy sources.

The process started by discovering the entire database of Oil and gas companies with production licenses and exploration licenses on the Norwegian Continental Shelf (Norsk Petroleum, 2024a). In addition, it made sense to reach out to companies exclusively focusing on Renewable energy sources. This approach enabled the research to draw distinctive similarities between the actors in the sector. It was relevant to speak to individuals of high responsibility and relevance to the research objective, such as managers or operational leaders.

Throughout the interviews, information was supplied as new learnings occurred. Even though a higher number of conducted interviews could positively contribute to codes and information to the data analysis, satisfactory extensiveness and theoretical saturation across the phenomenon were achieved.

Table 1: Informants

Informant #	Energy Mix Focus	Type	Publicly Listed	Role
1 / A	Oil & Gas & Renewables	Private	No	Business Manager
2 / B	Oil & Gas & Renewables	State-owned	Yes	Subsurface Director
3 / C	Oil & Gas & Renewables	State-owned	Yes	Production Director
4 / D	Solar	Private	Yes	Commercial Director
5 / E	Renewables	Private	Yes	EVP Sustainability

3.5 Data collection

The data collection in the qualitative inductive content analysis with a grounded theory approach was attained through the transcription from the semi-structured interviews. The combination of knowledge from research journals, governmental legislative acts and climate action plans, and an emergence theory approach in the interviews resulted in a more content-satisfactory outcome. The first interview candidate emphasized the importance and possibilities of Carbon Capture and Store and utilization (CCSU) investment. Being made aware of the importance of CCSU, the step toward the subsequent interviews included gaining extensive insights and adjusting parts of the interview guide. As the candidates brought up new insights, concepts, and information, secondary sources became essential in understanding the core concepts comprehensively and identifying the contexts in between.

The interview guide is divided into seven sections, covering all the phenomena' essential components. When performing interviews, the interview guide acts as an essential tool to ensure smooth transitions between themes and questions. Furthermore, providing the interview guide in advance made the respondents more prepared, contributing to increased thought and context coming up to the questioning. The sections touch upon various types of open-ended questions with follow-up questions. Based on the information the informants provided to the open-ended questions, some follow-up questions were subsequently developed on the spot as content analysis supports flexibility and the emergence of new information (Zhang & Wildemuth, 2015). This allowed the respondents to speak their minds, providing more thorough and distinct comments on the themes in connection to the topic of discussion. Ultimately, the transcripts from the interviews acted as the primary source of data in the content analysis.

Table 2: Interview guide sectioning

#	Section
1	Introduction & Background
2	Regulatory impact & Industry evolution
3	Investment strategies & Climate Policy
4	External Factors & Company adaptability
5	Risk management & Innovation
6	Future projections & Strategic planinng
7	Closing & Additional insights

3.6 Reliability and validity

In qualitative content analysis, the criteria used to evaluate the quality of the interpretive research work are credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Credibility, defined as the 'adequate representation of the constructions of the social world under study' (Bradley, 1993, p.436), is of high importance. To enhance the credibility and validity in qualitative research, a set of activities are recommended by (Lincoln & Guba, 1985; Noble & Heale, 2019). These activities, including persistent observation, triangulation, member checking, and checking interpretations against raw data, are particularly crucial in inductive content analysis. The design and utilization of specific data collection strategies in this context ensure an effective process with more accurate representations of the phenomena, supporting the systematic procedure for coding and analysis, and leading to more robust conclusions (Zhang & Wildemuth, 2015).

To maintain a high level of trustworthiness toward the interview candidates, the interview was conducted in the language of their preference, resulting in four Norwegian and one English interview. Providing the informants the opportunity to express themselves in their mother tongue gives more authentic answers with nuances added to them and keeps the natural flow of dialogue (Welch & Piekkari, 2006, p.428). In context, the verbatim transcription process became more time-intensive due to English translation and the reassurance that no nuances were lost, increasing the study's validity. (Bougie & Sekaran, 2020). However, the chosen process was quickly justified as it resulted in more detailed answers, significantly enhancing the general quality and depth of the data derived from the interviews (Welch & Piekkari, 2006).

Transferability in the context of qualitative content analysis refers to how the hypothesis can be applied to another context and to what extent it can be applied (Bougie & Sekaran, 2020). During the process of research and data collection, providing datasets and rich descriptions of the phenomenon is critical to ensure a high level of transferability. Research that emphasizes a high transferability level is eligible for further exploration in different settings and contexts, encouraging more knowledge and judgments regarding the topic (Zhang & Wildemuth, 2015). The exploration and limitations in this thesis might stimulate researchers to explore a different aspect of the sector or investigate other energy sources in Norway, eventually transferring the existing working hypothesis to gain new insights.

3.7 Ethical considerations

In business research, a high level of ethical standard is important in terms to maintain the expected societal norms of behavior during research. For qualitative studies, the ethical conduct applies especially to the researcher who conducts the study and in respect of the research participants (Bougie & Sekaran, 2020). It is crucial to map out potential ethical dilemmas before interviews, as information and interpretations tend to lean toward subjectivity. In this master´s thesis, the ethical code of conduct and ethical guidelines from the University of Agder have been used as a framework to minimize the risk of ethical complications and drawbacks. (University of Agder, n.d.).

The informants representing their organization in the semi-structured interviews must be assured of personal and organizational privacy concerning information. Following the process of retrieving participants, information on the thesis was provided via e-mail. This included a brief personal introduction of the researcher with a photograph alongside the purpose and motivation for the theme. Additionally, it described why the specific company and person would be interesting to interview for the thesis. The formal section of the e-mail emphasized the SIKT data security standards and personal rights, as well as the sectioning of questions to ensure openness and trust.

To maintain the informants' confidentiality, numerical codes were assigned instead of names. No confidential, personal, demographic, or company-specific information that could directly identify the informants was disclosed. One of the safety measures was to keep the data in a safeguarded database for a limited amount of time before destruction when the project ended. The informants may be able to recognize their contributions by reading through the thesis, although the public cannot identify the persona.

4.0 Findings and discussion

The discussion chapter will present the main findings relevant to the research and research question. The chapter will be conducted in a cross-case analysis, structured by information from the interviews. The chapters and subchapters are organized by the generic and sub-categories developed from the semi-structured interviews, existing literature, and a post-coding

assessment of the inductive content analysis to answer the research question. The first category presents the regulatory influence on investment strategies, followed by company adaptation and innovation, Economic and Market factors, and Corporate Social Responsibility and Ethical considerations. By categorizing and organizing the themes, unfolding the complexity of the phenomena will be manageable in a controlled and structured process.

4.1 Regulatory influence on Investment strategies

Regulatory effects and policy instruments have extensive effects on energy companies' investment strategies toward the adoption and scalability of renewable energy technology. Moreover, legislation directly impacts the production of fossil fuels and decommissioning rate. Earlier discussions in the literature review presented how policies and climate act as various tax systems, incentive programs, tariffs, and subsidies.

The potential of renewable energy investments is directly tied to the competitiveness of the fossil fuel industry. While the upfront cost of renewable energy technology involves significant capital expenditure, the energy produced is a testament to its long-term viability. For energy-intensive industries, the demand for energy-intensive production is high, and the cost to develop renewable energy systems capable of supplying a satisfactory amount of stable energy is not yet economically feasible for large-scale operations. However, this presents a promising opportunity for the future of the energy industry (IEA,2023b).

Regulatory barriers, insufficient policy support, and slow planning and permitting affect the attractiveness of renewable energy investments. The IEA report on World Energy Outlook (2023) presented that a lack of sufficient and continuous policy support is a factor of increased uncertainty among renewable energy investments. An example is the many sudden withdrawals of policy support in the last 15 years for wind and solar energy, resulting in regrettable market crashes worldwide. (IEA,2023b).

4.1.1 Regulatory Compliance and Adaptation

Several of the interview objects reveal that both hardships and opportunities come from the current state of the climate-related regulatory frameworks in Norway, with empirical data supporting these statements. The legislation that Norway follows coming from the EU through

the EEA membership shows to have an impact, and all the respondents are aware of how vital the CO2 tax and EU ETS are now and how important they will be coming forward as the quotas steadily tighten and the taxes increase.

> *"Reporting taxonomy is complicated and time-consuming. There are different types of standards, and there are still unclear standards and framework on how we should move forward with it. The EU Taxonomy puts something in the mind of all industries going forward towards 2030. It is important to make people aware that there is a climate footprint on everything we do, and we also have to increase the awareness of how we should deal with the footprint and how to reduce it. I think the establishment of the EU Taxonomy is great, and that the way climate policies are being developed in the EU is positive"* **-A, Business Manager, Oil&Gas&Renewables**

The landscape of new regulations appearing in the sector is challenging, especially for the smaller companies trying to establish themselves and increase market shares and exploration, production, and production licenses. Informant A explains that the EU European Sustainability Reporting Standards (ESRS) and Corporate Sustainability Reporting (CSR) will go into effect in 2025 but that the planning and analysis are already in their strategy and adoption processes.

> *"We are well prepared for 2030. We are a growing company, but there is always room for improvement. We learn every day and take new initiatives. There are many regulations to deal with, and prepare us for 2025 where new regulations and EU regulations EU ESRS AND CSR reporting. We have started working with it this year and have started with double-materiality analysis within the taxonomy framework*." **-A, Business Manager, Oil&Gas&Renewables**

informant A represents great responsibility as a small actor toward the climate policies and are already in place, trying to adapt the EU Taxonomy and other climate acts. On the other hand, informant C that has over 20 years' experience in the energy sector, emphasized on the perspective of how times have changed, and that the focus toward the new tax systems, quota systems and emissions has had an increased focus and that the attitude and feeling of responsibility toward emissions has drastically changed since the earlier days in the sector.

*"When we are in meetings with the executives, we often discuss Carbon tax, quota system and emissions. We keep track of how much GHG we have released compared to what was anticipated, and what we can do to keep them down or to reduce them further. The attitude has taken a shift since the start of the green shift***." -C, Production Director, Oil&Gas&Renewables**

Across all the interview objects, compliance and adaptation with regulations are a high priority in terms of proposed projects and that observance is deeply integrated in their strategies. The drawbacks stressed by the informants are that the governmental support in subsidies is relatively small-scale and needs to be more attractive for companies to pursue and finalize investments. This results in companies standing between two choices: Conducting high-risk upfront cost investments toward renewables or 2) Continuing non-renewable operations and losing competitivity over time from factors such as tax increases and product demand. Respondent A explained that the CCS license permits and approval time could be effective, which leads to unnecessary complexity of investments and forces them to make tough financial decisions and stall positions in the market.

"Even if a company takes on the entire screening and exploration of a potential CCS Injection area, it is not a given that the company will win the license. The government should take the standpoint where the operator that decides to invest in exploration operations should be automatically granted the field. Subsurface surveys are expensive and are sunk cost if you are not granted the license for the project in the end. If we're going to reduce the C02 in the atmosphere by 55% within 2030 the CCS framework must be revised, time is running out» **-A, Business Manager, Oil&Gas&Renewables**

"We have worked a lot with subsurface analysis. We have everything in place to start carbon capture. The only thing holding us back is awaiting license approval and response to the recommendation that we sent to the authorities. We´re currently in a time of uncertainty regarding our own transitional journey." **-A, Business Manager, Oil&Gas&Renewables**

4.1.2 Financial and Strategic Impact

The informants made it clear that the adaptation toward reducing GHG emissions and focusing on renewable energy cannot be disregarded any more. The determination of which degree companies are trying to stay ahead of regulations plays directly into the economic growth of the energy companies, with more factors critical by nature (---). The interplay between continuous adaptation and the minimum safeguard from the legislation is essential. Energy companies that are more determined to be early adopters of climate policies achieve a higher degree of renewable energy production, which positively impacts the corporate image and carbon taxation compared to the laggard companies.

> *"Our drivers towards the renewable energy transition are a combination of taxes, costs related to quotas, legislation and to take the social, corporate responsibility. The cost aspect of carbon quotas and taxes is that if they are set high enough, they will have a negative impact – it makes sense to find a solution quickly to the energy transition. Also, there is the political and social-economic element of it, and that is to realize that the energy transition is the only right thing to do for all energy companies."* **-B, Subsurface Director, Oil&Gas&Renewables**

In a climate where Norwegian energy companies are trying to adapt to increased taxes on their daily production, many respondents stressed that the government needs to do more to adapt and stimulate renewable energy investments. Companies experience that the revenue from the general fossil fuel production and carbon tax that the Norwegian government capitalizes on does not return as a benefit to the sector. One of the obstacles that are emphasized by respondents A, B, and C is that the policy framework and incentive framework for Carbon Capture Storage and Utilization (CCSU) still needs to be put in place. Respondent A explains how their company has made investments toward subsurface exploration, and the only thing holding them back from starting operations is the license approval, which now has been pending for two years now

> *"We have worked a lot with subsurface analysis and with the value chain, and to understand all the different parts of the value chain is detrimental. We have everything in place to start carbon capture. The only thing holding us back is awaiting license*

approval and response to the recommendation that we sent to the authorities." **-A, Business Manager, Oil&Gas&Renewables**

The Norwegian energy sector is unique, containing 156.000 experienced employees within petroleum. The journey from the 1970s to today has helped extract value for many generations to come, as well as experience and innovations that can be utilized for purposes other than purely oil and gas extraction. It is hard for Norwegian energy companies to operate in a climate where strict taxation exists. However, a practical and functional framework to reduce emissions is not in place when CCS technology exists. The initial phase of the Norwegian oil and gas journey in the 1970s contained thorough regulations that controlled the production and taxation, incentivizing growth, production volume, and scalability of the sector. Norway has been an essential player in the energy market for decades. Moving forward as a laggard country in the energy transition will negatively impact foreign investment in the Norwegian sector. It could lead to Norwegian operators seeking CCS opportunities in countries that have built up a functional CCSU framework, such as Denmark, England, or the Netherlands.

"The Norwegian government were highly determined when we found oil and gas in the 70s. The regulations and was in place to speed up the production and the investments. I can´t say the same about the energy transition we´re upon now" (...) "I don't understand why the government is taking such a long time because the Norwegian framework is world class. I mean, other countries have been looking at Norway to build their own petroleum sector and regulatory framework. Why the Norwegian government doesn't utilize the same framework and put it into CCS I cannot understand." **-B, Subsurface Director, Oil&Gas&Renewables**

Moreover, respondent B highlights the experience of being a subsurface director working decades in geology, seismic, and petroleum exploration, emphasizing the fact that Norway is fortunate to have hydropower. As of 2023, 88,2% of domestic power demand covered by renewable hydroelectricity with excellent storage capacity (Statista, 2024a). Furthermore, Respondent B argues that the Norwegian electricity system directly affects the adaptation of policy change and that the government needs to push harder because Norway theoretically has already established one of Europe's most renewable electricity supplies. Therefore, the government does not have the drive to upscale CCS, and it is not prioritized as it should be.

" The specific challenges we´ve experienced regarding the Norwegian energy sector transition is the governments regulations toward CCS. I think Norway´s drive for change isn't the same as other European countries because of the network of sustainable energy coming for hydroelectricity. If Norway wants to become a major storage facility for CCS, it needs to be sorted out quickly." **-B, Subsurface Director, Oil&Gas&Renewables**

Respondent C highlights that the overarching goal must be to reduce domestic emissions and that the Norwegian oil and gas sector plays a crucial role in the energy transition in Europe. Respondent B explained how countries like Poland are still heavily dependent on coal for energy supply as of 2024 and that large gas fields such as Troll, Sleipner, and Ormen Lange significantly contribute to Europe's green shift, lowering the overall emissions by steady gas supply through the Baltic pipe.

"Our appetite for gas going forward does not decrease, even with the climate tax being tightened. We're rather looking to double the production – and that's because the gas is going to Poland. The pipeline to Poland can take 10BCM a year, and we're right now delivering around 4BCM a year." This is a part of the energy transition, and this is how we view it." **-B, Subsurface Director, Oil&Gas&Renewables**

The EU ETS is the EU's cornerstone climate policy to battle climate change and target companies' carbon emissions. The respondents expressed a clear preponderance that the EU ETS is the most prominent and incentivizing climate tool to initialize the energy transition in Norway. Also, the respondents stressed that the pressure to establish GHG emission measures has increased since the initialization of phase 4 of the EU ETS in 2021 (ICAP, 2024). The CO2 tax is set at NOK1176/ton CO2 in 2024 and exponentially increases in size and coverage toward 2030, becoming a financial factor impossible to ignore (Finansdepartementet, 2024).

"The goal will be to reduce CO2, if we are to be allowed to live that long, and then we must take measures along the way that make it possible to extract as much oil and gas - but with as little emissions as possible to keep the field cost-effective but also effective for the climate. The carbon tax will rise, so it will be profitable over time to electrify it, but we also want to take responsibility to reduce emissions as early as possible." **-C, Production Director, Oil&Gas&Renewables**

The respective companies all adapt to the policy dynamics but view it differently. It has been identified that many of the obstacles to adapting are due to the legislation, incentives, and subsidies not yet being optimal for the dynamic and continuously changing landscape of the Norwegian energy sector. EU legislations play a significant role in the adoption of new sources in the energy mix and will continue to play a big role in new investments as the CO2 tax increases and ETS decreases. For oil and gas companies, the transitional measures have been slightly on pause since the Russian invasion of Ukraine, as Gas supply in Europe plummeted after Russia shut off the pipeline. The regulatory influence on the financial and strategic impact of investment strategies is significant, especially for renewable technology adoption, since it comes with high initial costs and scarce profitability in the short-term perspective but is instead becoming profitable over time.

4.1.3 Licensing and Policy Dynamics

Respondent A expresses frustration toward the subsidy and incentive agreements and their functionality in 2024. The limited funding from ENOVA hinders the electrification of the oil and gas-producing platforms as part of the renewable energy transition. Platform electrification helps reduce GHG emissions by being powered by renewable hydroelectricity from shore, with the hope of being further complemented by offshore wind farms to reduce capacity stress on the power grid. Respondent C has worked in connection with Equinor´s Hywind Tampen project that manages to cover 35% of the annual power demand for the five connected Oil&Gas platforms but explains that the drive to achieve full-scale electrification is the end-term goal for the field to be able to "live" to 2050/2060 (Equinor, 2023).

> *"There are no plans of CCS as there are no reservoirs in the area that suitable. We are therefore working toward a full electrification of the oil field so it can stay competitive and strategically survive for a long time in terms of the capacity of the reservoirs of oil and gas. If a full-scale electrification is made possible, the oil field can probably be extended to 2050 or 2060. The complete electrification of the oil field is an ambitious plan, but a good plan."* **-C, Production Director, Oil&Gas&Renewables**

Respondents' express dissatisfaction with the long processing time for the exploration permit approvals. The Norwegian energy companies show enthusiasm toward capturing and utilizing carbon to lower their CO2 tax and help save the climate. The adaptation and transitioning phase are lagging from the government side as it is apparent that companies need subsidies to some extent to invest.

The open, liberal economy in Norway coupled with strict laws, regulations and close to zero corruption eliminates the threat of companies pursuing energy production without upholding the minimal requirements of regulations and acts. All the informants draw attention to the nationalism and proudness of being able to produce energy in one of the best prerequisites in the world, utilizing the compliance of regulations as a competitive advantage toward all stakeholders and other energy producing companies operating in other parts of the world. Being a nation of large oil and gas exports to the world, respondent E can´t understand why the government won´t increase the funding and incentives coming from the sector toward development of new renewable energy technologies and carbon capture solutions.

> *"The product is there, the market is there, the areas are there, but it takes 7 years to get the legal concession and funding for the project. In my opinion, it's a hopeless system today, the government should go all in for commercialization and scalability of offshore and onshore wind energy. There are around 20 small- and large renewable wind energy companies in Norway, and there is 1 company getting compensation for projects. It just doesn't make sense when we´re in the midst of an important energy transition."* **-E, EVP Sustainability, Renewables**

The short-term financial implications come into play as no applicable CCS reservoirs are near the Oil&Gas field. The solutions to reduce emissions are either offshore wind or electrification from shore. The proposed electrification of the field is not yet accepted due to a national shortage of grid capacity. Respondent C explains that one of the alternatives is to connect to the "north grid" outside of Kristiansund, Norway, rather than Bergen. The north grid in Norway has higher capacity, and it is more likely that it can be utilized earlier. As a result, the oil field would reduce GHG emissions, climate impact, and carbon tax.

Consequently, early adoption of full-scale electrification will result in financial savings, where the funds could go into developing more offshore wind capacity, research and development, or other measures to enhance the CO2 efficiency per Barrel of Oil equivalents (BOE) produced at the field. Several projects have increased production on the field, including the Vigdis Boosting Station. The investment cost NOK 1,4 billion and helped increase the field's production capacity and achieve a pressure high enough to extract the remaining resources on the field for maximum value creation (Equinor, 2018).

> *"We depend on oil and gas income from the Norwegian continental shelf to invest in renewable and low-carbon solutions. In the long term, we want to be able to make money from carbon capture and be able to take on assignments for other companies where we can inject their carbon into our CCS reservoirs. Then the reservoir is already ready, which we use, but we can then get a new source of income by helping other companies to reduce their emissions as well. Something that will be positive economically, socially and for the environment" (...) "We are aiming to create value from CCS."* **-C, Production Director, Oil&Gas&Renewables**

For solar, the same problem occurs regarding licensing and permission for installation. Areas optimal for solar photovoltaic energy installation are in queue to be projected and utilized for maximum energy production. Often, these areas can supply nearby industries or supply the grid with surplus energy. Respondent D emphasizes the complexity of permits in green areas, which is confirmed by the report from DNV, (2024) as a significant barrier toward achieving the goal of 7,8TWh solar energy before 2030 (DNV et al., 2024).

> *"Right now, there are now 50 applications in the queue to get a license to build ground-mounted facilities here, preferably in green areas."* **-D, Commercial Director, Solar**

One factor that is a necessity for projects like this is governmental support until a regulatory settlement that commercializes CCS as a business opportunity for revenue earlier stressed by respondent C. After project costs are brought down, it still would not be economically feasible for companies to pursue the investments toward CCS without subsidies and incentives. In the annual report (2023) from Northern Lights, a total funding of NOK 2475 million was distributed in 2022, whereas the company's total assets at the end of 2022 were NOK 6380 million (Norlights, n.d.). The extensive funding to The Northern Lights negatively affects other parts

of the sector in the short term. Smaller-scale businesses that have invested in geological surveys and explorations that have their licenses turned down as the government's annual budget toward subsidies have diminished leads to negative ripple effect on the sector toward CCS.
"It has to be business, CCS can't be done for free. I mean, Northern Lights work because the Norwegian government paid for it, our taxes paid for it, we paid for it. The Northern Lights project shows that it technically can be done but funding alone is not going to solve the problem. There are needed more companies and more competition involved to make this work. To get competition we need a better framework around licensing and permits to make Norway an attractive country to storage CO2 in." **-B, Subsurface Director, Oil&Gas&Renewables**

The respondents clearly signal that the economic implications of climate policies and regulatory compliance are essential and are indeed changing investment decisions. They also show how the companies are changing their strategies toward 2030. Current legislation does not provide the freedom and necessary subsidies for all the players in the market, and the larger companies are prioritized when looking at data from Northern Lights. How the decision from the government ends up impacting the landscape of commercialized CCS in Norway is yet to be seen if it were an intelligent decision to fund larger projects and decline smaller operations spread across the country. The large scale-investment in Northern Lights potentially leads to vast experience and learnings that not only benefit the involved operators in the short-term but also provide solutions for the broader operatorship around the Norwegian energy sector, which can incentivize more companies investing toward CCS if it leads to effectivization measures or cost reduction.

First and foremost, subsidies are too small, and the approval time for licenses is too long. Additionally, foreign companies from other countries would strive to store carbon in Norway if the framework were attractive enough, like in the 1970s when Norway struck oil. From the information provided by informant B, there is no doubt that there is a theoretical foundation for companies to invest in carbon storage in Norway. Large-scale commercialization for domestic and foreign companies could be possible with extensive up-front governmental support. The regulations' direct financial implications relate to reducing emissions because of the increased taxation through the EU ETS and carbon tax.

4.2 Company adaptation and Innovation

4.2.1 Technological Advancements

The Norwegian energy landscape is dynamic, open to new innovations, and in the midst of an energy transition. The landscape of companies operating in Norway is represented by being highly adaptive, competitive, and knowledgeable. The rate of technological advancements in recent decades has been levelized, and upcoming innovations are developed to reduce emissions, increase production efficiency, and help reach the climate goals. For Norway to reach the climate goals and achieve the goal of 7,8TWh solar energy by 2030 and beyond coming forward to 2050, the legislation, regulatory landscape, subsidies, and incentive arrangement must be revised to cover strategic energy-intensive actors in the market. This includes wafer producers, industries and regular households (DNV et al., 2024).

Respondent C´s respective company has one of the most prominent circular solutions for sustainable silicone production. If the production were reinstated and commercialized, it would provide circularity to the industry, making solar even more renewable. Moreover, respondent D explains how their production would wean off the Chinese import of wafers, where the production is more GHG intensive and the aspects of health and labor conditions are limited.

> *"The silicone and solar market have been evolving since the 1990´s. Always new technology, greater requirements for cleanliness and achieving a higher degree of efficiency. We adopted to this and innovated a recycling process for the silicone production. The new plan was called " Making Solar Circular ". The plan was a success until the electricity crisis came. With no governmental support to tackle the increased power prices we had to shut down all production, including the circular one (…) We were losing money from day 1, what we were supposed to sell for 5dollars cost us 10 dollars to produce"* **-D, Commercial Director, Solar.**

Solar panel production and energy efficiency during the electricity crisis affected prices greatly, increasing demand for solar panels and wafers. During the crisis, the government stepped in with a power support scheme for residential and large industrial actors in the power market. This ultimately led to the depletion of the demand for silicone and solar photovoltaic panels.

Coming up to the support scheme, consumers and large industrial actors demanded photovoltaic energy as a source as the electricity prices were high. After the scheme, the market fluctuated as the payback period for the investment was increased, and the electricity prices lowered as an effect of the scheme.

> *"In other words, after the electricity subsidy came, the private market just disappeared for solar panels" (...) "If the industry had been allowed to let loose, and if it had been required to build solar panels on industrial or commercial buildings, then there would be no problem in reaching the proposed goal of 7.8 TWh of solar power by 2030. The theoretical capacity is even much higher than that. If everyone had 4-5 kWh on their roofs, as well as a home battery in their garages, we would be well on our way to meeting this target. Additionally, imposing requirements for solar installations on the industry could significantly contribute. Despite the difficult terrain, Norway has an incredible number of roofs that could be utilized for solar energy."* **-D, Commercial Director, Solar**

Respondent E explains how the company´s innovative global approach largely has evolved their operations. The promise to the end consumer is to offer 100% renewable energy, always. To fulfill this promise, the company had to expand their focus in the energy mix beyond solar, resulting in establishing wind and battery storage solutions. Further the respondent elaborates on how the innovation in 2024 is happening extremely fast and that the technological advancements and innovations are endless, resulting in accelerating the adoption and rate of renewable energy in the total mix of partnering businesses and countries.

> *"When we want to offer 100%, it can't just be sun. It has to be helped by other energy sources in the mix. Right now, there is a hugely exciting development. The whole innovation bit is very exciting when it comes to renewables."* **-E, EVP Sustainability, Renewables**

4.2.2 Renewable Energy Projects and Initiatives

One of the most prominent renewable energy projects is the Northern Light CCS project in Norway. It is the worlds' first open-source CO2 transport and storage infrastructure. The project aims to initialize the commercialization of CCS and help companies provide safe and permanent

storage of CO2 that would, in other ways, end up as direct open-air emission (Norlights, n.d.). Moreover, The World Energy Outlook report from IEA (2023) emphasizes the importance of innovation. It shows evidence of exceptional cost-efficiency regarding both bottom-fixed and floating offshore wind production (IEA,2023b). Respondent B stresses the importance of governments taking early-phase projects' initial risks and costs. CCS projects like the Northern Lights show that commercialization is possible in Norway from Norwegian companies in strategic partnerships. Looking back at the cost of early-adoption projects of offshore wind, the industry has come far in developing processes that reduce the costs on the way and invest in correct materials with more extended durability. An example earlier brought up in the literature review is Equinor's Hywind Tampen project. The project exceeded the planned project cost by NOK 2,4 billion but still managed to adapt many processes that would only have been possible if the industry had taken learnings from the Hywind Scotland project. The development is further emphasized by respondent B, who directly worked with the project.

> *"The costs are initially very high in renewables because we don't know how to do it efficiently yet. Only by doing and learning from pilot projects can you understand where the pinch points are and really work on figuring out how to reduce the costs for the future. We can already see the benefit from the Northern lights CCS project. It showed where the pinch points were on the cost. From that we can learn to figure out how to make it more efficient."* ***-B, Subsurface Director, Oil&Gas&Renewables***

Moreover, solar-photovoltaic technologies have experienced a shift in the later years, with more "green" and "grey" areas being utilized for solar parks as part of the energy transition with an increased number of domestic projects. For Norway, green areas are categorized as forests and open land, and grey areas are categorized as roofs, commercial buildings, and private households. The commercialization of green areas for solar parks in Norway cooccurs with public hesitation and expensive permitting and certifications, resulting in a slower transition than theoretically possible. Respondent D expresses how the focus on grey areas might be the solution moving forward and that Norway has many roofs that could have been covered with solar photovoltaic if the industry were enforced. Moreover, the respondent emphasizes the importance of utilizing every possibility to capture renewable energy. One of the later projects included floating solar farms on lakes in Norway, where areas could bring positive and renewable energy supply to manufacturing industries nearby.

"We hope to invest in a polluted lake located at Hydro's old plant on Herøy - this could provide 20 MW in solar energy. In this lake, there are absolutely no possibility of retaining biodiversity and life. In situations like this, we have to take advantage of what we can adjust to the energy transition." **-D, Commercial Director, Solar.**

Several financial and regulatory factors lead to the situation that respondent C´s respective company is experiencing coming up to Q2 2024. The respondent explains how the company could experience differences in energy prices the day the switch of the interconnector between Norway and England was turned on. Being relatively small, the company was not in a position to get power-price agreements like the large organizations in Norway. Company C is dependent on negotiating quarterly power deals on Nordpool&NASTAK. The respondent further explained that the average power price in the last ten years has been between 35 and 45 euros per MWh and increased to 70-75 euros per MWh during the electricity crisis. Eventually, this led to ceased operations, and the organization is currently under a restructuring and merger acquisition period. Respondent E clearly expresses frustration toward how the government did not manage to cover the support scheme across the sector during an important energy transition. Furthermore, the respondent stresses how redundant it is for the sector that is losing technological advancements, especially as it has resulted in production being paused for an undetermined period of time at a time when the energy prices have been stabilized.

"It is incredibly awkward that the government did not step in to support smaller companies during the electricity crisis in Norway. The result now is that we are no longer in operation, and that the same products that we produced are imported from China, with a much larger climate footprint, CO2 intensity and with worse humane working conditions throughout the supply chain. (...) We have a large customer base who request our products as they would like more, since they have received samples of the products. But we have to say no since we are closed." (...) If we had been allowed to continue with that, and build up the production we had here, we could have achieved great things." **-D, Commercial Director, Solar**

4.2.3 Transition strategies and Partnerships

Respondent B states clear indications of large strategical allocation of capital expenditures for their respective company over the coming 3-4 years. The initiative reflects a robust strategy moving forward to 2050 and the energy transition. By investing 40% toward renewable energy technology, the company ensures that it keeps up with the regulatory framework of the Norwegian government to reduce its carbon footprint. Simultaneously, the company aims to supply and support European countries transitioning from coal to gas. The investment plan of respondent B´s respective company displays high commitment toward achieving the goals set by the EU Green Deal and National climate goals. Companies taking these kinds of responsibilities and risks significantly facilitate opportunities for smaller-scale businesses, opening doors for cooperation toward renewable energy projects. The adaptation and strategic shift are also heavily supported by respondent C´s respective company, aiming for significant investments towards sustainable energy and capital expenditures moving from fossil fuel operations to renewable energy technology and adoption. The closer to 2050 and net zero, the more considerable CAPEX investment toward renewables.

> *"We have drawn up a somewhat tough strategy toward the energy transition. We´ve set fixed capital targets toward renewable and low-carbon solutions. It´s certain that we will manage it, and it´s part of our demanding energy conversion plan that include 20% CAPEX in 2030 and 50% CAPEX in 2050."*-**C, Production Director, Oil&Gas&Renewables**

Respondents A, B, and C, who directly work within the production of Oil&Gas among other sources, want to commercialize Carbon Capture Storage and Utility (CCSU). After decades of experience within the Offshore Petroleum sector, Norway should be a good location for companies to store their CO2 to reduce emissions and tax pressure. All the respondents explain how necessary emission reduction measures have become and that reporting has become a necessity, even for smaller-scale businesses with fewer resources. The most forthcoming investment from the three companies extracting oil in the short term is CCS technology. It is seen as a "bridging technology." The shift for oil and gas companies' medium to long term seems to be to produce purely renewable energy originating offshore wind to power the platforms instead of fossil-fuel driven turbines.

"Coming forward, we will invest our resources to get awarded more production licenses to increase Oil and Gas production, but also to increase our stake in CCS technology. We have seen it´s becoming a trend in the industry on a global level, and it´s an important step for the Norwegian economy to do our part to achieve the climate goals. We´re lucky in Norway to have the technological knowledge. **-A, Business Manager, Oil&Gas&Renewables**

It is up to further discussion whether investments toward increasing oil and gas production can be viewed as a strategic shift toward a net-zero world, but for Norway, it can. Europe´s energy mix is heavily divided country-wise, and many are lagging in terms of domestic energy production. For these countries to contribute substantially to the energy transition, they depend on the stable and secure import of Norwegian gas. For instance, 70% of Poland´s domestic electricity generation originates from coal, whereas the European average is 16% (Kardaś, 2023).

"I think within the EU, Poland is one of the countries that has got the greatest challenge to make the energy shift because it's been so heavily dependent on coal, and the Norwegian energy sector can be a big contributor to the transition through the supply of gas through the Baltic pipe and through CCS in Norway (...) Norwegian Gas is the energy transition for Poland.". **-B, Subsurface Director, Oil&Gas&Renewables**

For Norwegian energy companies to provide a stable gas supply through the Baltic pipeline, the EU´s GHG emissions can be drastically reduced over the span of the following decades. The measure must be viewed as a transitional, sustainable measurement toward net zero. Since Russia invaded Ukraine, the Norwegian gas supply has played a more central role in Europe´s transition away from the worst fossil fuel sources, strengthened by the RePowerEU legislation that ensures quicker renewable sources adoption for European countries (European Commission, 2022b). Respondent B brings essential aspects to the discussion of what strategic shifts must be made and which ones are realistic to achieve regarding the climate legislation imposed for companies producing energy throughout the energy mix.

"When I look at the funding in our organization for our activities and new projects in the next three to four years, we'll aiming to achieve a split of roughly 40/60, where 40% is exclusively new energy, green operations, and the 60% is the maintenance of existing operations and energies (…) Its quite a significant goal of capex investments in these types of projects and that's across the whole value chain from upstream to downstream (…) We have high ambitions and hope that the Norwegian government will give us a platform to ensure that we can try and deliver towards 2050. We feel we´re at phase 1 now, as the journey hasn't really started." **-B, Subsurface Director, Oil&Gas&Renewables**

Respondent D expresses the importance of always being eager and open to new solutions and changes in existing strategic approaches, so the respective company has explored solutions to utilize area and terrain around road exits from motorways. Establishing a long-term partnership with the state-owned company Nye Veier is an innovative approach to contribute to the energy transition. Solar photovoltaic technology's conditions and theoretical function make the proposed project a strategic fit, as other renewable energy sources in specific environments would not be feasible. "Green areas" around road exits and highways should be regarded as low-impacted areas concerning environmental degradation and harm to biodiversity. The proposed project comes with a twist as the current legislations undermine the theoretical potential that the areas and solar photovoltaic energy have for road areas.

"We have engaged with Nye Veier, who issued a Request for Information (RFI) seeking suggestions on how to utilize their road areas for solar energy installations. The challenge with Norwegian road areas is the 15-meter safety distance requirement. If this regulation were adjusted, significantly more solar energy could be installed along Norwegian roads. For instance, with current measures, we could install 3-4 MW of solar panels in collaboration with an industrial partner with facilities close to the highway. However, under existing regulations, this potential is reduced to approximately 1 MW which decreases the profitability and payback period of the investment." **-D, Commercial Director, Solar**

The regulations regarding the safety zones today restrict the possibility of solar upscaling toward the Norwegian road network. For instance, had the safety zone been changed by 5 or 10 meters, it would significantly impact the efficiency of solar photovoltaic energy sources in unused areas. Providing clean energy to industries nearby in areas already affected by pollution and regarded grey areas would benefit the environment and energy supply.

4.3 Economic and Market Factors

4.3.1 Market Demand and Economic Incentives

The demand within the energy mix plays a crucial role in which direction Norwegian energy companies are steering moving forward to 2030 and 2050. Existing governmental reports coupled with respondents' information provided insights into how Norway supplies energy to European countries through an extensive network of gas pipelines and interconnectors, essential to reaching climate goals. Meeting the market demand and supplying Europe with energy in the transition is crucial for growing the overall economy and stabilizing the energy security in Europe in the decades to come. The competitive and dynamic energy environment in Norway involves an interplay of market incentives to increase or decrease the strategic attractiveness of specific segments within the energy market. The Norwegian market has experienced various fluctuations in prices of raw materials, electricity, and supply chain problems in the later years. To meet the fluctuations, the government has imposed various incentives to decrease the negative economic effects on the market. The respondents have all been impacted by the economic incentives and market yet to different degrees regarding how it impacts their future investment toward a changing renewable energy market.

Informant E stressed the problem and hardship of being a renewable energy company without oil and gas revenues to support renewable projects; hence, it's crucial to have governmental support, aid, and incentives. The problem that was mentioned between the lines is that the regulations are there, but not in comparison to the motivation of the companies and the theoretical possibilities and size of scalability that exist in the market.

"Regarding the regulatory, environmental, social and legal aspects, sun is the most favorable renewable source to install at current times given the entire process from projection to commercialization. Going over to wind power, it´s a lot more difficult. Norway´s renewable market is clearly not mature when they do not have the regulations in place. You can't have green growth if you don't have money or subsidies on the bottom line." **-E, EVP Sustainability, Renewables**

The current procurements to get licenses are time-consuming, unfavorable to competition, and counteracting to high-scale commercialization. They emphasize the problem as a hinder to finalizing their shift toward more sustainable investments, further explained by respondent A.

"I am very concerned about sustainability, and that in Norway if change is to come, the change must come from the oil industry. There are the resources, the industry that has the money to change this shift, as well as the experience and 'know-how' to change (...) The exploration process for CCS reservoirs is the same technology companies use when looking for oil and gas, and everyone is aware of this." **-A, Business Manager, Oil&Gas&Renewables**

Respondents A, B, and C, who directly work within oil and gas production, among other sources, want to commercialize Carbon Capture Storage and Utility (CCSU). However, the current procurements to get a license are time-consuming, unfavorable to competition, and counteracting to high-scale commercialization. They emphasize the problem as a hinder to finalizing their shift toward more sustainable investments. As further explained by respondent A.

*"Coming forward, we will invest our resources to get awarded more production licenses to increase Oil and Gas production, but also to increase our stake in CCS technology. We have seen it´s becoming a trend in the industry on a global level, and it´s an important step for the Norwegian economy to do our part to achieve the climate goals. We´re lucky in Norway to have the technological knowledge. The exploration process for CCS reservoirs is the same technology you use when looking for oil and gas, and everyone is aware of this. It´s just not commercialized as hoped for***." -A, Business Manager, Oil&Gas&Renewables**

The Norwegian oil and gas market is expected to be in high demand for many years to come, and it accounted for 73% of the total export value of goods in 2022, equivalent to NOK 1900 billion (Norsk Petroleum, 2024b). As respondent A highlights, Norwegian technological knowledge coupled with the increasing global demand for CCS might result in Norway being a carbon storage marketplace and a significant oil and gas supplier if it is commercialized in time. Further development of green initiatives such as electrification and offshore-wind powered Oil&Gas platforms will be paramount to ensure a stable market supply for the transitional journey toward a net zero Europe and Norway.

4.3.2 Cost-benefit of Green Investments

What renewable energy source gives the most benefit with the lowest cost and risk must be individually evaluated according to various factors. However, solar is still one of the most excellent complementary sources to conventional energy during the current energy transition, presenting a generally lower overall risk than other renewable energy sources (IEA,2023b). The efficiency of solar photovoltaic technology has experienced remarkable development over the last decades, primarily regarding the production and technology of silicon wafers (Wang et al., 2023). Respondent E explains that solar energy cannot provide 100% of the energy demand but that the technology is currently at a low-risk, complementary source to the existing primary supply of energy on-site, inhibiting GHG reduction.

Solar photovoltaic technology has consistently improved and optimized, and the required area needed to produce the same amount of energy has been drastically reduced. The optimization and enhancements enable a more significant percentage of conversion of solar energy into electrical energy per unit area, further explained by respondent D.

> *"The solar panels that were installed early on were installed in the best conditions and locations. What has happened with the technology is that a panel of 1x1 meter in 1990 could produce 200W, while today a panel of the same size can produce 600W. This means that in the same area you can triple the energy production efficiency. Given the higher electricity prices we see in Norway today, it would be financially advantageous to dismantle old solar parks and reinstall the new, more efficient ones."* **-D, Commercial Director, Solar.**

Compared to fossil-fuel investments, renewable energy sources have much lower maintenance costs over the lifespan but more significant initial investments up-front with a more extended pay-off period (Roser, 2020). The cost-benefit relationship is therefore meaningful to discuss further to understand what kind of investment strategies are economically sustainable short-term and long-term for various-sized companies operating within the Norwegian landscape. As respondent D emphasized, solar is getting more and more effective, reducing the payback period of the initial investments by being able to harvest a higher quantity of renewable energy for extended periods. It can be further questioned if the increased efficiency of renewable energy sources will stimulate market growth and attractiveness. In a situation where the cost-benefit continues to increase positively, investors might hesitate to be early adopters of new technologies and rather stall the investments due to the risk of current technologies being heavily outperformed. (Dahl et al., 2022) argues the phenomenon is particularly relevant to Norwegian offshore wind investments in the energy sector, which are characterized by high initial cost, high risk, and rapid innovation. Over time, these investments will generally return yield and reduce overall emissions. What can help Norwegian energy companies overcome the risk and up-front financial barriers to renewable energy investments are governmental subsidies and incentive-schemes, as well as the effectiveness of the technology and the initial cost pay-off period.

> *"The goal will be to reduce CO2, if we are to be allowed to live that long, and then we must take measures along the way that make it possible to extract as much oil and gas - but with as little emissions as possible to keep the field cost-effective"* **-C, Production Director, Oil&Gas&Renewables**

From the respondents working within Oil and Gas producing companies, the cost-benefit picture of green investment is mainly evaluated on the ease of the tax burden as a result from the green investments, as respondent C draw attention to above. A report conducted for Offshore Norge in 2023 concluded that Equinor operated platforms in Norway will be able to reduce emissions by 0,3-0,75tons CO2/MWh energy produced if electrified from shore and provided with offshore wind energy (Thema Consulting Group, 2023). By 2030, the total emissions from Norwegian Oil&Gas production are expected to be 15 million tonnes of CO2 equivalents, aligning with EU´s target of emission reduction. By incorporating the expected carbon tax of 2000NOK/ton to the emission volume, the significance of green investments and

its ability to lower cost and overall emissions for Norwegian energy companies toward 2030 and 2050 are portrayed (miljødepartementet, 2021).

For floating and ground mounted offshore wind technologies, state of the art horizontal axis-turbines to maximize energy utilization efficiency are already in use (Wang et al., 2023). Future cost savings and benefits are likely more related to the processes, supply chain and "learning-by-doing" approach, as emphasized by respondent B and C. The investment barriers and risks toward offshore wind existing in 2024 will most likely be eliminated over time through large-scale commercialization and "learning-by-doing" initiatives combined with state provided incentives within the sector in the years coming up to 2040 and 2050.

The World Outlook report (2023) by IEA presents an expectation of full-scale global commercialization of floating wind turbines with lowered costs coming forward to 2040 with a lower levelized cost of electricity production (IEA, 2023b). This lowers the risk of investing in one of the renewable technologies regarded as the highest risk in 2024. Moreover, the Norwegian expertise in offshore operations will diminish the risks related to high supply chain costs of transportation, preparation, and maintenance, having a strong established sector. A government that exercises initiatives early on and utilizes the sector for future adjustments will benefit long-term with reduced oil and gas production post-2050.

4.3.3 Risk Management and Market Mitigation

To stay competitive and maintain financial stability, various risk management measures are implemented to ensure long-term success in the Norwegian energy sector. The respondents mention many risks associated with the current energy mix shift, resulting in revised strategies, budgets and investments. Adopting the current Norwegian energy landscape involves risks associated with market volatility, regulatory changes, innovation and environmental change. Since the start of the war in Ukraine, Russia has used natural gas as a weapon of war, throwing Europe into an era of energy crisis, resulting in significant strategic readjustments and further risk mitigation.

For Norwegian companies, the rapid changes in the market and the demand to quickly adjust presented significant risks but, at the same time, created opportunities. During the time of the energy crisis and transition, Europe's energy market has leveraged innovations and emerging

technologies to ensure energy safety, ultimately relying on an increased market of clean renewable energy technologies and production. Since the European independence of Russian gas, the evolving regulatory framework and Europe's strategy have strongly cooperated with Norway to ensure market stability and risk mitigation, being one of Europe's most important energy suppliers. Respondent A emphasizes the importance of measures their respective company took during times of uncertainty, such as buying options on natural resource prices and currencies.

> *"We have done a complex risk assessment in the current market and have invested in options on Oil&Gas prices and currency. To be in a stable position in the event of large price fluctuations on the raw materials and currency have big value. One of the most important risks measures an oil company can do is to secure and protect your financial position by stabilizing income in an unstable period of time***." -A, Business Manager, Oil&Gas&Renewables**

Respondent A stresses how their company's mitigation strategy involved a process of hedging fluctuations. In an unstable market, hedging provides insurance to the company for a limited amount of time. Ultimately, this empowered the company to maintain critical capital flow and financial positions during large fluctuations in raw material prices and currency alterations. The respondent further constitutes that the percentage of how much stake operatorship on the Oil and Gas installations the company partakes also are decided out of several risk factors as described below.

> *"The percentage of licenses we decide to buy in a producing Oil&Gas field are not affected by the climate taxes. The investment decision consists of an overall risk assessment of the company´s position, financials and other risks. An important aspect of the risk matrix is climate, and since 2021 we´ve had more specific focus toward climate."* **-A, Business Manager, Oil&Gas&Renewables**

The climate will be an important factor moving forward for respondent A, as it will help secure financial positions in the market that will be beneficial in the long term. The proactive approach by the company will help the company better adjust to the development and adjustment of regulations, market shifts and fluctuations in the future. The risk mitigation approach differs for

renewable energy companies, but the means are the same. The process involves evaluating social, economic and environmental factors. The combined evaluation helps the respondent to form a broader picture of the risks combined with a potential investment in the specific area. For an investment to be attractive, the overall factor assessment has to be convincingly low-risk and involve a reasonable payback time on the investment. Respondent E's company is installing solar photovoltaic plants, wind farms, and battery storage solutions. The process includes a comprehensive risk-management framework, thoroughly analyzing the portfolio's potential before venturing into the project.

> *"There are many factors that come into play. The most important moving forward in a potential investment is first to secure a land area with access to the power-grid. We then start with area-design with the projected energy source for optimized installation for maximum energy efficiency. When this crucial step of the process is finished, we carry out a comprehensive risk assessment looking at ecology, environmental, social, purchasing, laws and regulations and the political situation."* **-E, EVP Sustainability, Renewables**

Moreover, Respondent B explains how oil and gas companies looking to invest in CCS are negatively affected by the current regulatory landscape in Norway. The current incentives and legislation toward CCS impose unnecessary risks to companies. Companies wanting to store carbon on the Norwegian Continental Shelf experience significant upfront risk in both exploratory processes before establishing a functional economic CCS model for injection, and finally, when the economic model is set, the government decides which company gets the license, independent of who conducted the exploratory and seismic surveys. Finally, the revenue stream is connected to the amount of carbon tax the government decides to set. As respondent B further emphasizes, these factors impose an unnecessary risk on energy companies wanting to reduce their CO2 footprint.

> *"You don't get the same tax breaks in CCS that you do in oil and gas, so the companies at the moment would have to take all the risk before you get any revenue. Then the revenue stream is dependent on what the politicians decide to set the carbon tax. It's a lot of business risk and that's holding back many promising projects."* **-B, Subsurface Director, Oil&Gas&Renewables**

4.4 Corporate Social Responsibility and Ethical Considerations

4.4.1 Commitment to Climate goals

Corporate social responsibility, ethical deliberation, and moral commitments are vital qualities that energy companies should consider in their strategy. The energy transition in Norway has brought many challenges to various companies in the mix, and to meet these challenges in the most responsible way, it is critical to have all stakeholders in consideration, as they are critical to achieving long-term successful investments. Balancing the regulations and climate goals with economic performance comes with hardship. This last chapter aims to explore how the respondents have prepared and reacted toward the shift concerning the transparency in the sector coupled with their motivations to achieve successful investment strategies to reach the climate goals.

Respondent A and the respective company feel a close relationship and obligation to do their part to achieve the climate goals and are committed to being a part of the change. To be a part of the change, Respondent A and the respective company will follow the National climate goals of Norway and uphold and follow regulations set by the EU legislations that Norway follows through the EEA agreement.

> *"The feeling we get from working in the Norwegian energy sector is that companies want to take responsibility, and it seems like climate emissions are highly prioritized among partners and competitors."* **-A, Business Manager, Oil&Gas&Renewables**

Responsibility is to be at the core of Norwegian energy companies, being eager to lower emissions and contribute to lowering the overall emissions in Europe by supplying the cleanest oil and gas possible. As earlier mentioned by the informants, the commitment to climate goals is reflected in their investments toward new technology and renewable energy sources and establishing partnerships to have the financial strength to maintain and complete proposed projects within CCS, offshore wind and electrification.

> "We are undertaking activities related to Carbon Capture and Storage (CCS) in Norway, and we must ensure they align with our current strategy and future commitments." ***-B, Subsurface Director, Oil&Gas&Renewables***

Future commitments for respondent B´s company include ensuring a stable gas supply through the Baltic pipe to support the energy transition in Poland, which is heavily dependent on coal for electricity production. This strategy aligns with the EU´s target of reducing emissions by 55% before 2030 concerning EU Fit for 55 and EU Green Deal and Norway´s goal of reducing emissions from 50-55% compared to 1990 levels (European Council, 2021). In addition, the respondent emphasizes the commitment toward large-scale GHG reduction measures, explaining that they have ongoing processes planned for the future and ensuring that they capture the carbon in gas and oil supplied to Europe during the transition and dependency.

4.4.2 Ethical investment and Transparency

Ethical standards and considerations are steadily impacting investments in the energy sector as stakeholders are increasingly more aware of the adverse effects that conventional oil and gas production has on the environment. For Norwegian energy companies to maintain transparency with all stakeholders, being open concerning core activities moving forward in the energy transition is essential to be an attractive supplier and cooperation partner. Decorating operations as something they are not will quickly be discovered and brought to justice by the Norwegian government. Overall, the Norwegian market is known for being transparent. Not following ethical and transparent approaches in Norway will negatively affect the financial position, sustainable operations and overall reputation.

Respondent B highlighted a trend they have experienced in the Norwegian energy sector lately, where many companies are rebranding themselves away from fuels and oil and moving to energy, even though most operations are in oil and gas production. It might be discussed that the rebranding is part of a long-term strategic plan that aligns with the energy transition plan and climate goals, but it does not represent the current reality. With this in mind, respondent B stressed their commitment to staying transparent about their primary operations and stated that they would not follow this trend. Respondent B´s company will continue to identify as a petroleum company even though its strategic approach and investments coming forward to 2030 will increasingly focus on CCS, offshore wind, and electrification to reduce GHG emissions.

> *"We must be transparent and open about what we do. Our core activity is oil and gas production and presenting ourselves as an energy company does not reflect reality. Many companies have changed their name, and it can be discussing how transparent it*

is. Even though they have several renewable energy projects and initiatives, Oil and Gas are still their primary activity that finance the renewable energy projects." **-A, Business Manager, Oil&Gas&Renewables**

Respondent B explains how oil and gas production is a part of the transition, and stamping it as a dirty activity is wrong, as the world will have great demand for natural resources for decades to come. Their approach to conducting ethical and transparent business in Norway is closely followed up by having head-office officials placed in Brussels to deal with this kind of negotiation and complex issues related to the matter. Moreover, the respondent emphasizes the importance of transparency and openness in their operations. Poland is heavily coal-dependent for electricity production, and going through the national strategy of steadily increasing gas exports to Europe could be considered unethical and irresponsible during an energy transition. However, this is not the situation as ga can be seen as an transitional energy source comparing it to coal. example shows the importance of companies being transparent and presenting public datasets for all stakeholders to read and understand the company's perspective of operations. The current operations' due diligence shows financial investment for the better good of Norway, Poland, and other European countries receiving natural resources from the Norwegian petroleum sector. The revenues from the Oil and Gas production contribute significantly to the upscaling of renewable energy technology and further transition measures in the Norwegian sector.

"We have people from the organization stationed in Brussels to engage in negotiations to gain a thorough understanding of long-term EU policies and how we need to adjust our organization. The energy transition and climate goals are impacting the entire value chain in term of funding from the banks. (…) Energy companies rely on financial support from banks to invest in their activities. Banks are increasingly reluctant to finance 'dirty' activities and are more inclined to support green investments and renewable energy projects." **-B, Subsurface Director, Oil & Gas & Renewables**

The commitment to climate goals among companies in the Norwegian energy sector is reflected clearly in the various initiatives and strategies highlighted by the respondents. Experiencing a consistent alignment among the respondents, the strategies clearly commit to economic growth and doing their best to help achieve the climate goals. For the respondents, processes to achieve

climate goals in their long-term strategy are clearly integrated to make successful long-term investments in green solutions and renewable energy sources.

4.4.3 Broader motivations and Social Responsibility

Broader motivations and social responsibility have been emphasized as the overarching ethical and strategic reflections that Norwegian energy companies go through when conducting business and evaluating investment opportunities. These qualities help companies drive toward sustainable corporate behavior and maintain transparent stakeholder relations. For companies to maintain strong positions in the Norwegian market long-term, commitment to social responsibility significantly impacts sustainable operations. The respondents stressed the importance of socio-economic awareness and impact, especially being oil and gas producers. The broader motivations for these companies are to provide oil and gas with as few emissions as possible in response to the demand in Europe. The companies strategically evaluate the necessary steps to maintain social responsibility by providing this.

> *"To be able to completely move away from oil, we have to change our thinking and how we live, it is an unrealistic future to think about how we live. Especially regarding how important the Oil sector in Norway is regarding the social and economic aspect and considering all the jobs and the standard without this sector. We have to focus about producing oil in a more sustainable way, rather than believing it's realistic to stop producing it."* **-A, Business Manager, Oil&Gas&Renewables**

Respondent A´s honest statement represents transparency regarding the current dependence on fossil fuels in the global marketplace. Furthermore, the statement emphasizes the sector's broad importance for Norwegian society as a whole, in addition to the revenue stream.

> *"Our drivers towards the renewable energy transition are a combination of taxes, costs related to quotas, legislation and to take the social, corporate responsibility. The cost aspect of carbon quotas and taxes is that they will have a negative impact when they´re set high enough – it makes sense to find a solution quickly to the energy transition. Also, there is the political and social-economic element of it, to realize that a transition is the only right thing to do."* **-B, Subsurface Director, Oil&Gas&Renewables**

Moreover, respondent B brings up the policy instruments that indirectly steer the direction of the company toward more green investments and optimization of emissions as the price of carbon tax is waiting to increase in the coming years. During their change of strategy and investments, the respective companies have identified how important the energy transition and the effect of GHG reductions are for society and the environment. With respondents stating it is the only right thing to do, they are also influencing strategic cooperation partners to include the same socio-economic framework and corporate social responsibility in their operations.

Respondent D desires a future where the government steps in for the overall social responsibility of energy companies in Norway. The respondent emphasizes particularly toward energy companies, as they are primarily affected by volatile energy prices. For the future, the respondent states that the government cannot question if the energy transition is too expensive. The conclusion from the respondents that Norway must step in to achieve the climate goals toward 2030 and 2050 is that the government must step in. To make the transition happen, the government must take the overall social responsibility to make investments attractive and make the shift happen in the sector for all businesses, regardless of size and energy mix focus.

> *"It is no longer a question of whether the energy transition is too expensive, the government must simply have to take the cost. I believe this will be the conclusion.* **-D, Commercial Director, Solar**

5.0 Conclusion

The aim of this thesis was to explore the impact of climate-related regulatory policies on the investment behavior of Norwegian energy companies. By performing an inductive content analysis of five in-depth interviews with industry experts across the energy mix, the following research question can now be answered:

What are the effects of climate-related regulatory policies on the investment behavior of Norwegian energy companies?

The thesis display that climate-related policies significantly impact the investment behavior in the Norwegian energy sector. Through a categorization of critical identified themes, generic categories and sub-categories were developed to clearly illustrate the impact that climate-related regulatory policies have on investment behavior in the Norwegian energy sector.

Through the analysis, four categories were created to answer the research question: regulatory influence on investment strategies, company adaptation and innovation, economic and market factors, and corporate social responsibility and ethical considerations. The generic categories delve on extensions of factors that influence how climate policies impact the energy companies´ investment strategies toward ultimately achieving the climate goals.

The current regulatory framework in Norway have shown to influence the investment strategies of the energy companies in large scale. Policies and instruments as The EU Green Deal, Fit For 55, EU ETS and Carbon tax drive Norwegian energy companies to steer in new directions unlike the past. Investment toward renewable energy technologies to adapt to the compliance measures have shown to be necessary to stay competitive long-term in the Norwegian energy sector.

Adaptation and innovation have shown to be essential as a response to the regulatory framework in Norway. Larger investments toward CCS technology, offshore wind, solar energy and battery storage have shown to be crucial toward 2030 and 2050 deal with increased carbon price but most importantly to achieve the climate goals. Companies venture into strategic partnerships to reduce risk, emissions and to accelerate the shift, but finally and most importantly to handle the high up-front cost of the investments with limited government subsidies.

The robustness of economic incentives from the Norwegian government and market demand for more green energy have substantially affected energy companies. The carbon tax has been shown to align companies toward sustainable investments to reduce emissions strategically. Due to the current volatile European market, companies perform more comprehensive risk analyses to secure stable long-term investments in renewable energy projects and fossil fuel extraction to supply and ensure a steady energy transition in Europe.

Norwegian energy companies' overall corporate social responsibility and ethical considerations largely affect stakeholder relationships and long-term investment strategies. Their commitment to achieving climate goals is met with ambitious yet transparent targets. The research finds a clear indication of social responsibility toward reducing emissions and a broader motivation to achieve successful long-term investment strategies to manage the energy transition and become carbon neutral.

In summary, the thesis demonstrates that climate-related regulatory policies significantly shape and impact investment behavior in the Norwegian energy sector. Looking at the sector from a long-term perspective, it is essential to steadily increase the share of green investments over fossil fuel investments to achieve the set goals of 55% emission reduction by 2030 and net zero by 2050.

5.1 Practical implications

The research in this master thesis provides practical implications highlighting the current state of regulatory policies and their effect on Norwegian energy companies' investment strategies. Managers on the same level as the respondents in other organizations could take learnings from the respective respondents' approaches and other stakeholders in the sector, such as policymakers and investors. The research underscores the importance of a proactive approach to the entire regulatory body and continuous adaptation toward the evolving sector and stricter policy schemes. Green investments toward CCS and renewable energy sources will enhance the organizations with reduced emissions and reduced cost to climate taxes. Also, the research highlights the importance and advantages of initiating strategic partnerships to reduce risks toward green investments.

For policymakers, the various implications from the respondents might help to readjust the current regulatory framework, providing guidelines and incentives that provide a safer transitional journey for companies wanting to be early adopters of green solutions. Continuous adjustments from policymakers ensure certainty and financial stability, which fosters long-term investments across new solutions in the sector. The results of this thesis also help policymakers understand the hardships of the current state of CCS procurements and licensing approaches. An inclination toward the companies doing seismic surveys might be optimal and ensure licenses. Finally, the government can also start wholly subsidizing the exploration / seismic surveys to increase the attractiveness of finding storage sites for carbon.

The study furthermore emphasizes the importance of corporate social responsibility in ethical and transparent investment decisions in the sector. The study could work as an inhibitor for companies to increase the amount of resources allocated to this. To maintain a high level of transparency is crucial to maintain trust from the Norwegian society and stakeholders. All companies should integrate a more comprehensive, transparent sustainability reporting strategy such as the EU Taxonomy, which could expand investments toward future green projects in Norway and increase alignment from financial institutions, banks, and investors. Increasing and adapting sustainable investment strategies in Norway can help maintain Norway's leading global role as an energy nation.

5.2 Limitations and theoretical implications for future research

There are several limitations to this thesis. The findings are based on qualitative data of 5 respondents, which may not capture the full diversity and variety of perspectives currently experienced in the sector. Hence, the findings cannot be generalized. Future research would benefit from including a larger sample size and quantitative data analysis to support the qualitative findings. The constrained time limited to the thesis combined with the few business professionals who responded ultimately resulted in selecting respondents based on responses to inquiries. The competence and expertise of the respondents are not undermined as they brought significant contributions. Instead, the sample size limited the research to capture a subset of the insights and perspectives existing across the energy sector in Norway.

This master's thesis builds a solid foundation for future research throughout the Norwegian energy sector. This study has focused on the immediate effects of current climate-related

regulatory policies on investment behavior. To further understand the viability of these investments over time with the hope of a more commercialized renewable energy mix in Norway, a longitudinal study could be beneficial to understand the long-term environmental, economic, and social effects of increased green investments.

Another essential area identified in this thesis is the issues regarding the current landscape of permitting and license processes in Norway. A significant acceleration in licensing processes is needed to achieve the climate goals. Investigating the implications of expedited permit and survey approvals is crucial to understanding the cost-efficiency perspective and effect on biodiversity loss and green areas, particularly solar photovoltaic and onshore wind installation in green areas. Building on this thesis, further research is needed to determine the effects of successful carbon storage commercialization on future oil and gas production and green investments due to a more liberalized permitting policy landscape

Meanwhile, the current policies are subject to revisions and must be steadily assessed and evaluated for emerging green technologies, technological advancements, market shifts, and climate goals. Hence, political complications and challenges might occur. Continuously monitoring the effect that legislation has on the economy moving forward could be beneficial in further evaluating the effectiveness of current strategies and determining if the current climate regulations are viable in the long term. Norway, being heavily affected by supranational regulations imposed by the EU through the EEA agreement, global trends, and international market dynamics could quickly affect the Norwegian market, changing the current state of legislation and regulatory framework.

By conducting research in these areas, policymakers, stakeholders, and companies can significantly benefit from these areas to assess the future toward and beyond the energy transition. Increased knowledge and reinforcements in the Norwegian system sector increase the potential for the sector in the future. Ultimately, more knowledge in these areas might result in committing more systematic and well-informed decisions underway to optimize solutions that would be viable up to and beyond 2050.

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Appendix 1: Interview proposal

Vil du delta I forskningsprosjektet

"The future of Energy Investments: Analyzing the Impact of Climate Policy on Norwegian Energy Companies"

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å undersøke landskapet av risikoer og muligheter knyttet til fremtidens investeringsstrategier i energisektoren. I masteroppgaven er det av interesse å undersøke hvilken effekt regulatoriske inngrep fra myndighetene har for selskapet du er ansatt.

I dette skrivet gis det informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål
Formålet med oppgaven er å undersøke norske energiselskaps evne til å håndtere regulatoriske endringer i sektoren, og om/hvordan strategier og investeringer blir endret som et resultat av disse. Forskningsprosjektet er en del av avsluttende masteroppgave i International Business ved Handelshøyskolen UiA.

Hvem er ansvarlig for forskningsprosjektet?
Universitet i Agder er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?
Du får spørsmål om å delta på grunn av din stilling, kunnskap og erfaring knyttet til energisektoren.

Hva innebærer det for deg å delta?
Hvis du velger å delta i prosjektet, innebærer det at du er med på et dybdeintervju. Det vil ta inntil 1 time. I intervjuet vil det bli stilt spørsmål rundt regulatoriske endringer, investeringsstrategier, eksterne faktorer, risiko og innovasjon samt klima. Lydopptaket vil bli transkribert, anonymisert og deretter slettet.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bruke opplysningene dine til formålene opplyst. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Thomas Aanensen (student) og Andreas Erich Wald (veileder) vil være eneste personer med tilgang til datamaterialet.

Navn, kontaktopplysninger og den konfidensielle informasjonen uttrykt i intervjuet vil bli lagret gjennom sikker lagring og slettet i etterkant av transkribering. Personopplysninger lagres separat fra dette for sikkerheten til intervjuobjekt.

I ferdig publikasjon vil det fremkomme hovedaktivitet til firma (f.eks Olje&gass/Havvind) og tittel knyttet til det relevante intervjuobjektet. Navn og alder vil være skjermet, det vil ikke være mulig for lesere å identifisere intervjuobjektene direkte gjennom å lese den ferdige publikasjonen.

Hva skjer med personopplysningene dine når forskningsprosjektet avsluttes?
Prosjektet vil etter planen avsluttes i løpet av Juni når sensur er publisert. Etter prosjektslutt vil datamaterialet med dine personopplysninger slettes og lydopptak destrueres.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke. På oppdrag fra Universitetet i Agder har Sikt – Kunnskapssektorens tjenesteleverandør vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
• innsyn i hvilke opplysninger vi behandler om deg, og å få utlevert en kopi av opplysningene
• å få rettet opplysninger om deg som er feil eller misvisende
• å få slettet personopplysninger om deg
• å sende klage til Datatilsynet om behandlingen av dine personopplysninger

Hvis du har spørsmål til studien, eller ønsker å vite mer om eller benytte deg av dine rettigheter, ta kontakt med: Universitetet i Agder ved Professor Andreas Erich Wald - andreas.wald@uia.no +47 38 14 19 93 / +47 957 32 342.
Eller student: Thomas Aanensen, thomasaan@uia.no, +47 90154415.

Vårt personvernombud: Personvernombud@uia.no

Hvis du har spørsmål knyttet til vurderingen som er gjort av personverntjenestene fra Sikt, kan du ta kontakt via: Epost: personverntjenester@sikt.no eller telefon: 73 98 40 40.

Med vennlig hilsen

Prosjektansvarlig/veileder	Student
Andreas Erich Wald	Thomas Aanensen

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet Masteroppgave ved UiA – *«The Future of Energy Investments: Analyzing the Impact of Climate Policy on Norwegian Energy Companies»*, og har fått anledning til å stille spørsmål. Jeg samtykker til:

☑ Å delta i Dybdeintervju
☑ At opplysningene mine kan brukes i prosjektet fram til slutt ca 01.06.2024

.....
(Signert av prosjektdeltaker, dato)

Appendix 2: Interview Guide

Seksjon 1: Introduksjon & bakgrunn

• Presenter meg selv
• Introduser studien og forklar studiens mål
• Forklar NSD-kravene og tiltak for datalagring

• Intervjuobjekt – utdannelse
• Intervjuobjekt - rolle i nåværende stilling
• Intervjuobjekt - erfaring innen energisektoren / annen bakgrunn

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• Hvordan stiller selskapet seg i dagens marked med utsikt fram mot 2030?
• Kan du beskrive betydelige endringer i selskapets fokus eller strategi de siste årene knyttet til bærekraft?

Seksjon 2: Regulatorisk påvirkning & industriutvikling

• Er det noen nylige regulatoriske utviklinger har hatt betydelig innvirkning på selskapets drift, investeringer og strategi?
• Kan du beskrive hvordan selskapet holder seg forberedt på regulatoriske endringer og bransjetrender?

Seksjon 3: Investeringsstrategier og Klimapolitikk

• Hva er de viktigste hensynene dere tar før dere går inn for et prosjekt eller foretar en investering?
• Hvordan balanserer dere regulatorisk overholdelse mot andre investeringskriterier?
• Kan du gi et eksempel på en tid da langsiktige bærekraftsmål (satt enten av selskapet eller regjeringen) påvirket en større investeringsbeslutning eller prosjekt?

Seksjon 4: Eksterne faktorer og tilpasningsevne

• Sett litt bort fra reguleringer, hvilke eksterne drivkrefter har styrt selskapet dit dere er i dag? investeringsstrategier? politisk, økonomisk, sosialt?
• Har selskapets forretningsmodell utviklet seg for bedre å samsvare med bærekraftsmålene?
• Kan du nevne en innovativ tilnærming som selskapet ditt har tatt for å møte regulatoriske krav eller for å utnytte markedet slikt det er i dag?

Seksjon 5: Risikostyring og Innovasjon

• På hvilke måter har selskapet deres integrert innovasjon i sine risikostyringsprosesser?
• Hvordan ser du for deg at klimapolitikk vil forme risikovurderingen deres for fremtidige investeringer og prosjekter?
• Hvilke prosesser benytter dere for å sikre at selskapets investeringsportefølje er motstandsdyktig mot
markedsendringer og eventuelt reguleringer?

Seksjon 6: Framtidsprognoser og Strategi

• Hvordan forbereder selskapet ditt seg på mulige innvirkninger av fremtidige klimapolitikker på investering?
• Hvilke utfordringer og muligheter forventer du vil oppstå fra Norges unike posisjon i energisektoren?
• Er det noen spesifikke kilder i energimiksen eller teknologier som ditt selskap anser som avgjørende for fremtidige prosjekter og investeringer, eller vil dere fortsette hovedsakelig med olje og gassutvinning?
• Tror du selskapets nåværende investeringsportefølje er motstandsdyktig mot regulatoriske og
markedsendringer og i forhold til konkurrenter?

Seksjon 7: Avslutning

• Er det noen aspekt eller tanker rundt klimapolitikk og olje/energisektoren i Norge som vi ikke har snakket om, men som du finner viktig å nevne eller legge til?

Discussion paper: The concept of "Responsible"

-Thomas Aanensen

Introduction

International, innovative, and responsible are key concepts in the UiA School of Business and Law´s mission statement and strategy. This discussion paper is a part of UiA´s AACSB Assurance of Learning process. The AACSB accreditation is only attained by the most recognized business schools in the world, showcasing exceptional commitment, diversity, leadership and quality education on an institutional level. These concepts are particularly relevant for students graduating from UiA – School of Business and Law, as each individual carry a certain responsibility forward transitioning to their professional careers. Hopefully, the discussion paper will unveil reflections, abilities, characteristics, thoughts and learnings I´ve attained throughout my Master´s studies that contribute to the relevancy and improvement of the Master´s programme in International Business. Moreover, I will delve deeper into the concept of "Responsible" and reflect upon the term in connection to my thesis on Future energy investments and how Norwegian energy companies are impacted by climate policy.

It is evident that climate change is the biggest health threat facing humanity, and that global communities has a large task ahead (World Health Organization, 2023). The energy sector carries large responsibility to ensure transitional measures are implemented to reverse the effects it currently has on the environment (Statkraft, n.d.). To what degree governments chose to legislate and use incentive / disincentive measures in the energy sector will have a large effect on the global pathway to climate change mitigation and adaptation coming forward to 2050 (International Energy Agency, 2021). Prioritizing the shift toward renewable energy sources and taking responsibility for the future of humanity should be regarded as the foremost objective for governments, organizations and people.

I choose to conduct my Master´s thesis in a qualitative method utilizing both grounded theory and content analysis. My motivation for the thesis comes from my personal interest and experience in the energy sector working as an offshore electrician on installations on the Norwegian Continental Shelf. During my studies it has been clearer to me that the energy sector bears huge responsibilities toward the global net-zero goal. This made me want to research a rather undiscovered topic in Norway, which led me to the research question:

"What are the effects of climate-related regulatory policies on the investment behavior of Norwegian energy companies?"

How climate change and climate policies affect energy companies has been previously researched in various angles and point of views. What is interesting about the topic is that the climate policies are in continuous evolvement and change, just as the energy sector itself. Organizations across the globe are in the brink of potential world-changing breakthroughs and innovations, with continuous improvements in existing technologies (IEA, n.d.). Analyzing how Norwegian energy companies adapt to climate policies and how it interplays in their investment behavior play a vital role coming up in the energy transition. During the process, climate policies have been evaluated and shown to be somewhat effective to the sector as companies are changing their investment behaviors as well as GHG emissions being in decline since 2015 and aimed to further decline in the future (DNV, 2023).

In total, 5 participants have been involved in individual, semi-structured interviews as part of the qualitative research process. All of the participants worked in various organizations operating in Norway within the energy sector, being directors with responsibilities and experience within the scope of sustainability and investments. The approach turned out the be valuable as I received information from oil and gas producers, offshore wind operators and companies focusing solely on renewable energy production. This made it possible for me emphasize on information received during the interviews to build on new knowledge, as well as being able to further investigate interesting and earlier unknown topics. From all the data collected there are significant variances regarding some elements. Yet, other elements presented to the companies showed similarities regarding regulations and investments.

One of my goals early in the process of this master thesis was being able to present and draw distinctions between investment strategies and policy response across the various companies, depending on what energy source focused on. This goal has been achieved through the focus and hard work of retrieving respondents from various companies. Several papers review the energy sector "as a whole", and that it bears the overarching responsibility toward the energy transition. It is important to understand that each company operates under different, unique energy mixes and that it presents huge differences regarding strategy, investment abilities and opportunities.

Discussion

In the discussion part of this paper, I will delve deeper into how the concept of responsible has related to me during the last two years working toward achieving my Master´s degree, and how I have dealt with the various ethical challenges in the process. Moreover, ethical challenges that has occurred from the research question, operating environment, unit of analysis, findings and conclusions during the writing of the master thesis will also be discussed with the parallel thought of "responsible" in mind and how I have dealt with these challenges.

In the context of my Master´s thesis on the effect Climate-related regulatory policies has on the investment behavior on Norwegian Energy companies, the principles of responsibility and ethics were paramount. The fast-paced innovation climate in the energy sector, coupled with the complexity of climate legislations faced me with both complex and ethical challenges. One of the ethical challenges I endured was during my interviews. I had to be careful to not label or make the Oil & Gas producing companies feel like the "dirty emitters or climate betrayers" meanwhile labeling the exclusively renewable energy company as "clean, innovative and pioneer". By remaining non-biased and neutral during discussion of hot topics as the climate debate in the interviews I reinforced mutual trust, credibility and reliability as well as avoiding vulnerable and unnecessary discussions with the participants.

The qualitative study approach presents several ethical issues regarding the sensitive material produced after recording the interviews. Careful planning and openness to the participants how the data is stored, handled and deleted to uphold the privacy rights as stated is an ethical obligation. Early on, I carefully read through and followed the guidelines from the Norwegian Agency for Shared Services in Education and Research (SIKT, n.d.). The guidelines from SIKT helped me in the research process from the start to the end. The process started by filling out the blanks in the disclosure schematic. Relevant companies and candidates were then sorted out. Furthermore, I designed unique application letters and preliminary interview guides which were sent out through e-mail together with the SIKT schematic. I ensured that the emails were in a professional manner yet having the main concepts of the thesis and interview process explained in simple terms. This made all the information clear but also interesting for the candidates.

During the process of retrieving respondents, I experienced a lack of responses, and only 1 in 5 companies would answer to my e-mails. To address this issue, I set up scheduled phone calls 2-3 days subsequent to the first e-mail that were sent. I could then up-front address my previously sent mail, and the companies would in some situations get me in contact with the correct person. To the companies that didn´t answer the calls, I pushed further a second e-mail to receive answers. This showed to only be successful with one of the respondents.

The interviews were recorded using an individual, battery powered, internet free voice-recording device handed out by UiA. The data were safely stored on an internal SD-card, minimizing the risk of interference and data leaks. Furthermore, the data is due to be deleted in early June 2024 to ensure complete destruction of the material. The interviews were organized to be in Norwegian beside one of the interviews being conducted in English under the agreement of the researcher and the participant. Furthermore, the interviews were transcribed for interpretation and discussion. I expected to receive confidential information prior to the interviews as the thesis discovers confined subjects as investment decisions, climate responses and company strategies. I emphasized in advance of the interviews that the entire process is 100% anonymous, this is of importance concerning 1) Disclosing company market positions and competitiveness, 2) Reduce risk of the candidate withholding critical information for analysis, and 3) Personal protection of candidate upon information given with respect to their company. During the process of handling classified information and conversating with high-ranking individuals, I´ve gained new knowledge and approach to ethical standards and its importance.

The University of Agder and Andreas Erich Wald has shown to provide great ethical guidelines that has helped me through the entire research process step-by-step, minimizing the risk of drawbacks in my research by always having openness, trust, responsibility and respect in my thoughts (University of Agder, n.d.-a). The values have given me freedom to perform the interviews in my own way, opening the door for me to be both creative and take responsibility. The approach has given me a sense of trust from the University of Agder, which I proudly represent. This has encouraged me to be the best version of myself during the research and to the represent myself, the university and the thesis to the best of my ability upon the interview candidates and in respect to authors of research I´ve been using in my thesis.

The thesis touches upon a lot of topics where ethical standpoints and responsible manners can be included. Individuals, companies and governments stand upon the choice to invest their time, capital and beliefs toward what they know is right according to public information regarding the effects of climate change. In the context of how individual, ethical viewpoints and responsibility is integrated in a person, one can easily determinate by paying attention to the difference between right and wrong and continuing to do the right thing. Applying this to my thesis on the Norwegian Energy sector regarding the future of investment and the impact of climate legislations, the Governmental institutions, energy producing companies and individuals should know what is right in context of doing their part to achieve a net-zero planet by 2050.

Conclusion

My master´s thesis on the future of energy investments and the impact of climate policy on Norwegian Energy companies has been coupled with the concept of "responsible" in this discussion paper. My goal with the thesis has been to unveil the investment behaviors of companies in the context of climate change awareness, an evolving energy mix and government regulations adaptions. In the journey of writing this thesis, ethical issues have been occurring and dealt with accordingly. The research has shown that climate policy impacts the investment strategies of Norwegian energy companies, which could lead to ethical issues regarding the increase of domestic energy prices for households moving forward to a substantial larger mix of renewable energy production. To utilize the great potential that we inherit for a sustainable transformation in Norway, energy companies must take responsibility in their investment strategies toward renewable sources, research and design and innovation to ensure the best outcome. Furthermore, the government must take responsibility in their legislations, incentivizing climate change mitigation and energy sector regulations that help companies making pivotal changes in their strategies to ensure a net zero world in 2050. By acting in a responsible manner, individuals will gain the trust to empower the energy transition further.

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