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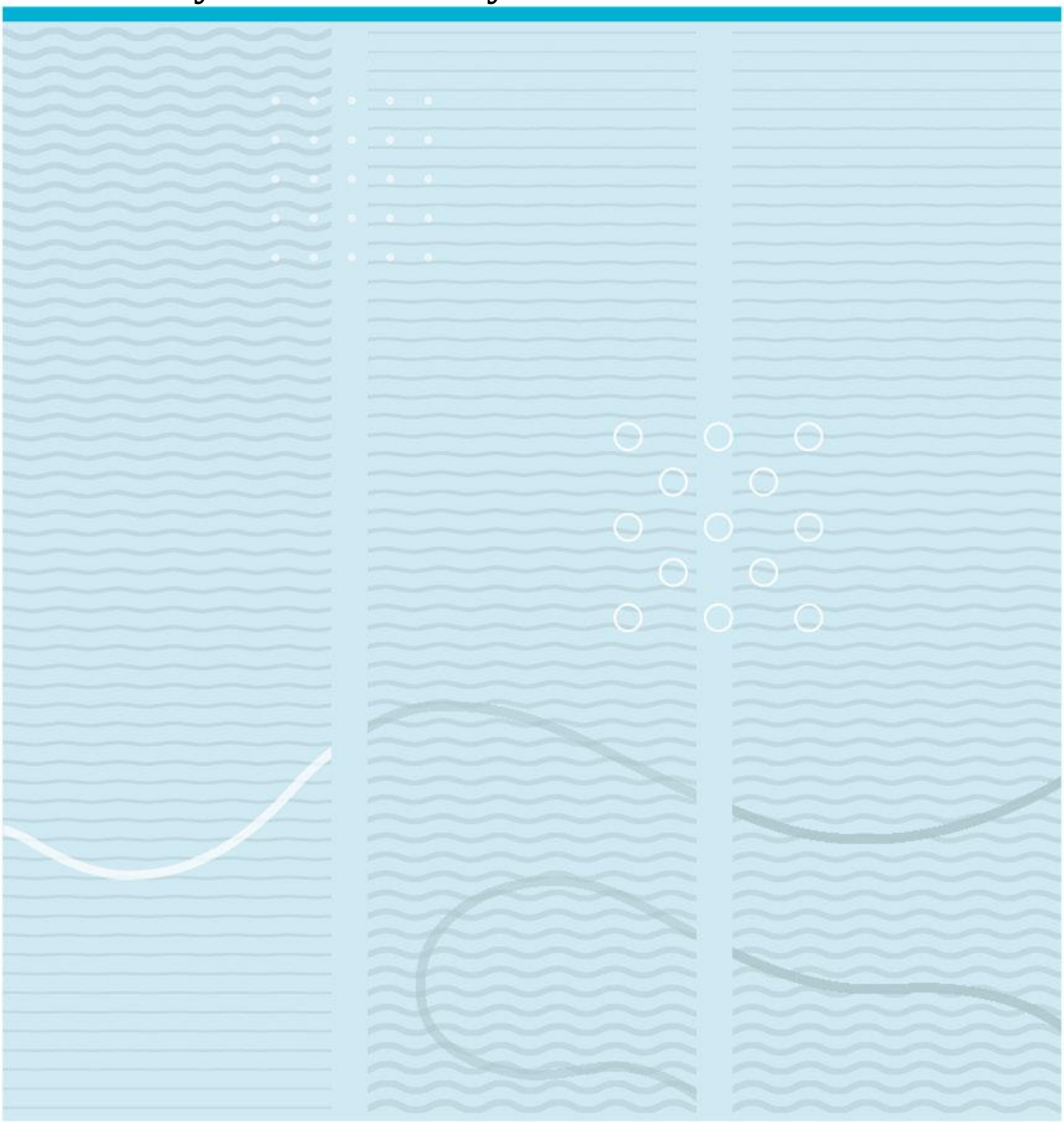
Understanding Sustainability and Climate Change in Norway: A Case Study



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This thesis is worth 30 study points

Abstract

The motivation of the thesis is the need to incorporate sustainability into the energy industry, especially renewable energy. It focuses primarily on climate change and sustainability at corporate levels. While two Norwegian companies such as, Aker Solutions and Norsk Hydro, where I have discussed sustainability and its adaptation practice. The main objective of the thesis is to respond to reporting and disclosure area and how companies are addressing their climate challenges and United Nations SDGs alignment with legitimacy theory.

Legitimacy demonstrate that the majority of the company is committed to the new changes; however, the transition process of improvement will continue within the company. Ultimately, most companies' understand and accept the importance of this change. It seemed on overall results of the data that companies have many progression as well as there are some lacking and issues connected to Professor Rob Gary's thought of about, how the companies and employees want to understand sustainability and ignore the real perspective. It is also marked in the thesis with Lindblom (1994) third strategy on, how companies distract its attention to something else to hide the real situation.

I have been trying to find annual and sustainability reports from both of the companies and more' for the last 2 to 3 years. I brought their reporting and transparency data and also collected interviews from the relevant employees of the sustainability department of company which enhanced my knowledge and helped me understand real time scenarios. However, I have found that there are some points that have been overlooked mostly. Which we should brought to lime light of discussion, employees don't always share real information and we don't get the real situation from the company level and the so-called annual and sustainability report.

Overall, the thesis brings new insights to the organizational studies literature by understanding how companies react and negotiate with challenges by opening up questions about the 'how' and 'what' of sustainability.

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Acknowledgment

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1. Introduction

Moving towards sustainability the European Commission has been working effortlessly on policy strategies for the industry to adopt, which will lead to a sustainability shift, circular economy, innovation n, and energy solutions (Child. M. et al., 2019). The European Union wants to eliminate greenhouse gas emissions and energy efficiency by moving towards renewable energy (European Commission, 2020). The EU has set ambitious targets for 2030, including reducing greenhouse gas emissions by at least 55% (from 1990 levels), increasing the share of renewable energy in the total energy mix to 42.5%, and improving energy efficiency by 32.5%. (European Commission, 2030). This shift to sustainable energy is tough for many countries and addressing the global challenge of climate change and achieving the Sustainable Development Goals of the United Nations. The Paris Agreement was signed in 2015 by 197 countries in the world which have a greater aim to keep global warming lower than 2 degrees Celsius above pre-industrial levels and temperatures below 1.5 degrees Celsius (United Nations, 2022). Increasing public awareness and support for clean energy and environmental policies has also fuelled the shifting of sustainable energy solutions. According to a Eurobarometer survey conducted in 2021, 93% of Europeans consider climate change to be a serious problem, and 91% rely upon that we need to take immediate action to save future generations. (European Commission, 2021).

Also, the Norwegian government has set high goals for renewable energy production. Norway aims to generate 67.5% of its electricity from renewable sources, primarily hydropower, by 2020 (Norwegian Ministry of Climate and Environment, 2020). In January 2021, the former Norwegian government submitted a White Paper to Parliament outlining an economy-wide climate action plan for 2021-2030 that would reduce emissions reductions by 50% and up to 55% by 2030 in (IEA, 2022). Also the Norwegian govt. has set its own goals to influence the use of sustainable energy, especially natural energy, in diverse sectors (Norwegian Ministry of Climate and Environment, 2020). These goals align with Norway's commitment to the Paris Agreement as well as maintaining the EU's climate and energy goals, that mission for the reduction of greenhouse gas emissions and motivate more use of renewable energy sources or sustainable energy (Norwegian Ministry of Climate and Environment, 2020). According to recent studies, large numbers of Europeans support renewable energy and believe it is their own responsibility to reduce greenhouse gas emissions (Eurobarometer, 2021). Also, the

expenses of renewable energy and its implementation cost have become cheaper in recent years, which makes the market more competitive the traditional fossil fuels (International Energy Agency, 2021). Moreover in 2020, global power capacity accounts for 72% of renewable energy mostly from solar and wind power accounting for the vast majority of new installations (International Renewable Energy Agency, 2021).

According to the International Energy Agency (IEA), energy companies have always been critical to the transition to renewable energy. The International Energy Agency, or IEA, *"energy companies are at the forefront of efforts to deploy renewable energy and decarbonize their portfolios"* (IEA, 2020, p. 43).

This transition to renewable energy is critical not only for the environment but also for the long-term financial viability of energy companies. According to Lazard, a financial services firm, renewable energy has become easy to buy and cheap in comparison to fossil fuels in many parts of the world, making it a viable option for energy companies to transition to (Lazard, 2020). In addition, Norwegian companies have made significant investments in renewable energy. Equinor, a leading Norwegian energy company, for example, has set a target of developing 4-6 gigawatts of offshore wind by 2026 and 12-16 gigawatts by 2035. (Equinor, n.d.). Statkraft, one of Europe's largest renewable energy producers, aims to expand its renewable energy resources and strength to move 20 GW by 2025, up from 18.4 GW currently (Statkraft, n.d.).

This Master’s thesis examines the potential sustainability and low carbon operations of the companies in renewable energy sector throughout their business. Energy companies such as Aker Solutions and Norsk Hydro have made significant contributions to the Sustainability movement to a potential emphasize on renewable energy. The primary data are collected from companies that represent the sector and have a portfolio of projects contributing to sustainability transformation projects relevant to this study. Based on primary and secondary data, this study draws policy implications that highlight both the factors investigated and changes, if implemented, would make it easier for companies to further conduct renewable energy production projects.

1.1. Brief introduction to methods

It is a case-based in-depth analysis of two companies with an emphasis on the energy industry (renewable energy) in Norway. Primary data was collected from companies working on specific areas (renewable energy) production. Semi-structured interviews were conducted with (self-designed interview guide), Questions informed by legitimacy theory.
- Interviews conducted over the phone. (Participant's privacy was maintained and no personal information ion collected.)

Secondary data are collected from digital databases by reviewing annual reports, sustainability reports, and publications of the respective companies. All data will be processed using NVivo software, coded and analyzed for interview analysis. The aim is to identify factors/trends in the primary data from the energy companies focusing on sustainability.

1.1.1. Interview and Data Collection

I tried to find some scope of the work before conducting interviews and data collection to determine the scope of the thesis work. This entails determining the specific area of the renewable energy sector on which I want to concentrate our efforts. These steps assist me in identifying the appropriate firms to interview, as well as the appropriate data to collect.
After I have defined the scope of the Thesis, the next step is to identify the industry's key stakeholders. Where industry experts, renewable energy firms, government agencies, and research organizations are involved. I also looked through online databases, industry publications, and professional networks to find potential interviewees.

I developed a list of interview questions after identifying key stakeholders to assist me in gathering the necessary data. Consider including questions about the state of the renewable energy sector, the initiative companies took and the effective impact of climate change that they are working to eliminate. I began scheduling interviews once I had a list of interviewees and questions. I was conscious of the need to give each interview adequate time. Also, I make sure to take detailed notes of the discussions during the interviews. If necessary, ask follow-up questions to clarify any information provided.

1.1.2. Research question

How do two industrial companies (Aker Solutions and Norsk Hydro) in Norway address the challenges of climate change?

Where I will look at:

- The companies' climate change and renewable energy initiatives.

2. Conceptual Background

To go in-depth into the research problem I will discuss corporate Social Responsibility (CSR) for an organization and how it connects to legitimacy theory. Every corporate entity faces different kinds of social expectations in its own context (Olateju, D. J., et. al., 2021; Guthrie, Cuganesan, & Ward, 2006). These expectations can be valued or have more interests of social stakeholders, as in corporate social responsibility or CSR (Olateju, D. J., et. al., 2021; Noah, 2017). If any of these expectations that have been strategically improved or leveraged in the organizational performance are not met or are perceived as insufficient or inappropriate, stakeholders lose trust in the organization, This also can threaten its existence, hard to survive, and well function (Olateju, D. J., et. al., 2021; Dowling & Pfeffer, 1975; Guthrie. Et al., 2006). Among the descriptive theories of CSR, we will discuss more legitimacy theory later in this chapter.

2.1 Policies Regarding Climate and Renewable Energy

2.1.1. European Union's Climate Policy

EU climate policy aims to reduce greenhouse gas emissions and reduce the effects of climate change. The Paris Agreement, the European Green Deal, and the EU 2030 Climate and Energy Agenda form the basis of the EU climate policy (European Commission, 2030) the following are the main objectives of the EU climate policy. While reducing greenhouse gas emissions, the EU set a target of reducing greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels shell. This objective was endorsed in the European Climate Act adopted in 2021 (European Commission, 2030). Transitioning to a low-carbon economy, the EU is working towards a low-carbon economy by 2050, focusing on increased use of renewable energy and energy efficiency (European Commission, 2030) Climate change adaptation, the EU also works on strategies to adapt to such climate change impacts, such as sea level rise and weather extremes (European Commission, 2030).) To achieve this goal, the EU has implemented policies and mechanisms, e.g.

The Emissions Trading System, the European Union’s Emissions Trading System (ETS), is the world’s largest carbon market. It limits emissions from power plants and heavy industry and enables companies to negotiate emission credits (European Commission, 2030).

Renewable energy, the EU set a goal of achieving a 42% share of renewable energy in end-use energy by 2030 and implemented subsidy programs to encourage the use of renewable energy will encourage use (European Commission, 2030) This is through measures such as energy controls and eco-design standards (European Commission, 2030). In climate finance, the EU is committed to providing financial assistance to developing countries to help them mitigate and adapt to the impacts of climate change (European Commission, 2030).

2.1.2. Norwegian Climate Policy

Norway is committed to reducing greenhouse gas emissions and transitioning to a low-carbon economy. In pursuit of this goal, the country has set ambitious targets to reduce carbon emissions by at least 50% by 2030 and reach carbon neutrality by 2050 (Ministry of Climate and Environment). , 2020).

One way Norway can achieve these goals is by investing heavily in renewable energy. The country is a leader in hydropower and has also developed wind power and carbon capture and storage (CCS) technologies. According to the International Energy Agency, 97% of Norway's electricity generation is hydropower, making it one of the highest in the world (International Energy Agency, 2021). The country also has electric vehicles (EVs) greater share. (International Energy Agency, 2021)

Another important aspect of Norwegian energy policy is energy efficiency. The country aims to reduce final energy consumption by 20% by 2020, compared to 2005 levels, and by 2030 (Norwegian Ministry of Petroleum and Energy, 2019) Norwegian initiatives such as construction regulations, energy labeling of buildings and equipment, and energy taxes and subsidies (Norwegian Ministry of Petroleum and Energy, 2019).

The country plans to increase the share of renewables in its energy mix, aiming for 67.5% by 2020 and 100% by 2030 (Norwegian Ministry of Petroleum and Energy, 2019) In addition to investing in renewable energy, various policies and strategies are implemented to support the transition to a low-carbon economy. These include a carbon tax on fossil fuels, EV subsidies and rental incentives, a ban on alternative coal for residential heating (Ministry of Climate and Environment, 2020), and becoming a fossil fuel-free country by 2050 in the country The target has been set (Norwegian Ministry of Transport and Communications, 2018).

Norway's efforts to reduce emissions and transition to a zero-carbon economy have been recognized internationally. It topped the Climate Change Performance Index 2020 which evaluates countries' climate policies and practices (German Watch, 2020). Norway's actions to combat climate change are also in line with the Paris Agreement, which aims to limit global warming to well below 2°C above pre-industrial levels (United Nations Framework Conference on Climate Change., 2015).

2.1.3. EU's Emissions Trading Scheme

The EU Emissions Trading System (ETS) is a key policy tool to reduce greenhouse gas emissions from power plants and heavy industry. This is the world's largest carbon market, accounting for more than 40% of the EU greenhouse gas emissions. (European Union, 2030). The EU sets limits on the total amount of greenhouse gases that can be emitted by areas covered under the ETS. The cap was reduced to meet EU emissions reduction targets. Companies under the ETS are given emission credits to enable them to trade with other companies. This creates a market for emission tolerances, encouraging businesses to reduce emissions and invest in low-carbon technologies (European Commission, 2030).

2.1.4 EU Policy on Renewable Energy

The EU Renewable Energy Policy aims to increase the share of renewable energy in the EU energy mix and reduce dependence on fossil fuels. This policy is based on the EU Renewable Energy Policy Guided, first implemented in 2009 and updated several times since then. Under this strategy, by 2030, the EU has set a target of 42% renewable energy. This target was increased from the previous target of 27% set in 2014 (European Commission, 2030). To achieve this goal, the EU has implemented several strategies including national renewable energy targets, each EU Member State must set its own national target for renewable energy half of total energy consumption These targets should be in line with the EU-wide target of 32% by 2030 (European Commission, 2013). 2030). Support Schemes, Member States are encouraged to implement subsidy schemes, such as feed-in tariffs and quota schemes, to encourage the use of renewable energy (European Commission, 2030). Grid integration, the EU has established rules for the functioning of the electricity market, including the use of market-based mechanisms to ensure the equivalence of all sources of electricity, enabling the

quantification of renewable energy increasingly integrated into the grid (European Commission, 2030). Research and innovation, the EU funds renewable energy research and development, including through its Horizon 2020 programme. International cooperation: The European Union cooperates with other countries and world regions to combat climate change by promoting the use of renewable energy sources (European Commission, 2030).

2.1.5. Norwegian Renewable Energy Policy

Norway is committed to a renewable energy policy aimed at promoting the development and use of renewable energy sources to reduce greenhouse gas emissions and achieve a wind future sin free The country has set ambitious targets for renewable energy, the share of renewable energy in its energy mix 67.5% by 2020 and 100% by 2030 (Norwegian Ministry of Petroleum and Energy, 2019) The country has made significant progress in this regard, with hydropower currently accounting for 97% of electricity generation (International Energy Agency, 2021).

However, Norway acknowledges that it cannot rely solely on hydropower to meet its renewable energy goals. To this end, the country is investing in the development of new renewable energy sources, such as wind, solar and geothermal. Norway has considerable wind energy, especially offshore wind power, and plans for offshore wind farms in the coming years (International Energy Agency, 2021). The country is also investing in solar energy, which fields have longer solar radiation during the summer months. In addition, Norway is exploring the potential of geothermal energy, which has the advantage of providing a reliable source of energy that is not climate-dependent (International Energy Agency, 2021).

To support renewable energy development, Norway has also created a Renewable Energy Fund where the government has funded renewable energy projects with tax exemptions, investment subsidies and renewable energy certificates paper (International Energy Agency, 2021). In addition, the country has developed carbon capture and storage (CCS) technology, which captures carbon dioxide emissions from industrial processes and stores them underground. This technology has the potential to reduce greenhouse gas emissions from industrial production, such as electricity generation and cement (International Energy Agency, 2021). According to the company's data both Aker Solutions and Norsk Hydro uses CCS and have regulatory data.

2.2 Legitimacy Theory

Legitimacy theory is a descriptive theory of corporate social responsibility (CSR) that suggests that companies engage in CSR activities to gain and maintain legitimacy in the eyes of stakeholders (Suchman, M. C., 1995). ; Deegan, C., 2002). According to the theory, the legitimacy of a firm is determined by the social expectations of its stakeholders, which may include employees, customers, shareholders, regulators, and communities (Deegan, C., 2002). Companies engage in CSR activities to align their actions with stakeholder expectations according to legal principles and demonstrate their commitment to social and environmental issues (Deegan, C., 2002). Firms can therefore improve their reputation and credibility, potentially improving economic performance, and access to resources, and requiring less regulatory scrutiny (Dowling, J., & Pfeffer, J., 1975; Deegan, C., 2002).). Gray et al. (1996) suggested that firms use social and environmental reporting to enhance their legitimacy with stakeholders.

Even so, legitimacy theory suggests that companies can only make symbolic gestures in terms of intangible CSR activities aimed at maintaining legitimacy without social and environmental concerns it controls the bottom line This is called "greenwashing" or "social washing", and if stakeholders view its CSR activities as inauthentic or ineffective then it can harm the company's reputation (Preston, L. E., & Post, J. E.). , 1975). As a whole, legitimacy theory provides a framework for understanding why businesses engage in CSR activities and how these activities are shaped by stakeholders' expectations. It emphasizes the importance of maintaining credibility in the eyes of stakeholders, as well as the risks of failing to do so (Wood, D. J., 1991; Deegan, C., 2002).

To beat the 21st century's challenge organizations and authorities must follow certain rules, values, and norms, also this includes self-declaration or publication of their own social and environmental work. When it comes to legitimacy for organizations to apply. (Burlea, A. S., & Popa, I., 2013).

Owen said, in one of his research papers, "Chronicles of Wasted Time? A Personal Reflection on the Current State of, and Future Prospects for Social and Environmental Accounting Research" that, *Legitimacy theory was sometimes seen only as a 'plausible explanation of managerial motivations' without any real effort to determine how a disclosure "...may or may not promote transparency and accountability towards non-capital provider stakeholder*

groups" (Owen, 2008, p. 248; Burlea, A. S., & Popa, I., 2013). Due to the submissive nature of legitimacy, it always is hard to look into the actual efforts and motivation of the organizations (Burlea, A. S., & Popa, I., 2013).

The legitimacy of a firm can be achieved through various means, including the dissemination of performance information or stakeholder information sharing (Solikhah, B. 2016; Deegan et. al, 2002; Yoo, Lee, & Lee, 2016). Throughout the process, companies negotiate following the principle of legality. Talking and having inclusiveness toward stakeholders to change people's expectations of the company (Solikhah, B. 2016; Ashforth and Gibbs, 1990). Also, the principle of honesty is much broader for legitimate theory. This is a concept that is associated with the expression of social responsibility and goes through a process. The legitimacy activities often carried out by the organization should follow the values and customs of the company society and be in line with society's expectations (Solikhah, B. 2016; Harahap, 2011; Ilias, Razak & Rahman, 2015).

2.3 Decarbonizing in the EU

In Europe, de-carbonization targets are defined at the EU level and then implemented in each of the member states, leading to heterogeneity in the net zero strategies adopted by individual countries (Seck, G.S. et al., 2022; Harmsen, 2022; M., 2021). The European Commission approved in October 2014 the 2030 Climate and Energy Agenda, which sets out a 'credible and transparent governance framework' to meet the EU's energy goals: reducing GHG emissions 40% compared to 1990 levels, energy consumption will be reduced by 27% in terms of shared investment in renewable energy (allowing Member States flexibility in their national policies), and to improve energy efficiency (European Council, 2014, p. 9; Szulecki., K. 2016). The 2030 Agenda is based on the first 2020 Climate and Energy Agenda, which was eventually integrated into the European 2020 master plan for Smart, Sustainable and Inclusive Growth (European Commission, 2010; Szulecki, k., 2016).

2.4 Importance of Climate Change

"The Kyoto Protocol is seen as an important first step towards a truly global emission reduction regime that will stabilize GHG emissions and can provide the architecture for the future international agreement on climate change"

- United Nations Framework Convention on Climate Change (UNFCCC) (Man Energy Solutions, 2023).

The climate change is being a crucial issue, this is being acute more in recent years when we oversee the consequences of long term climate pollution, natural disasters and so on. So we choose the topic to understand more about the climate change and its physical sides. Here the United Nations Secretary General said,

"To all those working, marching and championing real climate action, I want you to know that you are on the right side of history and that I am with you."

ANTÓNIO GUTERRES, (United Nations Secretary-General, 2023)

The United Nation SDGs Goal no.13: Take urgent action to combat climate change and its impacts (United Nations SDGs, 2023).

Every part of the planet is already feeling the effects of climate change. Millions of people are already experiencing the effects of climate change in the form of changing rainfall, rising sea levels, melting ice sheets, warming seas and often severe weather (IPCC Climate Change, 2021).

Renewable energy sources such as solar and wind energy have been discussed in detail due to their increasing importance in mitigating the negative impacts of climate change (National Geographic, 2023). Benefits of renewable energy sources are not limited to the environment. What it costs to the creation of new jobs, the transformation of electricity, greater access to electricity in developing countries, and the reduction of energy costs (National Geographic, 2023). In recent years, renewable energy has made a comeback with phenomenal growth, and wind and solar have achieved unparalleled records in electricity generation (National Geographic, 2023).

According to The Paris Agreement, *the vision of fully realizing technology development and transfer for both improving resilience to climate change and reducing GHG emissions.* (United Nations Climate Change, 2023). Implementation of the Paris Agreement requires economic and social reforms informed by greater knowledge. Countries are expected to "ratchet up" climate action every five years under the Paris Agreement (United Nations Climate Change, (2023).

In 1987, the United Nations Brundtland Commission defined sustainability as *"meeting the needs of the present without compromising the ability of future generations to meet their own needs."* United Nations Academic Impact, (2023)
Where the Brundtland commission introduced the concept of sustainable development. This landmark report emphasized the interdependence of economic, social and environmental aspects and defined sustainable development as "meeting the present without empowering future generations." meet their own needs is not wasted." - Played a key role in developing a balanced platform and establishing a platform for global projects.

In the European context the EU Taxonomy includes Climate adaptation and Climate mitigation are two key areas of environmental sustainability. The EU classification is also binding on Norway and relevant for the case companies in this thesis. According to EU taxonomy the companies in Norway also obliged to follow the same reporting framework. The introduction of reporting obligations in Norway means that it is recommended that listed companies with more than 500 employees report basic figures reflecting the business sector of activities covered by the classification rule (DLA Piper, 2022). It includes the portion of total sales, investment, and operating expenses that meet the requirements for sustainable development as defined in the paragraph (DLA Piper, 2022).

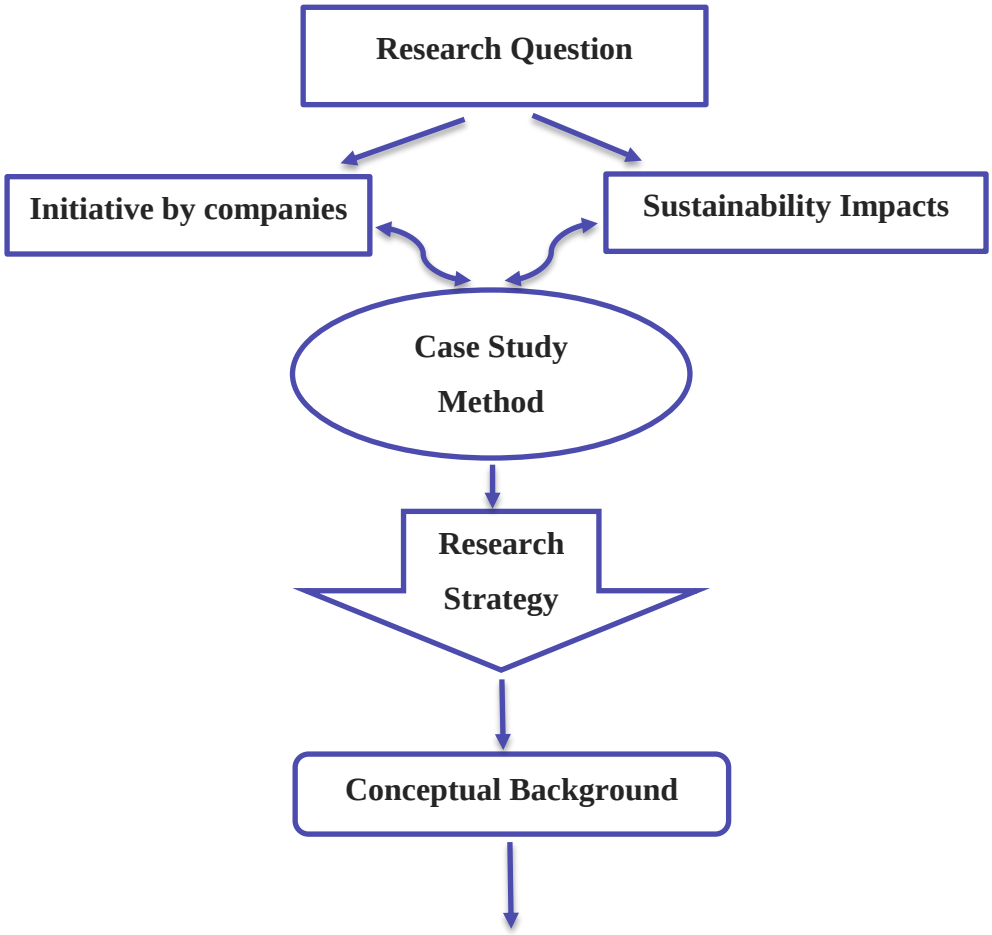
The Annual UNFCCC, commonly referred to as COP (Conference of the Parties), stands out as a pivotal event in Climate Change adaptation and discussion. Each year, global leaders convene to deliberate urgent climate action and address issues related to the climate emergency (United Nations Climate Change, 2023). The next conference is taking place in Dubai (Nov/Dec 2023). The conference encompasses a comprehensive agenda that includes adaptation and resilience, capacity-building, climate finance, climate technology, cooperative activities and SDGs, as well as considerations for education, youth, and gender (United Nations

Climate Change, 2023). This platform serves as a crucial forum for fostering international cooperation and advancing meaningful strategies to tackle the challenges posed by climate change (United Nations Climate Change, 2023).

3. Methodology and Research Design

This thesis wants to show a case study approach method that how two or three renewable energy companies in Norway approach to sustainability through qualitative method and answer the ‘What” question will address the question, 'What kind of initiatives are being taken to achieve the goal?’ Also to the 'How' and 'What' issues. Here the ‘How’ will answer inquires to “How sustainability is working for impact?” This chapter first analyzes the thesis’s methodological position. Second, it explains why a case study was chosen and how this study evolved. Third, it addresses the case study's methodological strategies. Lastly, the thesis emphasizes a more extended description of the research method and design.

The research question of the thesis has been segmented into two parts where we will see the “Industrial company’s initiatives in terms of climate change and renewable energy” from “What” and The “Transition impact on energy sustainability” from How question answers.



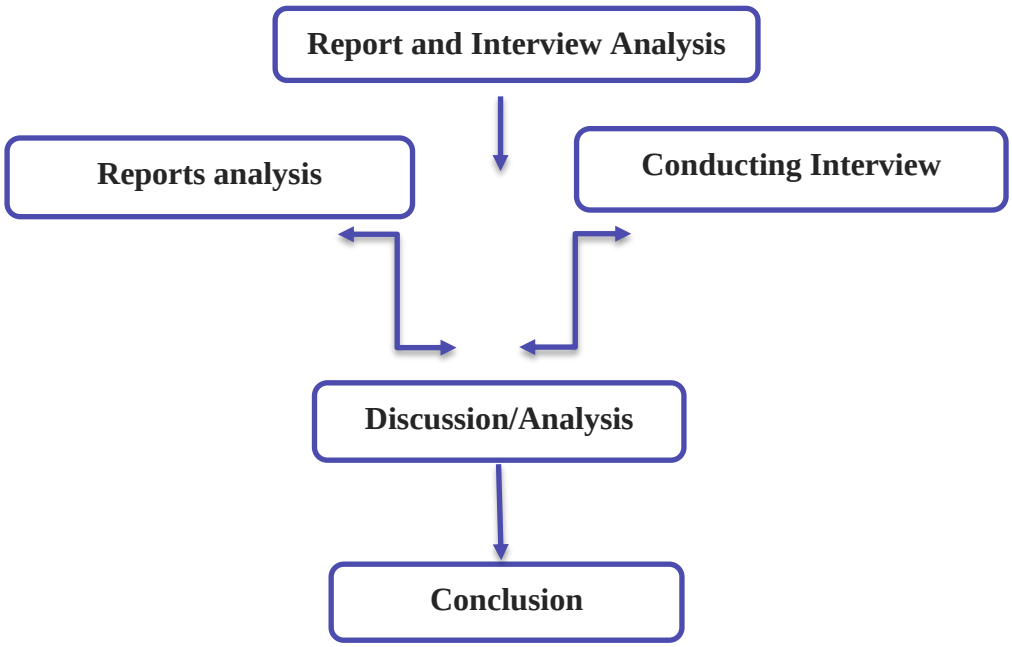


Figure 1: Research Strategy Steps (Own Illustration)

To understand the proper scenario we will segment the research question into two parts and try to find out the answer from the interview. Besides this I will also analyse the annual report, sustainability report and publications from the companies to have a greater overview of the matter. I will contact with companies in Norway with energy and renewable energy background and also have a good track record in sustainability. Afterwards I code the interview data based on a theme. Alongside I will focus on both company reports to find out the answer of what initiatives and how impactful the initiatives are from interview data. Then I shared my analysis and discuss the progress in both negative and positive side. Lastly I elaborate on the answer of my research question with a conclusion.

3.1 Ethics

Ethical considerations are always important when conducting research, and this thesis is not an exception. The next sections below will describes the ethical standards and practices followed in the thesis. At the time of writing this thesis, the ethical standards of scientific research are carefully upheld. Ethical principles such as informed consent, anonymity, confidentiality, zero harm and profitability were observed while writing this thesis.

At first in line with ethical standards, all participants in this study were given full and truthful information regarding the purpose of the study, data collection procedures, and safeguards, everyone gave their informed consent before participating in learning. Then the identity of all

participants is withheld to maintain anonymity and confidentiality. All identifying information in the final report has been removed or replaced with pseudonyms. In addition, the data collected will be securely stored and accessible only to those who need it.

I took all necessary precautions to ensure that volunteers were not harmed. Potentially embarrassing or intrusive questions were avoided, and participants were informed of their right to withdraw from the study at any time without consequence. And also this thesis aims to maximize benefits for members while minimizing risks. The summary is intended to increase understanding of the issue at hand and may be useful to a wide range of people. And lastly all data collected were used for this thesis only. After the data process and apply in the thesis all data will be permanently deleted.

4. Company Profile-Aker Solutions AS

The context for this topic is Aker Solutions AS, a Norwegian company. This situation is relevant to this topic. Thus, this section provides a case study of Aker Solutions AS and illustrates how the distinction between the forces works. Also, it shows how external pressures work with it.

Aker Solutions is a leading global provider of energy industry products, systems and services, with a focus on the offshore and marine sectors (Aker Solutions, 2023) The Company has a long and illustrious history, dating back to 1841 in Oslo, Norway (Aker Solutions, 2023). It has evolved into a leading technology and engineering company, focusing on providing solutions for the oil and gas industry and renewable energy (Aker Solutions, 2023) offering a comprehensive range of solutions and services for energy in all phases of the project, from research to production to commissioning (Aker Solutions, 2023). Subsea processing, drilling equipment, floating, and renewable energy technologies are among the available solutions (Aker Solutions, 2023).

Figure 2: Picture from Aker Solutions, webpage: www.akersolutions.com

Aker Solutions has an extensive global presence, with offices, offices, and projects in more than 30 countries worldwide (Aker Solutions, 2023). This extensive network enables the organization to serve its customers globally and to adapt to the specific needs and constraints of each country (Aker Solutions, 2023). The company emphasized sustainability and the transition to an environmentally friendly energy state (Aker Solutions, 2023). There is considerable interest in renewable energy projects, especially offshore wind and carbon capture and storage (CCS) (Aker Solutions, 2023).

The company usually invest in R&D to develop cutting-edge technology and solutions that increase the efficiency and safety of offshore operations (Aker Solutions, 2023). To develop innovative technologies and solutions, Aker Solutions frequently collaborates with other industry leaders, academic institutes, and governments (Aker Solutions, 2023). In the energy business, safety and quality are crucial, and Aker Solutions lays a great emphasis on these factors in all of its projects (Aker Solutions, 2023). The company is committed to providing products and services that satisfy the highest safety and environmental protection standards (Aker Solutions, 2023).

Aker Solutions is well-positioned to play a big part in the energy transition, with the world's rising focus on decreasing carbon emissions and switching to greener energy sources (Aker Solutions, 2023). This includes expertise in renewable energy, such as offshore wind and carbon capture and storage (CCS), which are critical components of a sustainable energy future (Aker Solutions, 2023). Aker Solutions has grown and adapted throughout the years to maintain its position as a market leader in the energy sector (Aker Solutions, 2023). With its emphasis on innovation, sustainability, and worldwide reach, the company is well-positioned to contribute to the development of the energy industry, both in traditional hydrocarbons and growing renewable energy sectors (Aker Solutions, 2023).

Finding potential risks as per the Aker Solutions, The company’s CEO, EVP of Sustainability, HSSE, and Communications, as well as senior executives from strategy, finance, sustainability, and technical divisions, looked and marked the possible risks and possibilities highlighted in these scenarios discussed below (Aker Solutions Climate Risk tcfd, 2023).

- From the Task Force on Climate related Financial Disclosure (TCFD) recommendations, the company has comes up with three financially significant

climate-related concerns that have been identified, **Risk 1:** Decrease in investment in upstream oil and gas in core markets. **Risk 2:** Attracting and retaining talent. **Risk 3:** The impact of extreme weather on the supply chain and facilities (Aker Solutions Climate Risk tcfd, 2023).

Moreover there are two financially significant climate-related opportunities that have been identified by the company,

- **Opportunity 1:** Improve oil and gas competitiveness through de-carbonization technologies and services. **Opportunity 2:** Diversification of revenue into markets aided by the energy transition (Aker Solutions Climate Risk tcfd, 2023).

Aker Solutions defines the natural environment as disappearing owing to overdevelopment and exploitation, and the value of biodiversity has grown in importance at the organization from last couple of years (Aker Solutions Sustainability Report, 2022). It is critical to safeguard biological diversity to ensure the survival and continuity of plant and animal species, genetic diversity, and natural ecosystems (Aker Solutions Sustainability Report, 2022). Before moving ahead with any new projects that may have environmental implications, the Company undertakes risk assessments to identify hazards and ensure that suitable risk mitigation plans are established in compliance with standards (Aker Solutions Sustainability Report, 2022).

4.1. Discussion and Analysis of Reports

Rather of this Aker Solutions requires the reporting of environmental occurrences such as leaks or spills that may have an impact on biodiversity (Aker Solutions Sustainability Report, 2022). Aker Solutions has a role to play in biodiversity conservation and mitigating the harmful effects of development and pollution (Aker Solutions Sustainability Report, 2022).

"It is important to note that the oil and gas industry is and will remain our biggest market – this year and also in 2030. We are proud of being among the first oil and gas offshore contractors to set concrete targets for the energy transition."

– CEO Aker Solutions, Sustainability Report 2019

Comment:

The CEO of Aker Solutions has a noteworthy comment on the oil and gas business, which can also be found in numerous portions of Aker Solutions' annual and sustainability reports. The CEO clearly stated in the report how important the oil and gas sector is to the company and what its top priorities are in the market. In statements, this also symbolizes the organization and its future mission goal.

Although if the results of the company's' findings were negative, they always found support for legitimacy theory in explaining motivations for environmental disclosure (Richard Collins, 2012). Tilling's (2004) study also provides support for legitimacy theory as a means of understanding the meaning behind environmental reporting. (Tilling, 2004); (Richard Collins, 2012). This idea connects well with Lindblom's (1994) early regulatory process, which aims to "educate" stakeholders about the organization's commitment to enhancing its performance. In this context, even as of 2030, the company continues to primarily focus on serving the oil industry and adheres to oil-centric business processes (Lindblom, 1994); (Richard Collins, 2012). A brief survey of the use of legitimacy theory in the literature provides evidence that power a strong existence to define an organization's environmental exposure, which explains the rationale behind its use in this debate. (Lindblom, 1994); (Richard Collins, 2012).

In the Long term, the energy demand continues to increase, and the challenge for our industry is to provide sustainable solutions with a significantly lower carbon footprint (Sustainability Report 2019).

Comment:

Therefore, it is also highlighted in the statement that was just presented, how energy demand and issues can fall apart if we don't continue to go forward with a sustainable solution to the growing energy demand. The company demonstrates that change is possible via the use of renewable resources and sustainable ways of thinking.

Aker Solutions Reporting Status on Years:

Status/Years	**2022**	**2021**	**2020**	**2019**
How do they report on energy?	GRI, TCFD, CDP			
GRI standards Reporting	Yes			

Greenhouse gas (GHG) emission	21532 metric tonnes	31032 metric tonnes		63000 metric tonnes
TCFD	Yes			
Carbon emission	A-	B	C	
Carbon dioxide emission	21532 tonnes		24914 tonnes	35255 tonnes
Climate change	Yes, Have an action plan			
Renewable Energy	Yes			
Climate Risk	Yes identified several aspects			
SDGs indicators addressed	3,4,5,7,8,12,13,14,16			
How much are they moving towards renewables	22% of revenue	15 % of revenue	6% of revenue	
Biodiversity disclosure	Yes			
Deforestation Reporting	Not specific			
Reporting Frameworks	Yes			
EU Taxonomy Related Information	Yes			
Recycle Activities	14870 tonnes	20700 tonnes	16183 tonnes	8350 tonnes
Reporting Frameworks	Yes, (GRI, TCFD, CDP)			
Risk Assessment	Yes			

Figure 3: Aker Solutions Reporting Status, (Own Illustration)

Comment:

The table provides information on Aker Solution's specific environmental and sustainability-related activities and reporting over the past four years (2022, 2021, 2020, and 2019) in the context of energy, greenhouse gas emissions, carbon emissions, climate change, renewable energy, climate risk, Sustainable Development Goals (SDGs), biodiversity, deforestation reporting, reporting frameworks, information related to the EU Taxonomy, and recycling activities. Offering insight into their progress and commitment to various aspects of sustainability and climate action.

- But here the renewable energy projects would support climate mitigation, however the projects serving the oil industry can potentially be damaging, in terms of climate change unless it very clearly is carbon capture which would be Climate mitigation-
- Where the question arises that if serving the oil industry always is compatible with climate mitigation

Aker Solutions appears to be reporting on its energy-related activities regularly. For reporting, the corporation uses the GRI (Global Reporting Initiative), TCFD (Task Force on Climate-related Financial Disclosures), and CDP (Carbon Disclosure Project). It also shows the company reports its sustainability data following GRI criteria. "Yes" indicates that they do in this circumstance. The TCFD also specifies whether the organization reports following the TCFD recommendations, with a "Yes" signifying compliance and the usage of a reporting structure.

The greenhouse gas emissions (in metric tons) of the corporation for each of the years given. Between 2020 and 2022, it displays a downward trend. Carbon emission data from the corporation during the last many years, is categorized into A, B, and C. The carbon dioxide emission column shows the annual carbon dioxide emissions in tonnes. It is likewise on the decline. Climate change and climate risk reporting The Company has an action plan to combat climate change, to which the answer is "Yes" and has recognized numerous areas of climate risk.

In terms of renewable energy, it is specifies that if the company is active in renewable energy activities, with a "Yes" indicating participation in renewable energy. The company is involved in a variety of projects and initiatives that has a continuing impact on the environment and sustainability thinking. The percentage of revenue allocated to renewable energy initiatives is shown in the firm moving towards renewables. The organization's revenue allocation to renewables has increased from 6% in 2020 to 22% in 2022 from only renewable sector.

Participation in SDGs, as Aker Solutions is working on the advancement of SDGs, It is indicating clearly that the organization is motivated for using SDGs indicators and currently implementing SDGs with special focused on. SDG 3, 4, 5, 7, 8, 12, 13, 14, 16. Which is also close to the company’s goals and targets.

The biodiversity reporting mentioned in TCFD, whether or not the organization provides information about its biodiversity conservation initiatives, with a "Yes" indicating disclosure.

The company's deforestation reporting is not particular, which means the table does not contain specifics on its deforestation reporting actions.

Also the section on EU Taxonomy Related Information indicates that the company provides information about the EU Taxonomy, implying compliance or involvement with European Union standards. Data from Recycle operations indicates the company's recycling operations, as well as the amount of materials recycled in tons each year. Recycling decreases significantly between 2021 and 2022.

Renewable Revenue	**2022**	**2021**
Renewables & Field Development	14857 NOK Million	10625 NOK Million
Electrification, Maintenance & Modifications	12164 NOK Million	9197 NOK Million
Subsea	14055 NOK Million	9712 NOK Million

Figure 4: Renewable Energy Status in 2021 and 2022. (Own Illustration)

Comment:

For the years 2022 and 2021, the table provides information on Aker Solution's renewables and field development, electrification, maintenance, modifications, and subsea operations. The information is presented that represent the scope or extent of these activities in both years. Renewables and field development activities in renewable energy include the development of renewable energy projects such as wind farms or solar systems, as well as the development of renewable energy production fields. The revenue increased in 2022 than 2021 stated (NOK 14857 mn in 2022 and NOK10625 mn in 2021) represent the magnitude of these activities, which appear to have increased from 2021 to 2022.

	Unit	2021	2020	2019
Non-hazardous waste and waste handling method[1]				
Total waste, including hazardous waste[2]	Metric tons	26,158	21,466	8,350
Recycled waste, excluding hazardous waste	Metric tons	18,637	10,853	5,105
Reuse	Metric tons	184	100	70
Incineration without energy recovery	Metric tons	10	0	0
Incineration with energy recovery	Metric tons	2,762	2,847	746
Composting	Metric tons	80	93	16
Landfill[4]	Metric tons	3,942	3,882	478
Other / not specified	Metric tons	280	34	329
Waste to energy, energy recovery	Metric tons	0	0	818
Recycling factor[4]	%	71	61	69
Hazardous waste and waste handling method				
Total Hazardous waste[2]	Metric tons	1,589	3,706	719
Hazardous waste treatment -handled by waste company	Metric tons	261	280	149
Incineration with energy recovery	Metric tons	48	51	72
Incineration without energy recovery	Metric tons	5	0	3
Other / not specified	Metric tons	164	134	402
Recycling[3]	Metric tons	617	3,133	84
Reuse	Metric tons	1	5	9

Energy data is harvested locally either via meter readings at the sites or via invoicing of purchased electricity and fuels. Each location submit their environmental data on a monthly basis for the premises and activities controlled by Aker Solutions.

Scope 2 emissions are reported using both market- and location-based emissions factors. Scope 3 business travel data is provided by travel agencies. Aker Solutions does not sell energy. All calculations are done automatically in our Synergi Life reporting tool.

All information on waste disposal methods are derived either from the site itself (some sites have their own compost facilities and do this in-house) or from the waste handling companies.

LRQA Group Limited (LRQA) was commissioned by Aker Solutions to provide independent assurance on GHG emissions in 2021. The assurance engagement covered Aker Solutions and its' subsidiaries in global operation. The Independent Assurance Statement can be found our website.

Figure 5: Environmental Figure of emissions (Aker Solutions Sustainability Report, 2021).

	Unit	2021	2020	2019[4]
Total energy and carbon dioxide emissions[1]				
Energy consumption	MWh	159,429	176,196	181,864
Energy intensity	MWh per million worked hours	3,798	4,006	3,031
Total carbon dioxide emissions	Metric tons	24,014	30,940	41,981
Total carbon dioxide emission intensity[3]	Metric tons per million worked hours	572	703	700
Scope 1 and 2 emission intensity[3]	Metric tons per million worked hours	496	573	450
Scope 3 emission intensity	Metric tons per million worked hours	76	130	250
Scope 1 carbon dioxide emissions	Metric tons	10,003	12,033	12,402
Scope 2 carbon dioxide emission (location)	Metric tons	10,831	13,174	14,588
Scope 2 carbon dioxide emission (market)	Metric tons	45,883	49,372	50,469
Scope 2 carbon dioxide emission residual after purchase of EACs	Metric tons	21,029	25,612	N/A
Scope 3 carbon dioxide emissions[2]	Metric tons	3,181	5,734	14,991
Non-renewable fuel consumption				
Diesel	m3	1,886	2,547	2,187
Gasoline	m3	60	19	47
Heavy fuel oil	m3	72	55	112
Natural gas	m3	1,281,511	1,128,036	1,544,983
Acetylene	m3	11,070	10,118	23,742
Propane	m3	355,198	486,939	514,976
Electricity consumption	MWh	44,911	61,875	65,021
Renewable fuel consumption				
Biofuel	m3	127	129	61
Electricity consumption	MWh	68,683	60,000	60,000

Figure 6: Environmental Figure of emissions (Aker Solutions Sustainability Report, 2021).

Comment:

The total amount of energy used by the company in-house increased by 6% between 2021 (when it used 159,429 MWh) and 2022 (when it used 168,719 MWh). A higher level of activity in 2022 accounts for 11 percent of the rise in man-hours, which in turn explains the rise in overall energy consumption. Emissions of greenhouse gases decreased by almost 31% between 2021 and 2022, from 31,032 to 21,532 metric tonnes of carbon dioxide equivalent (CO2e). Aker Solutions also keeps tabs on their recycling and trash separation efforts.

The company reported producing 14,870 tons of garbage in 2022, down from 20,700 tons the year before. Overall, recycling rates decreased from 69% in 2021 to 54% in 2022. Aker Solutions has both opportunities and threats to its operations, performance, finances, reputation, and share price due to its global footprint, activities, and exposure to energy markets. In addition to internal risk factors like operational risks and financial risks, external risk factors like market risks, supply chain risks, pandemics, cybercrime, compliance and integrity risks, political risks, risks related to civil- or political unrest including war, and climate-related risks may have a significant adverse impact on the company.

5. Company Profile-Norsk Hydro AS

Norsk Hydro also known as Hydro, is a Norwegian multinational firm that is one of the world's largest integrated aluminium and renewable energy enterprises (Norsk Hydro, 2023). Hydro was founded in 1905 and has evolved into a global industry leader with a strong emphasis on sustainability, innovation, and responsible resource management (Norsk Hydro, 2023).

Hydro's main business lines include primary aluminium manufacturing, rolled and extruded products, and renewable energy (Norsk Hydro, 2023). They are well known for their knowledge of the entire aluminium value chain, from bauxite extraction to recycling to the distribution of high-quality aluminium products (Norsk Hydro, 2023). The company operates in more than 40 countries and has a large global footprint, with a focus on Europe and North America (Norsk Hydro, 2023). Their global presence allows them to serve a variety of industries and customers around the world (Norsk Hydro, 2023). Hydro is at the forefront of sustainable development in the aluminium industry and renewable energy (Norsk Hydro,

2023). The company is committed to reducing environmental impact and promoting responsible practices in the value chain. Efforts to reduce carbon emissions and reduce energy consumption are included (Norsk Hydro, 2023).

Hydro is one of the world's leading producers of primary aluminium, and its smelting operations are known for being both energy-efficient and environmentally conscientious. They are always investing in R&D to increase the performance and sustainability of aluminium goods (Annual Report Hydro, 2022). Hydro is dedicated to the development of renewable energy sources, particularly hydropower (Annual Report Hydro, 2022). They have a substantial presence in hydropower generation and are involved in several renewable energy projects that correspond with their sustainability objectives. By recycling and reusing aluminium, Hydro actively fosters a circular economy. Their recycling efforts contribute to the reduction of the requirement for primary aluminium production and the reduction of waste in the sector (Annual Report Hydro, 2022). The Norsk Hydro is a leader in the aluminium sector and a significant contributor to the transition to a more sustainable and circular economy because of its commitment to sustainability, innovation, and responsible business practices. Their focus on renewable energy and low-carbon aluminium production is consistent with global efforts to lessen environmental impact and combat climate change (Annual Report Hydro, 2022).

According to report the company stated biodiversity challenges by 2021, they will excavate 427 hectares and reclaim 389 hectares. Also the annual report of Norsk Hydro said, 2021 estimates that Paragominas Khane Hydro's operations lost about 7,000 hectares of land (The annual report Norsk Hydro, 2021).

5.1. Discussion and Analysis of Reports

Norsk Hydro Reporting Status on Years:

Status/Years	**2022**	**2021**	**2020**	**2019**
How do they report on energy?	Yes, it follows GRI, TCFD, and CDP format			
GRI standards Reporting	Yes			
Greenhouse gas (GHG) emission report	10.03	11.46	10.64	
TCFD	Yes it's structured			
Carbon emission				
Climate change	Yes, with a focus on climate, environment, and society.			
Renewable Energy	Yes			
Climate Risk	Identified			
SDGs indicators addressed	Connected to all Sustainable Development Goals (SDGs).			
How much are they moving towards renewables?	Progress is evident but lacks clear definition.			
Biodiversity disclosure	Yes			
Deforestation Reporting	No			
Reporting Frameworks	Yes			
EU Taxonomy Related Information	Working according to			
Recycle Activities	321,000 tonnes of post-consumer aluminum scrap: 71% in 2022, 74% in 2021, and 71% in 2020.	74%	71%	
Reporting Frameworks	Yes, GRI, TCFD, CDP			
Risk Assessment	Material, incidental, climate, accidental, financial, and other risks have been assessed."			

Figure 7: Norsk Hydro Reporting Status on Years, (Own Illustration)

Comment:

This table above provides an overview of Norsk Hydro's reporting position in several respects. From the years 2019 to 2022, Norsk Hydro, a leading company in the global aluminum industry, has regularly reported on its development and environmental performance against internationally recognized reporting standards and policies between the intervals

Energy reporting: Norsk Hydro's approach to energy reporting is in line with the Global Reporting Initiative (GRI), the Task Force on Climate Finance Disclosure (TCFD), and the Carbon Disclosure Project (CDP) framework that builds cooperation is committed to providing transparency and accountability in its energy disclosures. A sample of energy reporting on consumption stated below shows the year 2018 to 2022 are from 149.7 to 171.8. Which also indicates that somehow the company consuming more energy from previous years.

Energy Consumption Reporting

Energy consumption per energy carrier	**2022**	**2021**	**2020**	**2019**	**2018**
Total energy consumption in PJ	171.8	179.5	170.3	162.6	149.7
Total energy consumption in TWh	47.8	49.9	47.3	45.2	41.6

Figure 8: Energy Consumption reporting. (Information from Annual Report Norsk Hydro, 2022), (Own Illustration)

GRI Standards Reporting: The Company continues to adhere to GRI standards, ensuring a systematic and comprehensive approach to sustainability reporting.

Reporting greenhouse-gas (GHG) emissions: GHG emissions are reported in metric tons, indicating a gradual decrease in emissions from 11.46 in 2021 to 10.03 in 2022. Water a indicates Norsk Hydro's environmental efforts Direct GHG emissions increased by approximately 10%, and indirect GHG emissions increased by approximately 12%. The

production volume of primary alumina and aluminum increased in 2021 compared to 2020, which was the main reason for growth (Annual Report Norsk Hydro, 2021).
Hydro has the potential to significantly contribute to the reduction of greenhouse gas emissions in various industries, especially in transportation. One prominent example is the automotive industry, where the adoption of lightweight aluminium could play an important role. By incorporating low-weight aluminium into car manufacturing, Hydro could help make cars lighter. This increases energy efficiency, as vans, buses and other vehicles require less energy to run. The use of Hydro aluminum not only enhances sustainable automotive practices but is also in line with broader efforts to address environmental concerns in the transport sector meet.

TCFD Reporting: The TCFD framework is being systematically used to assess and report on climate-related risks and opportunities, reflecting Norsk Hydro's commitment to climate risk management.

Carbon emissions and climate change: specific figures for carbon emissions are not explicitly provided in the reports so the table remains blank; However, Norsk Hydro has an ambitious target to eliminate carbon emissions by 2030 and 2050 and the company's report includes a comprehensive approach to climate, environmental and social issues role, demonstrating its full commitment to addressing climate change and environmental concerns.

Renewable Energy: Norsk Hydro has a strong and positive attitude towards renewable energy in terms of its commitment to sustainable practices. Also, the company to have almost zero emissions in the value chain. For, the company's primary aluminum plant for the production of hydrogen, electricity, or biogas capacity to generate a large percentage of renewable energy, is new for household scrap and recycling reuse (Annual Report Norsk Hydro, 2021). Hydro for 70% of its core projects uses renewable electricity, and has carbon-free internal aluminum (Hydro REDUXA and Hydro CIRCAL) (Annual Report Norsk Hydro, 2021). According to an estimates, the share of renewable energy from the total energy consumption is about 41 percent in the water sector (Annual Report Norsk Hydro, 2021).

Climate Risks: The Company has identified potential climate risks to determine the need to address environmental risks.

SDG indicators: Norsk Hydro's report also included all the Sustainable Development Goals (SDGs), which reflect a holistic and universal approach to corporate responsibility. The company is currently implementing SDGs 1-17.

Transition to renewable energy: While the company's progress in renewable energy is evident, the specifics of this transition are not clearly defined.

Biodiversity disclosure: Norsk Hydro incorporates ecological issues, emphasizing its commitment to environmental stewardship.

Deforestation reports: Although other environmental issues are reported, no specific deforestation reports are issued.

Reporting System: Norsk Hydro's successful adherence to its reporting system underscores its commitment to transparency and sustainable practices. The company uses several reporting frameworks such as the United Nations Global Compact and GRI standards to report on reporting information (Annual Report Norsk Hydro, 2021). Following are the main principles mentioned in the Norsk Hydro report, climate change compliance, environmental management, creative innovation, human rights- organizational structure and working conditions (Annual Report Norsk Hydro, 2021).
EU Taxonomy Information: The Company is actively working to include information on European Union (EU) classification, which shows close compliance with EU sustainability standards (Annual Report Norsk Hydro, 2022).

Recycling activities: Norsk Hydro contributes to sustainability through recycling activities, recycling 321,000 tonnes of post-consumer aluminum, with 100 per cent is 71% to 74% in the years 2019 to 2021, and 71% in 2020. Aluminum growth of consumers after steel about a year it is 35 percent.

	2022	2021	2020	2019	2018
Total recycled metal aluminum	1285	1353	421	438	474

Figure 9: Recycled aluminum scrap used in Hydro Aluminium Metal and Hydro Extrusions, (Own Illustration)

Risk Analysis: Various risks including material, weather-related risks, contingencies and financials have been thoroughly analyzed emphasizing the company's commitment to proactive risk management.

Energy consumption per country	**2022**	**2021**	**2020**	**2019**	**2018**
Brazil	78.8	79.9	71.9	61.7	54
Norway	**71.8**	**71.3**	**72.5**	**71.5**	**66**
Slovakia	5.5	12	11.1	12.8	12.5

Figure 10: Energy consumption per country, (Own Illustration)
(Unit in Petajoule (PJ)

This table provides a comparative analysis of energy consumption over several years (2018 to 2022) in three specific countries: Brazil, Norway and Slovakia energy consumption is an important metric at country level assessing the energy needs of some, which directly affects economic activity, environmental sustainability and overall development.

Brazil: Over a five-year period, Brazil showed a remarkable increase in energy consumption, increasing from 54 in 2018 to 78.8 in 2022. This upward trend reflects the country's energy demand has expanded, which can be attributed to economic growth and population growth. The data show a steady growth trend, with the notable exception of a slight decrease in 2019, indicating the need for further research on the causes of these changes.

Norway: In contrast, Norway has maintained its energy consumption over the same period. The ratio has remained consistently between 66 and 72.5, showing a slight difference. This recovery can be linked to Norway's reliance on hydropower and its aggressive efforts in energy efficiency and sustainable development. This finding reveals that the firm's energy use in Norway creates a similar perspective to that of a country like Brazil. It means that for sustainability and environmental considerations the company should consider rethinking energy consumption in Norway and can control it to conform to green practices and the eternal has met.

Slovakia: Slovakia, like Brazil, experienced a transition in energy consumption during this five-year period. It started at 12.5 units in 2018, decreased to mainly 12 units in 2021, then increased again to 12.8 units in 2020, but with a sharp decrease to 5.5 units in 2022. In terms of energy consumption within Slovakia, these variables may require in-depth analysis towards identifying factors influencing such variables. The data are key to understanding the dynamics of these countries, their economic activities, population growth.

Key performance measures – sustainability

Environmental performance	Ambitions and targets	2022	2021	2020
Total greenhouse gas emissions by ownership equity (million tonnes CO2e)[1]	10% reduction by 2025 against 2018 baseline and net-zero by 2050	11.03	11.46	10.64
Indirect Scope 3 GHG emissions by ownership equity (Million tonnes CO2e)[2]	30% reduction per tonne aluminium by 2030 against 2018 baseline[3]	14.41	15.39	20.21
Recycled post-consumer scrap (thousand tonnes)[4]	620-770 thousand tonnes per year by 2027	321	335	104
Accumulated area disturbed by mining operations at Paragominas (hectares)	1:1 rehabilitation target of mined areas within two hydrological cycles	7,512	7,017	6,607
Accumulated area under rehabilitation (hectares)	1:1 rehabilitation target of mined areas within two hydrological cycles	2,905	2,646	2,486
Recycled waste (share of total waste generated)[5]	Eliminate all recoverable waste by 2040	71%	74%	71%
Social performance				
Total recordable injuries (per million working hours)[6]	Zero life-changing injuries	2.4	3.3	2.7
Number of fatal accidents	Zero fatal accidents	0	0	0
Persons empowered with skills and education[7]	Provide quality education and capacity building to 500 thousand people by 2030	157	129	108
Share of women employees[8]	25% share of women by 2025[8]	22%	20%	19%
Share of women leaders[8]	25% share of women leaders by 2025[8]	19%	18%	-
Employee inclusion index	78% inclusion index score in 2023	76%	76%	-
Governance and compliance indicators				
Substantiated claims of corruption	Zero substantiated claims of corruption	0	0	1

Figure 11: Picture of carbon emission scenario. (Annual Report Norsk Hydro, 2022)

The table above stated clearly three consecutive year's GHG gas emissions on year 11.03 on 2022, 11.46 on 2021 and 10.64 on 2020. Additionally they have ambitious target of 10% reduction by 2025 of 2018 baseline.

As per the reports of the company and its data, it is clear that the company is progressing with lot of backlogs and there are always a place to improve and I think that they need to take immediate action in several aspects. Such as they fails to acknowledge their failure at The Hydro Alu Norte disaster in 2018. They have their usual operation data and targets at the Hydro Alu Norte but didn't mentioned in their report about the incident of 2018. Hydro has expressed about the incident in web publications and caused on heavy rainfall at Alu Norte. But the consequences of Barcarena water contamination is long term and hazardous to the biodiversity in the area. Which is also have strong link with,

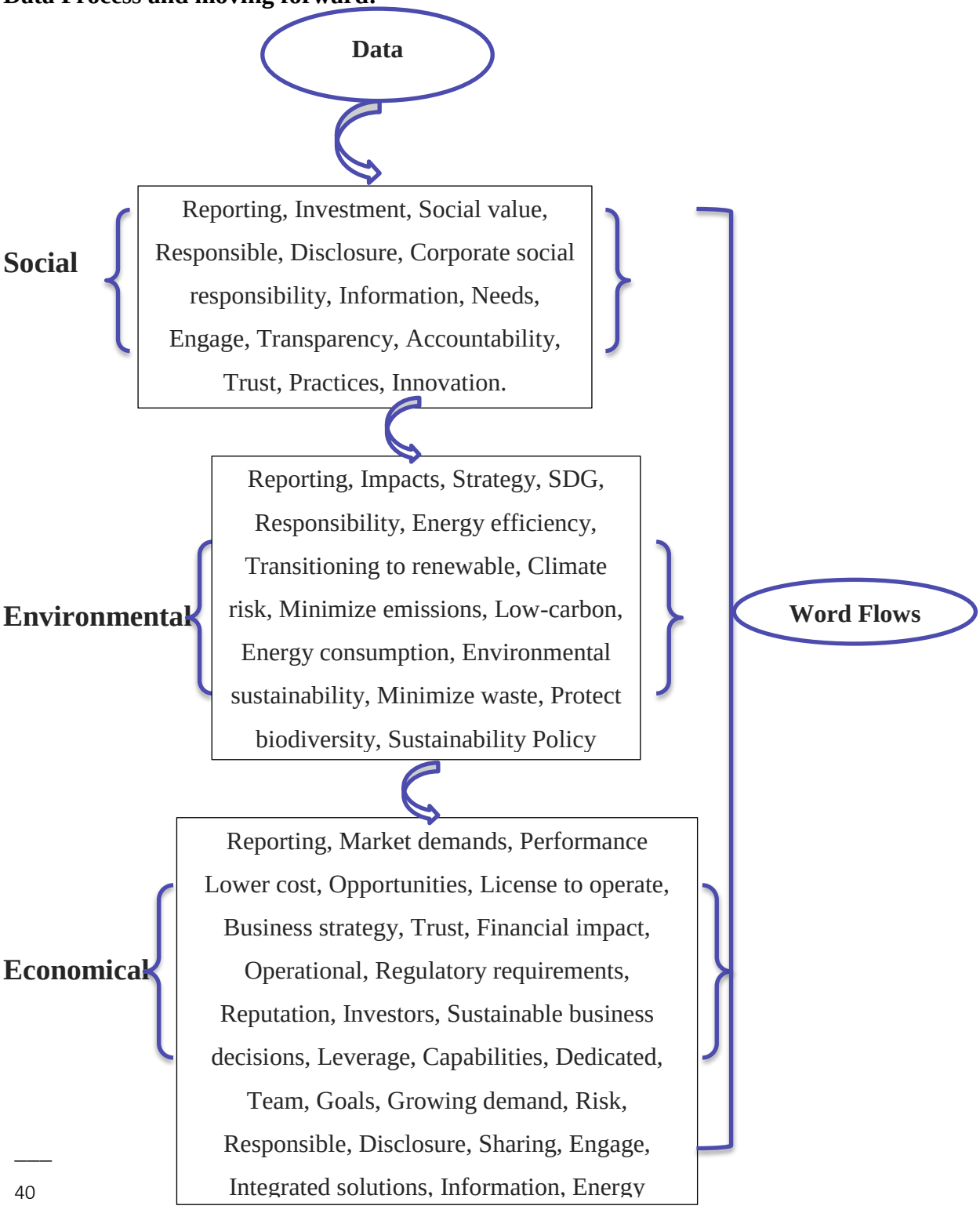
Lindblom's (1994) third strategy, "Distract attention away from the issue of concern", suggests that under certain circumstances, organizations may adopt a more generic sustainability discourse have used renewable energy as a means of "distract attention from this disaster". This approach seeks to steer the narrative toward broad and positive topics so as to focus less on specific challenges or features. In the context of sustainability, this can mean that organizations can emphasize their overall commitment to sustainability in order to deflect attention from particular problems or risks when facing critical issues. Which is huge concern of Legitimacy and disclosure issue.

Hydro's one of most important Brazilian plant, Alu Norte, is currently operating with heavy oil. However, Hydro announced that it intends to switch from heavy oil to natural gas. While this shift signals a move towards cleaner energy sources compared to heavy oil, it should be noted that natural gas is still considered a fossil fuel. Although natural gas is considered a cleaner-burning fuel compared to some other fossil fuels, such as coal or heavy oil, carbon dioxide (CO2) is released during combustion decision replacing heavy oil with natural gas may represent a way to reduce the environmental impact associated with refinery operations. But in the broader context of sustainability, reducing the overall carbon footprint and shifting more towards renewable energy and non-fossil fuel sources should be the ultimate goal. Which is also another legitimacy issue towards the environment and society. It comes to the matter of responsible and maintain the risk of legitimacy.

6. Discussion and Analysis of Interview Data

The interview process of the thesis done with employees from sustainability and reporting department from two companies, where we have asked a set of structured questions regarding reporting, sustainability, climate change, renewable energy, investment and business disclosure and competitive advantage of having sustainability on their work. We have pass through the whole research process below:

Data Process and moving forward:



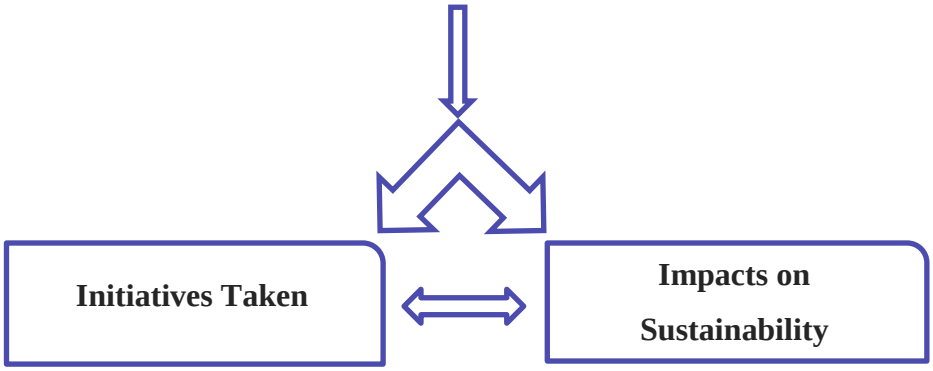


Figure 12: Research process of data purify and moving forward (Own Illustration)

6.1 Factors comes from discussions

The following analysis is based on discussions with representatives of two leading Norwegian renewable energy company. Investing in climate change and the SDGs, risk management, disclosure and sharing of shareholder information, the right to consult, promotion of renewable energy projects, both of the company's commitment to less carbon emissions, as well as the board's efforts to increase recycling, are all talking points. Among the key elements from sustainability, we have defined a word flow that comes one or more often throughout the interview data that is, having a proper reporting system is a core vital for any organization and here for the thesis topic both of the organization have that system and they are functioning properly.

6.1.1 Investment in Climate Change and Sustainable Development Goals (SDGs)

One of the key outcome of the interviews was the companies' commitment to fight climate change and align with the SDGs. Aker Solutions has demonstrated a discerning awareness of the imperative to invest in renewable energy for the mitigation of greenhouse gas emissions. Their commendable financial commitment and strategic approach toward attaining the Sustainable Development Goals (SDGs) are noteworthy. However, it is noteworthy that, as indicated in their reports and reiterated by the CEO, the company's primary business priority until 2030 remains rooted in oil and gas. During the interview, the company's representative

did not contest this perspective but rather provided an affirmative response, affirming that the company remains steadfast in its dedication to both the oil and gas sector and the technological advancements associated with it.

"Within the tapestry of our corporate vision, oil and gas stand as the foundation, but woven intricately alongside is our commitment to technological innovation, which threads the narrative of our journey towards a sustainable future—one where renewable energy becomes an indispensable strand in the fabric of our success."

- Sustainability And Reporting (Aker Solutions)

This commitment goes beyond simple corporate responsibilities. Which is shown that the company is committed to their role as a sustainable business organization and aware of the serious social and environmental impacts of climate change.

Norsk Hydro whereas another company whom carbon footprint and impact on climate report isn't so impressive of being core operation on aluminium. During the interview, one of the company's sustainability leader, emphasized on their commitment to addressing climate change. He added in his words that, *"climate and SDGs being one of core part of our reporting".* The company is constantly looking for new investment opportunities to support the SDGs, in particular Goal 7 (Affordable and Clean Energy) and Goal 13 (Climate Action).

6.1.2 Risk Management

Aker Solutions manages climate related risk and other associated risk in a comprehensive approach in their operation and activities. It came out through the interview, that their recognition of various risks associated with the renewable energy sector, such as technological, market, and policy risks, indicated a pragmatic and well-prepared stance.

"We've got a proper system to risk mitigation strategies in operation, from diversification and rigorous due diligence to a proactive stance, all aimed to tackling potential challenges head-on." – Sustainability and Reporting (Aker Solutions AS)

Norsk Hydro, in terms of risk management and risk factors from external affairs the company reflects proactive in managing risk and ensuring the sustainability of their operations. As they

are concern about climate risk and other materialistic risks. Still they should not mentioned much on risk mitigating issues. They have focus on environmental, social, and governance (ESG) factors.

6.1.3 Disclosure and Shareholder Information Sharing

Being a huge energy and renewable energy company, Aker Solutions AS have commitment to openness was fully evident in the way it handled the material disclosures to investors. They follow strict reporting guidelines and detail their economic, ecological and social impacts. Thus there were not mentioned any backlog or negative side from the authorities. It were also absent in their reports and interview.

Norsk Hydro as a company it is also have commitment to accountability and responsible governance is reflected in its transparent approach, which inspires shareholder confidence. Since in my opinion the company still have room for sharing and disclosure. Especially their operation in Brazil and incident related to that.

6.1.4 Promotion of Renewable Energy Projects

Aker Solutions AS have several renewable energy projects including, offshore wind projects contributing its engineering and technology expertise to enhance the efficiency and sustainability of wind energy generation. As well as they have diverse initiative in renewable sector and technological advantage in development of the sector. In terms of progress the company itself moving forward, but until 2030 their core target is in oil and gas sector and it is again and again came out from their reports and CEO’s statement.

Norsk Hydro being a major global company in the aluminium industry it has historically been associated with hydropower. The company utilizes hydropower and solar power for its energy-intensive aluminum production processes. Outside of its operations, the companies actively supports renewable energy initiatives. They have been involved in several projects aimed at increasing the use of renewable energy and facilitating the transition to sustainable sources of electricity.

6.1.5 Low Carbon Emissions and Low Carbon Footprint

Aker Solutions AS has couple of core focus on lower the carbon foot print, Reduce own emissions (scope one and two), Unite the supply chain to reduce scope three emissions, Strengthen low-carbon solution and Leverage data insight to take action.

At Aker Solutions it is also believed that,
"While we are increasingly shifting to renewable and low carbon energy sources, we also know that without carbon capture and storage (CCS) we will fall short of our net-zero target."
-By Janne Rasten, Senior Vice President, Carbon Capture at Aker Solutions. (Aker Solutions Linkedin, 2022)

Norsk Hydro is ambitious towards low carbon emission by its scope 1, 2, and 3. Since the company prioritizing scope 3 and its related emissions. According to the CEO, *consumer focus on Scope 3 emissions brings low-carbon opportunities for aluminium producer Hydro*, CEO says. He added, *"Green alumina is really one of the most important components in order to bring low carbon aluminium to the partnerships that we have," Aasheim said.* (Fastmarkets, 2023)
As the company is committed to reducing its carbon footprint and emissions as a core tenet of its business model. Their commitment to environmental sustainability is demonstrated by strict adherence to emissions requirements and ongoing programs to reduce environmental impact.

6.1.6 Increase in Recycling Over Years of Operation

The recycle and reuse of materials have been noticed, which is very progressive mode. According to the interviews, the organization takes a forward-looking stance on sustainability, with evidence that recycling efforts have steadily increased over the years. Aker Solutions' mentions one of its publications that, this year the company sort recycle 18,000 tons of steel to the circular economy which would cut carbon emissions by 26,000t to 30,000t. Which is a remarkable data.

Norsk Hydro's operation and showcase reflects the company working on renewables and it also saying the renewable energy industry as a whole would benefit greatly from such a more proactive approach. It is positive that the company use scrap aluminium and it working hard

on green aluminium to have low carbon foot print. But as the business main focus is on aluminium and it is their core profit part. There are higher emissions both scope 1, 2 and 3.

Figure 13: Word cloud (Own Illustration generated from NVivo)

6.2 Connection through Legitimacy

From the interview with companies it is revealed that, they have been actively seek to align their activities and reporting with the expectations and values of the people around them. As the concept of legitimacy of theory is an important factor through which practices and strategies are identified of Norwegian renewable energy companies. They want to keep their "license to work," in other words.

In general perspective Aker Solutions seems to be among the companies that are **committed** to address climate change and alignment with the Sustainable Development Goals (SDGs). As it is an effort to maintain its credibility in an environmentally friendly world, sustainability is becoming increasingly important. The company positions itself as a reputable and responsible player in the renewable energy market by funding projects that directly support the SDGs.

Also based on the **regulatory principle**, we emphasize strong corporate risk management and open corporate disclosure standards. Both Aker Solutions and Norsk Hydro shows that they are taking proactive steps to mitigate risk and publish open reports in an effort to gain and maintain the trust of their customers, investors and vendors. This once again establishes it as an organization worthy of trust and confidence. Though they have misuses and accidents that should be take into account. Which seems absent in reports.

The companies desire to **engage with investors and demonstrate** its legitimacy is reflected in its transparency and protection of requests for information from any interested parties. This means that it committed to accountability and legitimacy through its policies of openness and responsiveness.

Companies are doing their part to advance their goals and establish their legitimacy by **partnering with** government and local communities to advance renewable energy initiatives. It demonstrates the company's commitment to a clean energy future, and further strengthens the company's position in the public eye.

Corporate efforts to reduce carbon emissions and reduce environmental impact are not simply motivated by environmental concerns. As we have seen that, they are also essential to maintaining confidence increasingly concerned about climate change. By aggressively striving to reduce its environmental footprint, the Company promotes itself as a **responsible** player and is viewed as a contributor to a zero-carbon economy.

The company's **commitment** to sustainability is reflected in its ongoing efforts to improve its recycling processes. The company has demonstrated its commitment to reducing its environmental footprint through consistent efforts to reduce waste and the environment.

To have a good understanding of thorough legitimacy both companies matched with core elements of legitimacy, as of, stakeholder Analysis, Sustainability Disclosures, Alignment with Social Expectations, engagement, commitment, information and Responses to Criticism. As we know company's sustainability reports, corporate social responsibility (CSR) reports, and other public disclosures where we analyze the content of these documents to identify how the company communicates its commitment to social and environmental issues.

"These accounts might most easily be interpreted as how organisations ***would like to understand*** *sustainability and how it would convenience them if the body politic would accede to such a view"* (Gray R., 2010)

Where I have noticed a significant reflection of this statement of Professor Rob Gary published in AOS journal in 2010, organizations have been shown to communicate for their sustainability efforts. When there is a potential for interpretive bias in the organizational perspective. Essentially, these facts can be taken as representative of the desirability of sustainability thinking. The ideal is usually associated with what would be most relevant or useful to the organization, especially if accepted and accepted by the broader community.

Organizations driven by a variety of motivations, including reputation management, stakeholder relations, and compliance with emerging standards. They may use a narrative to inform their policies sustainability was positively expressed. This statement should be strategically framed to demonstrate that the organization is environmentally and socially responsible. It is a reflection of how the organization looks at itself to contribute to a sustainable future, and more generally, how it wants to be perceived by stakeholders and the public.

It also emphasizes the idea that organizations need to deliver a sustainability strategy that matches their interests and goals. The convenience lies in the hope that this particular definition of sustainability will be embraced and supported by the broader social and political context. Acceptance of this definition may legitimate the institutional sustainability narrative as a proxy for social consensus. It transforms organizational status into a negative influence, and can influence public opinion, investors, and create a negative environment.

However, this approach also triggers the critical consideration of whether the data and information presented do indeed meet the context that reveals the still complex and illusory issues of sustainability in the organization. It raises questions about the authenticity and depth of sustainability practices and whether the given narrative corresponds to specific practices and measurable impacts. This nuanced analysis reveals potential tensions between the organizational aspiration for legitimacy and the actual content of their sustainability strategies. This in turn can lead to greenwashing that will align credibility with actual sustainability efforts and highlight the need for transparency and accountability in corporate communications.

7. Challenges

From the observations and discussions from interview, it have been overviewed that the companies face a wide range of challenges in operations. We all knows that the natural disasters and manmade disasters are different in their consequences. Due to climate change and industry's rough behavior towards environment making this tougher. Moreover, there were always lack of stability and reliability of energy supply from renewable sources that can damage renewable energy and infrastructures. Where renewable energy have many advantages over the fossil fuel counterparts, but it have to survive in market competition and profit sharing.

Companies' always face issues with balancing profitability and sustainability is a multifaceted challenge that requires a strategic and integrated approach. In our general thought, we may say that companies can navigate this delicate balance by aligning sustainability goals with overall business goals but adopting a long-term, valuing sustainable practices as investments, adopt innovations to improve efficiency, and manage climate risks more aggressively. It's not something will happen overnight and it comes with operational risk as well. In addition, less transparent information in reporting, measurable metrics to assess, unethical competition and market demand often make sustainability and adaptability a critical situation.

Complex Supply Chains and integration sustainability into corporate culture is way more far from the real situation and in the reporting perspective. Moving towards a sustainable supply chain requires ensuring the continuity of the supply chain, engaging suppliers, managing risk diversity, and compliance with regulations. Integrating sustainability into corporate culture requires leadership commitment, employee training, effective communication and performance management. A culture of continuous improvement and collaboration with stakeholders is essential for successful implementation. By addressing these challenges comprehensively and adaptively, companies can strike a balance between profitability and sustainability which is missing and challenging to implement.

Companies' runs after fast profit and Norway have strong fossil fuel market. The actors such as energy storage, grid connectivity, and resource availability also affecting the feasibility of renewable energy. It is also clear that, despite EU de-carbonization ambition goals, it offers few options for businesses and formidable challenges in achieving substantial reduction targets.

Moreover, transition to renewable energy can cause changes in biodiversity and habitats. Large-scale renewable projects such as wind turbines or hydroelectric power plants can have detrimental effects on local flora and fauna especially birds and fish. Companies are still struggling to reduce their environmental impact and adopt policies that do not support biodiversity.

There are problems with sustainability from both the company and the market level. Companies operating in the energy sector face new risks as government policies and regulations constantly change. Energy market volatility, changes in energy costs and competition from conventional sources pose risks for renewable energy companies. Another one is, financing the transition to renewable energy faces challenges due to high initial costs, investments, capital availability, policy uncertainty, and the reluctance of traditional financial institutions to be market competitive, financial conditions, perceived risk to accelerate adoption and need to be addressed.

In the case of climate change, greenwashing involves companies making misleading or exaggerated statements about their environmental efforts. Issues include unclear or selective disclosure, presentation efforts without appropriate adjustments, controversy surrounding carbon offsets, use of dubious certifications, lack of transparency, inconsistent branding, temporary services, vague language, and disregard for procedural details. And a demonstrated commitment to long-term sustainable practices is critical to building trust and confidence

8. Conclusion

This master's thesis has evolved into an examination of the changing environment of the renewable energy sector, in which I have highlighted two Norwegian company which have renewable backgrounds and sustainability projects. With a through in-depth interview with concerned staff from companies' it has been easier for me to be able to work on this thesis and broaden my knowledge to uncover the firm's commitment to addressing climate change, Sustainable Development Goals, shrewdly managing risks, and information sharing.

Here both companies' seems dedicated through their annual and sustainability reports to ensuring future success by expanding their operations into new areas, such as environmental responsibility and global sustainability. Legitimacy Theory is a theory that emphasizes the need for organizations to match their activities with social expectations and norms. The acts and strategies mentioned during the interview are in perfect accordance with these broader concepts. By tackling climate change, adopting responsible risk management, transparent, disclosure, shareholder participation, promotion of renewable energy projects, and the perpetuation of sustainability initiatives, the companies expertly legitimizes its operations within the renewable energy sector. Both of the companies' activities have not only solidified its reputation, but also bolstered its social license to operate, which is especially important in today's world when environmental and social responsibility have gained vital prominence. Such credibility is the basis for long-term success in business. There will be obstacles on the path to a future powered entirely by renewable energy, as there will be with every effort to improve sustainability. Regulatory risks and market-based uncertainties have also been explored, along with the effects of biodiversity loss and natural disasters brought on by climate change. The company's commitment to addressing these difficulties with innovation, adaptation, and strategic planning serves as a hopeful paradigm for the whole renewable energy market.

Here it is remarkable that most of cases these companies have long term ambitious target for sustainability but approx. till 2030, here they do not have any further steps in near future. Which means like Aker Solution's main business will be oil and gas. Also Norsk Hydro have disclosure issues regarding Alu Norte in Brazil incident. There was a lack of detailed information on some critical incidents such as the Alu Norte disaster, which posed a challenge to understand the environmental impact of companies on the environment. In addition their main business is aluminium which itself have controversial for carbon emission.

Corporate entities such as Aker-Solutions and Norsk Hydro's companies' are not merely contributors to environmental solutions but integral stakeholders in the collective effort to mitigate climate change, and this aspect of the transition needs to be emphasized. In addition to being good for business, this move demonstrates that corporations can play a significant role in fostering a more environmentally friendly and sustainable global community. These practices align well with the principles of legitimacy theory that emphasize the importance of aligning professional activities with societal expectations and values.

The thesis identified several limitations and challenges

The survey faced several difficulty of obtaining responses from many companies, as many did not respond to emails or return phone calls. I have reached out to about 10 to 11 companies in Norway that are actively involved in energy and renewables. Despite the breadth of my question, only three companies responded positively and expressed a genuine interest in giving time for an interview and an in-depth discussion about what I'm focusing on with my title. The willingness to communicate reflects the companies eager to contribute valuable insights to my master's thesis.

Suggestions for future research

To better examine environmental accountability and problem solving by firms, future research should examine incidents such as the depth of sustainability progress and SDG indicators. Also expanding the analysis to include a larger number of companies in the renewable energy sector would provide a more comprehensive understanding of industry challenges and opportunities. In addition, agencies need long-term research to assess the impacts of renewable energy projects and sustainability programs on the environment and society. To have a well understanding about the scenario companies should have transparency in disclosure and reporting mechanism.

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10. Annexes

Interview Questionnaire

RQ Part 1: Initiatives

1. Do you have an established system of sustainability reporting to SDG indicators?
2. Do you report both positive and negative aspects (from stakeholders' perspective) of your performance in terms of sustainability? If yes, why do you do that?
3. In your reporting, do you describe the link between sustainability activities and business performance?
4. What role does sustainability reporting play in creating social value?
5. What role does sustainability reporting have in sustaining the license to operate?
6. How do you choose issues/topics to report upon?
   (Sustainability disclosure policy, international guidelines, stakeholders' information needs, or other determinants)?
7. Do you have an established system of sustainability reporting indicators (quantitative and qualitative)?

RQ Part 2: Sustainability Impact

8. Are you using GRI?
9. What does "Company X" do to reduce its greenhouse gas emissions?
10. What do you do to reduce its environmental impacts? Or how do you work to improve environmental performance?
11. What is the driving force behind "Company X" work to improve sustainability performance?
12. How do you address climate risk?
13. Do you define your key stakeholders and their information needs? If yes, how do you find out about the information needs of your stakeholders?
14. Does your company deem it necessary to be sustainable? If yes, what do you do in this regard (social, environmental)?
15. Do you think that society gives your company a license to operate? If yes, what do you do in response (acting as a responsible member of society, engaging with communities, etc.)?