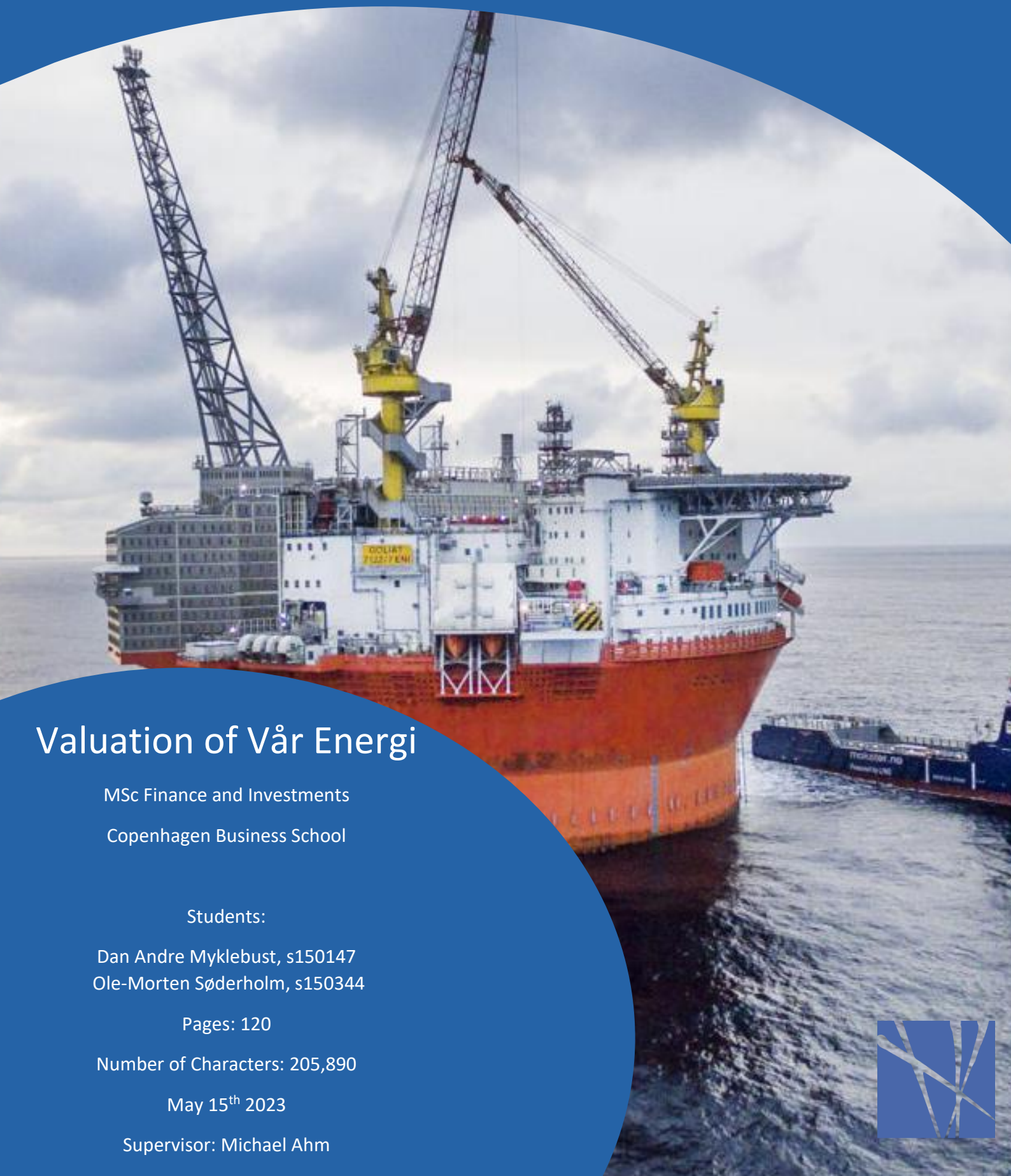

Valuation of Vår Energi

MSc Finance and Investments

Copenhagen Business School

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Pages: 120

Number of Characters: 205,890

May 15th 2023

Supervisor: Michael Ahm

ABSTRACT

This thesis presents a strategic analysis and valuation of Vår Energi ASA as of the 1st of April 2023. Vår Energi is publicly listed on the Oslo Stock Exchange under the ticker VAR. The stock traded at NOK 25.52 on the 1st of April 2023. The study employs fundamental and relative valuation methods, and all estimates are based on publicly available information. The primary research question addressed in this paper is:

"Is it still worth buying a company such as Vår Energi, which only operates and invests in Oil & Gas?"

The valuation of Vår Energi commences with a comprehensive strategic analysis of its external and internal environment, which reveals that the Norwegian Oil & Gas industry is exposed to several risks that could significantly impact future growth and value creation. A renewable energy model is constructed to forecast the Oil & Gas prices for the next four years and to predict the revenue of Vår Energi. The model is based on supply and demand related to the assumption that renewable energy will replace fossil fuels as commitment to net zero 2050 is assumed.

Further, a detailed analysis of historic financial statements is conducted to forecast Vår Energi's future performance. Future performance estimates rely on industry outlooks and guidance provided by Vår Energi. After forecasting future performance, the cost of equity and cost of debt are estimated to be respectively 9.53% and 4.40%. Vår Energi's market value of equity is higher than its interest-bearing debt, resulting in a weighted average cost of capital of 9.36%.

Based on the forecasted cash flows and the weighted average cost of capital estimate, the implied value of Vår Energi's share is 22.17 NOK. The relative valuation based on comparable companies provides an estimated value of 23.52 NOK per share. A sensitivity analysis was conducted, revealing that the value per share is highly sensitive to the assumptions made. Given a share price of 25.52 NOK as of the 1st of April 2023 and the final value estimate of 22.17 NOK per share, a sell recommendation is made for Vår Energi ASA.

Contents

1.0 Introduction

Vår Energi is a Norwegian Oil & Gas company with a rich history that can be traced back to the 1970s. The company was formed in 2018 through a merger between Eni Norge and Point Resources, and it has quickly established itself as a leading player in the Norwegian petroleum sector. Vår Energi operates on the Norwegian Continental Shelf, where it has a diverse portfolio of exploration and production assets. The company's operations include the development of Oil & Gas fields, as well as the transportation and sale of these resources. Today Vår Energi is only focused on Oil & Gas production and is yet to commit to meeting the renewable energy needs in order to ensure a sustainable future.

This paper will analyze Vår Energi to determine its fair share value. The analysis comprehensively evaluates the company's financial statements, operations and competitive landscape. External and internal factors are analyzed in detail to locate Vår Energi's strengths and weaknesses. By examining these factors, the thesis aims to provide a thorough and objective assessment of Vår Energi's value, which investors and other stakeholders can use to make informed decisions about the company's prospects.

This valuation deviates from a traditional valuation as the future revenue of Vår Energi is forecasted based on a renewable energy model. The model will build on expected renewable energy generation and how this increase affects the demand for fossil fuels, such as Oil & Gas. External factors such as the Russian-Ukrainian War and OPEC are analyzed to understand the market drivers. However, the revenue is estimated purely on the decrease in demand for fossil commodities as renewable energies are expected to replace them. This renewable energy model is used because, as of the 1st of April 2023, Vår Energi has no plans to invest in renewable energy technologies. It plans to continue utilising its skills in the Oil & Gas sector and increase its production for the upcoming years. By using Vår Energi as the target company, this thesis aims to answer the following problem statement:

"Is it still worth buying a company such as Vår Energi, which only operates and invests in Oil & Gas?"

The following sub-questions will be explored to support the problem statement:

- What external factors have impacted Vår Energi in the past and what factors are likely to affect the company in the future?
- What are the competitive advantages of Vår Energi and how do Vår Energi compare to those of its peers?
- How much future renewable energy is expected and how does this affect Vår Energi?
- How does Vår Energi's profitability compare to that of its peers and what is the breakdown of its profitability?
- What is the forecast for Vår Energi's future performance?
- To what extent do changes in the input of the DCF model impact Vår Energi's valuation?
- How do Vår Energi's financial multiples compare to those of its peers?

1.1 Limitations

This thesis is subject to various limitations that may significantly affect the estimates of Vår Energi's enterprise and equity value. The analyses and value estimates are solely based on publicly available information as of 1st of April, 2023. As such, Vår Energi may possess private information that could potentially impact the conclusions. Moreover, the relatively short analysis period and the cutoff date may influence the analyses and value estimates. While five years of historical data is shorter than common practice, it is deemed appropriate given the recent changes Vår Energi has undergone. Additionally, any information made public after March 31, 2023, may alter the perspective on Vår Energi's future performance, despite not being considered in this thesis.

This thesis utilises two primary valuation methods and the estimates depend on these preferred methods. If other valuation methods were employed, the value estimates would likely differ. The cost of equity is highly dependent on subjective adjustments and comparable companies. Therefore, different comparable companies and adjustments would likely yield different results.

The projections of future Oil & Gas prices significantly influence the value estimates, as they are contingent on global supply and demand growth estimates. These estimates are highly uncertain and primarily developed using sources from developed countries. The future Oil & Gas price will be primarily based on a renewable energy model, building on estimated future renewable energy

production. As a result, demand for Oil & Gas will decrease as renewable energy replaces it. Estimating supply and demand growth based on other sources could result in entirely different price estimates. Furthermore, the thesis is limited by the decision to use this model to analyse future Oil & Gas prices. The inclusion of external factors, such as the Russian-Ukrainian War or OPEC announcements, could have resulted in different prices.

2.0 Methodology

The methodology chapter will explain the methodical approach to data collection and processing. Only publicly available data is utilised to represent an investor's position in this assignment. Interviews and direct contact with Vår Energi could have been conducted to gain a better insight into the company, but this may remove some of the objectivity in the valuation. Vår Energi may overestimate many of its positive projects and underestimate the consequences of negative scenarios. Therefore, it was chosen to conduct this valuation based on public information such as annual reports and similar sources.

2.1 Methodical Approach

Data collection constitutes an essential component of the research process to formulate an informed and reasoned recommendation regarding the valuation of Vår Energi. As this thesis aims to evaluate whether the share is accurately priced on the stock exchange, the analysis exclusively relies on publicly available information. According to the efficient market hypothesis, stock prices in a semi-efficient market should reflect all publicly available information, as insider trading is illegal (Downey, 2023). Hence, we have not conducted direct interviews with the company to avoid influencing the valuation with confidential information undisclosed to the market.

The thesis has deployed two forms of data collection: primary and secondary data. Primary data refers to information collected directly from individuals with direct involvement or experience with the subject under study (Presskorn-Thygesen, 2021). In the context of business, press releases and annual reports are considered primary data sources, as they originate directly from the company itself (OWU Library, 2021). While this information is generally deemed reliable, it is important to note that certain biases may also influence it. Vår Energi adheres to International Financial Reporting Standards (IFRS) and Norwegian accounting law, which enhances the reliability

of the information obtained from these primary data sources and facilitates cross-company comparisons (Vår Energi, 2023).

In this thesis, secondary data is defined as information that has already been collected and analyzed by others in the past (Presskorn-Thygesen, 2021). This type of data encompasses both qualitative and quantitative data and contains information from reputable companies, news articles, textbooks and market reports in the valuation. The use of third-party materials helps to mitigate any potential bias that may be present in Vår Energi's own reporting. Critical judgment has been exercised when employing secondary data, ensuring that the sources' authors are reliable, neutral and unbiased. Given that the analysis is based on data collection and subsequent interpretation, an empirical inductive method has been employed in this study.

2.2 Valuation Approach

Further, the valuation approaches used in the thesis will be explained. Two methods are utilised: the relative valuation approach and fundamental valuation (discounted cash flow – DCF).

2.2.1 Relative Valuation

Relative valuation is based on multiples and the relative pricing of earnings of identified peers (Petersen & Plenborg, 2012). Valuations based on multiples are common due to the relatively low level of complexity and the pace at which it can be performed. Despite this, a thorough relative valuation based on multiples is both complex and time-consuming. A three-step plan can be used to show the path of a relative valuation based on multiples (Penman, 2013):

1. Identifying comparable peer firms with similar operating activities.
2. Calculating the multiples comparable among firms.
3. Deploy the calculated multiples in order to value the target firm.

According to Penman (2013), relative valuation is a method for a first impression of a company and can be used as a supplement to other forms of valuation. Additionally, Koller et al. (2010) highlight that a DCF analysis is more flexible and accurate, but it may be appropriate to include a multiple analysis where the valuation object is compared to other comparative companies to improve the accuracy of a DCF valuation.

Performing a relative valuation depends on a sufficiently large market, as well as the target firm having comparable peers (Damodaran, Investment Valuation: Tools and Techniques for Determining

the Value of Any Asset (3. utg.), 2012). The relative approach should only be applied if these assumptions are fulfilled, which is the case for Vår Energi, which operates in a large industry with comparable peers. Damodaran (2012) points out that mature or declining companies have the strongest basis for using multiples. For newly established companies with rapid growth, it is often difficult to find the right companies to compare with, and extreme values can affect the result.

2.2.2 Fundamental Valuation

The fundamental valuation approach is the most used method among practitioners. The discounted cash flow model (DCF) states that the company value is decided by the present value of the future cash flows (Petersen & Plenborg, 2012). The company's future cash flows are forecasted in the DCF before being discounted by the weighted average cost of capital (WACC) to get the future cash flows in the present value. The fundamental valuation method is explained in five steps by Penman (2013):

1. "Knowing the business": The first step is to map out the company. This can be done by analysing the company's history, the industry, and how it operates. It can also involve analysing strategic and qualitative aspects of the company.
2. "Analysing information": This is not just about looking at the financial statements but also about the company's qualitative and quantitative aspects. In this section, the information needed to make forecasts is collected and structured so one can move on to step 3.
3. "Developing forecasts": In this step, it is crucial to identify the drivers relevant to the forecast period, as this ensures the validity of the analysis. The growth rates of these drivers should be calculated based on the information gathered in the previous step.
4. "Converting the forecast to a valuation": Future cash flows should be calculated and discounted to a present value, providing an estimate of the company's worth at the valuation date.
5. "The investment decision": Finally, a conclusion is reached regarding whether to invest in the company. Based on a fundamental valuation, a stock value is determined, allowing us to assess whether the company is over- or undervalued compared to its current market value.

3.0 Vår Energi and the Oil & Gas Industry

3.1 History of Vår Energi

Vår Energi is an independent Norwegian petroleum company established in 2018 following the merger of Point Resources and Eni Norge. Before the merger, Eni Norge was a subsidiary of the Italian Oil & Gas company Eni, which was founded in 1953 (Vår Energi, 2023). Eni Norge was established in 1962 and was primarily focused on exploring and producing Oil & Gas in the North Sea. Over the years, the company made several significant discoveries, including the Goliat field in 2000 and the Norne field in 2011 (Eni, 2018).

Point Resources was a Norwegian independent Oil & Gas company founded in 2014. The company was established to acquire and develop Oil & Gas assets in Norway. It quickly made a name for itself through its successful exploration and production activities in the Norwegian Continental Shelf (Offshore Energy, 2018). In 2017, Eni Norge and Point Resources announced that they would merge to create a new company, Vår Energi (Offshore Energy, 2018).

The merger was completed in 2018 and the new company quickly established itself as one of Norway's largest Oil & Gas companies. Vår Energi has a portfolio of assets, including exploration, production and development projects in the North Sea and the Barents Sea. The company is headquartered in Stavanger, Norway and is currently one of the largest Oil & Gas companies in Norway.

Vår Energi does not have a strong focus on sustainable and responsible business practices and is currently not aiming to divest and focus on producing renewable energy. However, Vår Energi is invested in carbon capture technology in order to reduce its carbon footprint from Oil & Gas production. The company is also committed to creating value for its shareholders, employees and the communities in which it operates. Vår Energi is a good example of the ongoing consolidation in the Oil & Gas sector and is well-positioned to continue growing and expanding its business in the coming years.

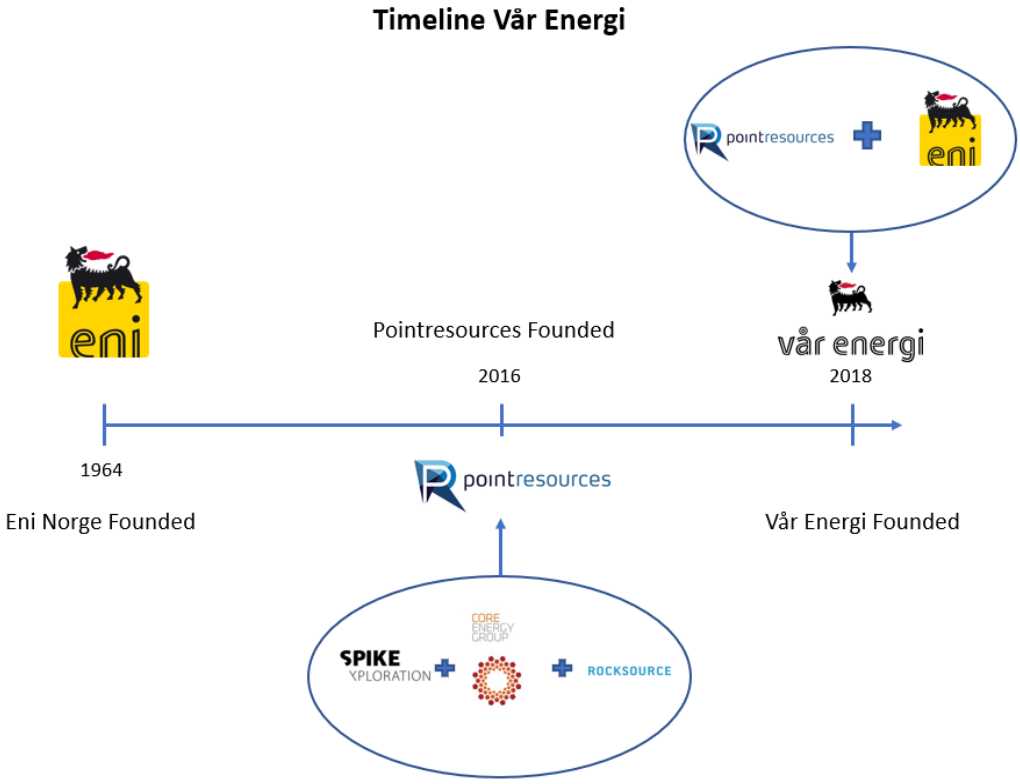

Figure 1: Own Creation. Source: (Vår Energi, 2023).

3.3 Business Idea, Vision and Strategic Framework

In order to gain a better understanding of Vår Energi's future prospects and growth potential, it is essential to examine the company's vision, business idea and strategic framework. These key perspectives will be outlined below and will serve as integral components in the forecasting process.

3.3.1 Mission and Strategic Framework

The mission of Vår Energi is to maximise value through secure and responsible exploration, development and production of hydrocarbons as a leading operator and preferred partner (Vår Energi, 2023). In order to obtain its mission, the company aims to achieve responsible long-term growth by having a diversified portfolio of assets and ongoing development projects, as well as a strong track record of exploration. Vår Energi believes in delivering a better future by prioritising safety, sustainability, value creation and employee satisfaction.

The company's strategic priorities reflect its vision of becoming Norway's leading energy company. Vår Energi aims to become the safest operator on the Norwegian Continental Shelf (NCS), the partner of choice, an ESG leader and a net zero producer by 2030 (Vår Energi, 2023). Vår Energi believes that the energy system and the Oil & Gas industry is in transition and that mitigating

climate change is a global endeavour requiring economic and social transformation towards a carbon-neutral world. The company also believes that Oil & Gas will continue to be a part of the long-term energy mix, with gas increasing its share of NCS production. The NCS will remain attractive due to its cost competitiveness, low emissions, and long-term-oriented government and regulators (Vår Energi , 2023).

Vår Energi plans to reach its mission and strategic goals through five key priorities in the following framework (Vår Energi, 2023).

1. The safest operator with leading ESG performance:

   The company seeks to embody safety in its culture and implement critical safety initiatives in all operations. Tracking leading and lagging indicators to prevent harm to people, assets, and the environment. Through defined initiatives, the company has a clear pathway to achieving zero emissions by 2030.

2. Have a robust portfolio positioned for further growth:

   Vår Energi seeks to leverage its hub-centric approach to focus on developing the portfolio both organically and inorganically. This creates opportunities for scale, diversification, and a holistic approach.

3. Operational excellence:

   Vår Energi aims to achieve operational excellence across its portfolio with clear ambitions of reducing costs and becoming a top quartile performer on the NCS. The company will achieve this by optimising its portfolio and reservoirs, improving efficiency, and implementing new technologies.

4. Partner of choice:

   As a leading upstream Oil & Gas company, Vår Energi aspires to be the best partner for field operators, suppliers, regulators, and other stakeholders. The company believes that value can be created through partnerships and innovative collaboration models in the future.

5. High-performing organisation:

   Vår Energi fosters a high-performing organisation that is flexible, efficient, and collaborative. The company develops world-leading capabilities and creates a highly satisfying work environment for all its employees to work towards the same goals.

3.3.2 Business Model

The business model of Vår Energi is in the upstream side of the Oil & Gas industry, specifically Exploration & Production (E&P). The E&P sector is a distinct part of the Oil & Gas industry concerned with the initial phases of energy production. It involves the search for and extraction of Oil & Gas resources (Norsk Petroleum, 2022). Its primary focus is on the extraction of raw materials, which are then sold to other companies for refining and energy production.

Figure 2: Own creation. Source: (Vår Energi, 2023)

Exploration

In the exploration part of the business, the target is to discover new commercial hydrocarbon reserves. The primary objective of Vår Energi's exploration approach is to achieve profitable reserve replacement. This is done by pinpointing drilling opportunities in established assets and core regions of the Norwegian continental shelf that are in close proximity to existing fields. Additionally, the company selectively engages in high-risk, high-reward exploration ventures in less developed areas. To find drilling opportunities, Vår Energi utilises new time-lapse 4D seismic data and multiple-azimuth seismic data to improve the success rate of identified drilling targets (Vår Energi, 2023). To continue the development of new technology, the company is involved in multiple projects in R&D. Further, the exploration phase continues by drilling an exploration well where the targets get considered as a successful commercial discovery or a dry well.

Appraisal & Development

The appraisal and development phase of E&P starts with assessing the data of successful commercial discoveries. Here measurements and data from the rock and fluids in the wells are assessed to make an appraisal of the quantity of the discovery. The appraisal aims to accurately estimate the hydrocarbon reserves (Vår Energi, 2022). An accurate estimation helps give the information to make the optimal decision of the most efficient way to extract the petroleum. When the discovery is going to the development phase, Vår Energi must create a plan for development and operation, which needs to be approved by authorities before further action is taken (Norsk Petroleum, 2022). When the plan is approved, wells for extraction are drilled.

Production

The oil or gas is physically extracted from the wells in the production phase. Vår Energi appropriates facilities for optimal oil or gas production in the field. Appropriating facilities include installing equipment for well productions, surface facilities such as platforms and pipelines, and testing the facilities. Facilitations are done to secure as safe and efficient production as possible (Vår Energi, 2022). Further, the physical extraction of the hydrocarbons proceeds. When extracted, the crude oil products are transported and sold in cooperation with Eni Trading & Biofuels in London. The NGL gas is extracted and stored in the UK and Norway before being transported by pipelines or tankers to the markets. Natural gas sales are secured by Vår Energi itself through Gassco, which operates the gas transport infrastructure on the Norwegian continental shelf (Vår Energi , 2023)

3.3.3 Core Activities

Vår Energi's core activities focus on the exploration, development, and production of Oil & Gas resources in the Norwegian Continental Shelf, focusing on sustainable and efficient resource utilisation (Vår Energi, 2023). Regarding prospecting, Vår Energi engages in exploration activities to identify and evaluate new Oil & Gas reserves in its portfolio. This involves using advanced geological and geophysical technologies to locate and analyse potential hydrocarbon reservoirs.

Once an oil or gas field has been identified, Vår Energi works to develop the field, which involves designing and building infrastructure such as platforms, pipelines, and other facilities necessary to extract and transport the resources. Vår Energi also produces Oil & Gas from its fields using

advanced technologies and processes to optimise production and maximise recovery rates while minimising the environmental impact (Vår Energi, 2023). At the end of a field's life, Vår Energi is responsible for decommissioning the infrastructure and restoring the environment to its natural state.

In addition to its core activities, Vår Energi is also focused on innovation and sustainability, particularly digitalisation, electrification, and hydrogen. The company is committed to reducing its carbon footprint and promoting sustainable resource utilisation in all aspects of its operations.

3.4 Organization and Ownership

3.4.1 Management

Regarding management and hierarchy, Vår Energi follows a traditional corporate structure (Vår Energi, 2023). A traditional corporate structure typically consists of three primary levels of hierarchy: the board of directors, top-level executives, and middle management. The board of directors is responsible for setting the company's strategy and overseeing the company's performance. At the same time, the top-level executives are responsible for executing the strategy and managing the company's operations. Middle management is responsible for managing day-to-day operations and implementing the company's strategy at a departmental level.

A traditional corporate structure has clear benefits, including a clear hierarchy that makes it easy for employees to understand their roles and responsibilities and a specialisation that allows employees to hone their skills (Quain, 2018). Additionally, this structure provides a stable environment and clear career progression, which can motivate employees. However, there are also drawbacks to this structure. Its rigidity can make it difficult for the company to adapt to changes in the market or industry, and slow decision-making can hinder the company's ability to act quickly. The hierarchical nature of the structure may also discourage innovation, and communication can be challenging as information often has to pass through multiple layers of management before reaching relevant stakeholders.

Vår Energi also has various departments or business units responsible for specific functions, such as exploration, production, operations, and finance (figure 3). Vår Energi have a well-educated management team, where most managers hold a relevant master’s or bachelor’s degree. The

management team has well-diversified aged groups, ranging from three different decades, which is positive as it diversifies ideas and creativity and can lead to better performance (MIT, 2019). The entire team also has relevant previous working experience from other large and successful Oil & Gas companies.

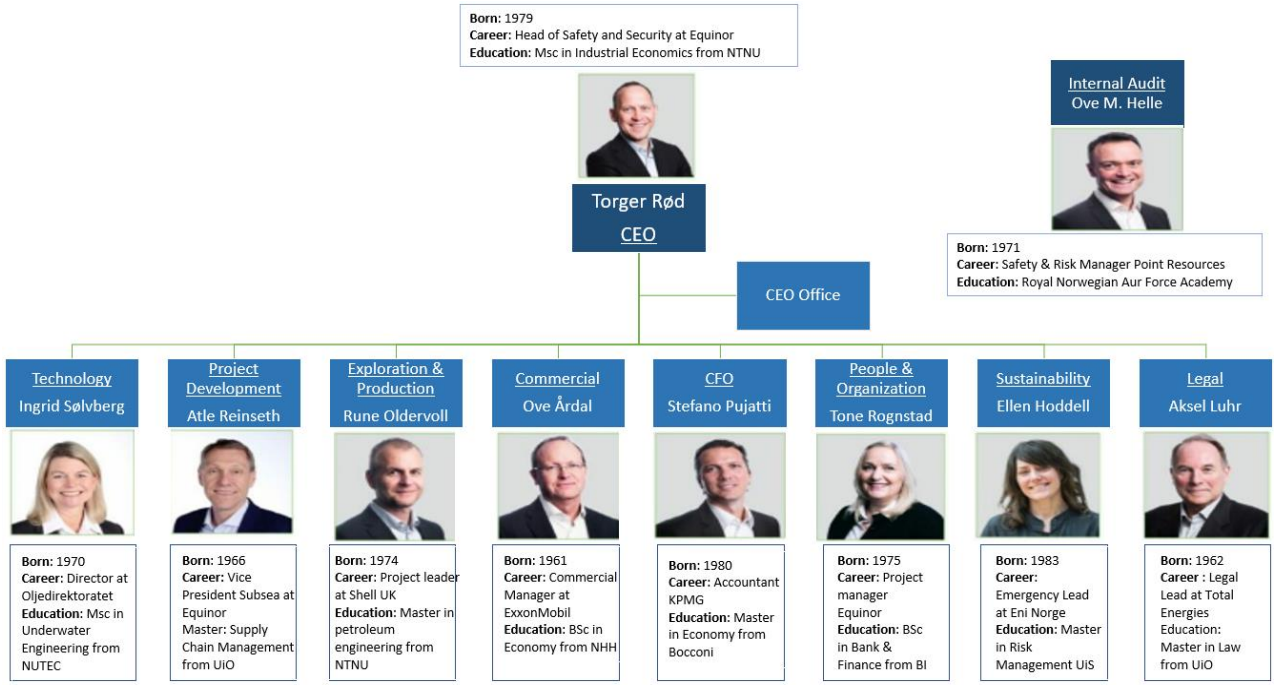

Figure 3: Own Creation. Source: (Vår Energi, 2023)

3.4.2 Board of Directors

The guidelines of Vår Energi's board of directors apply to the CEO and members of the executive management team who directly report to the CEO, comprising 12 employees (Vår Energi, 2023). Among these, two members are employed by ENI SPA and have separate arrangements for compensation and benefits. Vår Energi´s board is well diversified in the form of education, backgrounds and the average age is 53 years old. The board consists of six men and six women. Thorhild Widvey is the chair of the board and was elected by the shareholders in 2022. She holds an MSc in Economics from BI Norwegian Business School and used to serve as the Chair of the Norwegian power giant, Statkraft.

Regarding compensation, Vår Energi is currently reviewing its bonus schemes, including the long term incentive model, with the performance criteria, target and maximum levels, eligibility, and key performance indicators (KPIs) subject to evaluation and adjustments (Vår Energi, 2023). These changes are planned to be implemented in 2022. These guidelines, processes, and control

mechanisms aim to attract, develop, and retain executives with relevant experience, advanced leadership skills, and expertise.

The company's board of directors oversee the company's operations, including implementing the guidelines, processes, and control mechanisms. The board is comprised of members responsible for ensuring that the company's management adheres to the company's vision, strategy, and values and that the company is run sustainably and responsibly (Vår Energi, 2023). The board is accountable to the company's shareholders and stakeholders for the company's performance. It conducts its duties in accordance with the company's articles of association and applicable laws and regulations.

The board also establishes policies and procedures for risk management, including financial risks, regulatory compliance, and reputational risks. It also monitors the company's financial performance, approves the annual budget, and oversees the company's financial reporting (Vår Energi, 2023). The board reviews the performance of the CEO and the executive management team, approves their compensation, and ensures that the company's remuneration policies are aligned with the ccompany's long-term interests. In summary, the board plays a critical role in ensuring that Vår Energi operates efficiently, effectively, and in compliance with applicable laws and regulations while safeguarding the interests of the shareholders and stakeholders.

3.4.3 Ownership Structure

At the end of 2022, Vår Energi´s shares were split between multiple groups of investors, with two large institutional companies dominating. 63.04% is held by the Italian Oil & Gas firm Eni, and the Norwegian private equity firm HitecVision own 20.36% (Vår Energi, 2023). 16.26% of the shares are in free float, where Eni and HitecVision own some of these. Private equity ownership through HitecVision may result in short-term focus and pressure on maximising profits, which may conflict with the company's long-term strategic goals. However, HitecVision through their energy sector and private equity investment expertise can bring significant value and operational efficiency to Vår Energi's business.

More than 80% of Vår Energi's employees hold shares in the company (Vår Energi, 2023). CEO Torger Rød owns approximately 107,000 shares, and each member of the board and top management also owns a substantial amount of shares valued at over NOK 1 million on average

(Vår Energi, 2023). This insider ownership results in a combined value of approximately NOK 67 million, which can be both healthy and unhealthy for the firm's decision-making. On one hand, the share ownership gives incentives for the delivering results for the firm. On the other hand, the individual gain may incentivise short-term gains over long-term growth. Referring to figure 4 below, the stock split between the largest institutional shareholders is not very balanced, indicating that Eni and HitecVision have superior voting rights.

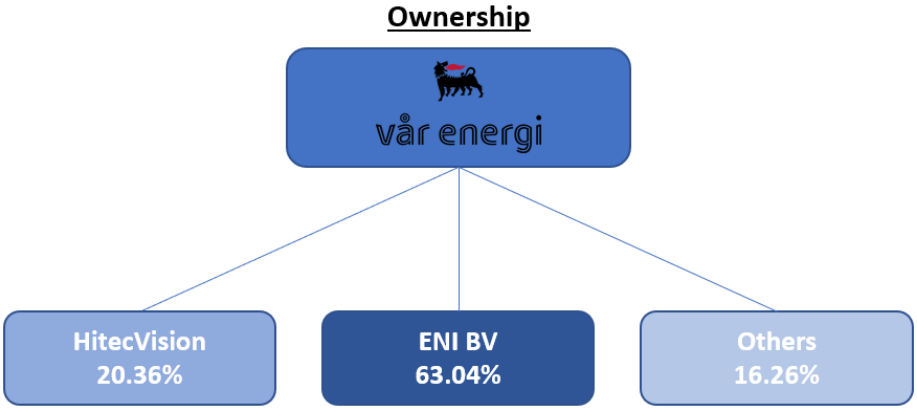

Figure 4: Own Creation. Source: (Vår Energi, 2023)

3.2 Oil & Gas Industry

The Oil & Gas industry is the exploration, production, refining and distribution of oil and natural gas products. It involves the extraction of hydrocarbons (mainly oil and natural gas) from the earth and then processing and distributing these products to be used as fuel and in various industrial processes (Oil Refinery, 2023). The industry is a major contributor to the global economy, where oil accounts for around one-third of the total demand for energy in the world and natural gas accounts for around 24% of the demand (IEA, 2022). The sector has experienced significant growth in energy consumption in recent years.

Vår Energi is part of the Norwegian petroleum industry, which is crucial when valuating the company's profit. This is because, in addition to the corporate income tax rate of 22%, Norway has a special "petroleum tax". The petroleum tax is a specific tax on the production of Oil & Gas and is calculated based on the production volume and the commodity's price. To ensure a neutral taxation system, paid corporate tax is written off when calculating the special tax base. This entails a special tax rate of 71.8 % in order to maintain a combined marginal tax rate of 78 % (Norsk Petroleum, 2023).

In addition to the extra taxes, the Norwegian government uses CO2 fees to reduce greenhouse gas emissions and combat climate change. The fees are applied to specific industrial sectors, including the Oil & Gas industry, power production and manufacturing. The CO2 fee is based on the carbon dioxide emissions produced by a company or facility. The fee is calculated by multiplying the total emissions by the current CO2 fee rate, which the government sets. The rate is subject to change and is reviewed on an annual basis. For 2023, the carbon tax is NOK 1.78 per standard cubic meter of gas and NOK 2.03 per litre of oil or condensate (Norsk Petroleum, 2023). For the combustion of natural gas, this corresponds to NOK 761 per tonne of CO_2. For emissions of natural gas to air, the rate is NOK 13.67 per standard cubic meter (Norsk Petroleum, 2023).

However, Norway is considered one of the most promising regions for future Oil & Gas discoveries. The largest companies in the sector are Equinor, Aker BP and Vår Energi (Norsk Petroleum, 2023). Equinor is convincingly the largest operator on the Norwegian Continental Shelf, producing 2,000,000 Barrels/day (Equinor, 2023). The second largest player is Aker BP, which produces 400,000 barrels/day and Vår Energi, with 250,000 barrels/day, respectively (Aker BP, 2023). Equinor is also Norway's largest natural gas producer, followed by Esso, Total Energi and Vår Energi (Statista, 2022).

Norway’s market share is still relatively small compared to larger oil-producing countries such as the United States, Russia and Saudi Arabia. According to the Norwegian Petroleum Directorate, Norway's Oil & Gas production accounts for about 2% of the world's total oil production and about 4% of the world's total gas production (NPD, 2023).

In early 2022, Russia invaded Ukraine and massive sanctions against the Russian economy were implemented, targeting their Oil & Gas exports. Russia used to be the third-largest oil producer and the fourth-largest oil exporting region worldwide, exporting over 7.4 million barrels daily in 2020 (Statista, 2022). Russia also used to be the world’s largest gas exporter, producing 34% of the gas demanded in Europe. These sanctions against the Russian Oil & Gas industry have resulted in a significant reduction in the supply of Oil & Gas, which has increased the demand and price of these commodities. In 2022, the cost of natural gas increased by 300% in 6 months and the oil price increased by 50% (Trading Economics, 2023). Despite these abnormally high prices in 2022, the

world economy has adapted to the fallout of Russian production and exportations and the prices are now back to “normal” levels.

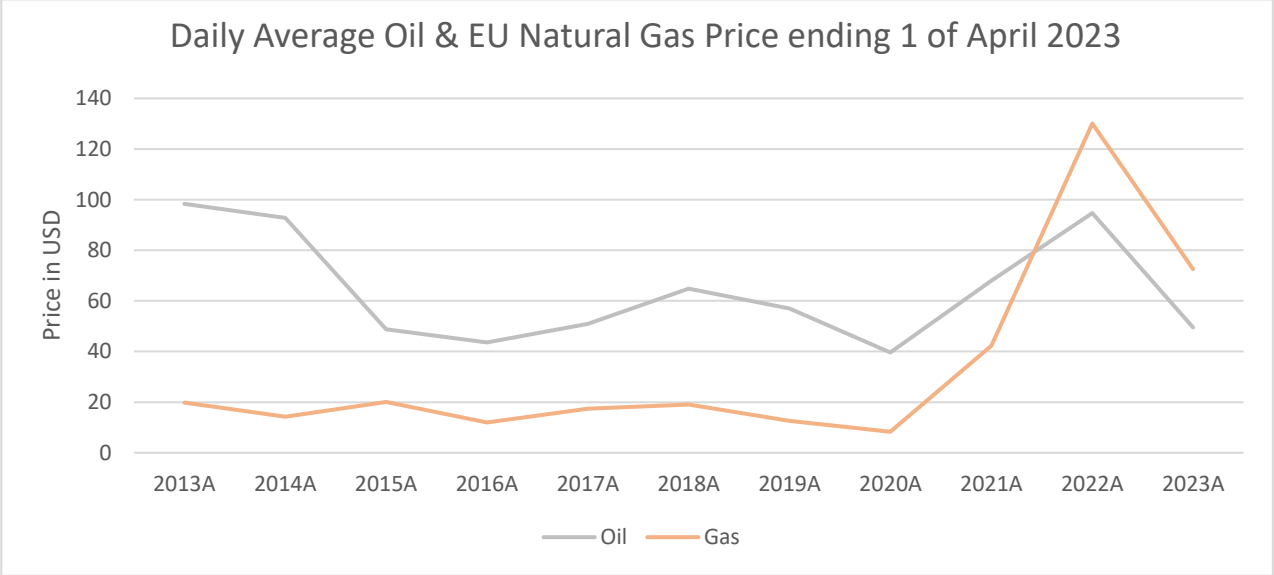

Figure 5: Own creation. Source: (Macrotrends, 2023)

Another vital factor which has greatly influenced Oil & Gas prices is the organisation ”OPEC”. OPEC stands for the Organization of the Petroleum Exporting Countries. It is an intergovernmental organisation comprised of 14 member countries, primarily located in Africa and South America, that coordinates and unifies the petroleum policies of its member countries. Its mission is stabilising the international oil market to secure fair and stable prices for petroleum producers and a regular consumer supply (OPEC, 2023). The organisation was founded in 1960, headquartered in Vienna, Austria. The countries currently in OPEC are: Algeria, Angola, Gabon, Iran, Iraq, Kuwait, Congo, Libya, Nigeria, Equatorial Guinea, Saudi Arabia, United Arab Emirates, Venezuela and Ecuador (OPEC, 2023). Even though Norway and Vår Energi is not a member, its profits depend on this organisation due to the demand and supply of Oil & Gas in the world economy.

4.0 Strategic Analysis

4.1 PESTLE

The PESTLE analysis will be used as a framework to analyse the macro-environmental factors that may impact Vår Energi. The acronym stands for Political, Economic, Sociocultural, Technological, Legal, and Environmental factors (Pestleanalysis, 2023). The analysis will help identify potential opportunities and threats in the external environment and will be used to analyse Vår Energi’s strategic decision-making. PESTLE can also be used to analyse the environment of a specific

country or region, or at a global level. The findings in this analysis will later be used in the forecasting module to predict future revenues and costs.

4.1.1 Political Factors

Vår Energi is a Norwegian Oil & Gas energy company, and as such, it is subject to various political factors at national and international levels. Given that Oil & Gas is a nationalised product in Norway, Vår Energi faces the risk of political factors such as Oil & Gas taxation, CO2 fees, exploration quotas and economic and trade policies. These factors may impact the company's operations or access to resources and the energy industry, such as policies on renewable energy and emissions reductions. The price of Oil & Gas is crucial for Vår Energi's revenue. Its political risks extend worldwide to countries and governments that could affect the price, such as Russia, the United States and Saudi Arabia.

Russia's invasion of Ukraine has had rippling humanitarian and economic impacts across the globe, particularly on the energy industry. The invasion of Ukraine has raised massive uncertainty in the Oil & Gas industry. The war has already caused plenty of the world's governments to impose sanctions on Russia, including restrictions on buying and selling Russian commodities such as Oil & Gas. Russia is one of the world's top three crude oil producers, vying for the top spot with Saudi Arabia and the United States (IEA, 2022). When the sanctions restricted the supply of Oil & Gas, prices increased dramatically, increasing Vår Energi's revenue. As of today, the volatile prices have stabilised at normal levels again. However, if Russia declared peace in Ukraine and was allowed back into the global economy, the supply of Oil & Gas would overflow the market, and prices would drop, reducing Vår Energi´s revenue.

In Norway, the government heavily regulates the Oil & Gas industry, and Vår Energi is subject to the risk of government intervention. The Norwegian government controls the rights to explore and produce Oil & Gas within the country's borders, and the government could make it difficult for companies to secure these rights (Norsk Petroleum, 2023). The government can change regulations and terms of production licenses, which can create uncertainty for companies such as Vår Energi. Even small changes in government policies or priorities could significantly impact the entire industry and Vår Energi. Additionally, Norway has a long-term low-emission strategy, where it wants to become emission-free by 2050 (Norwegian Parliament, 2020). This will result in a reduced demand for Oil & Gas and increased competition for alternative energy sources, such as

renewables. An example of a policy the Norwegian government can impose to affect Vår Energi´s revenue negatively is an increase in oil taxes or additional CO2 fees.

The net zero strategy also aims to reduce the use of fossil fuels in the transportation sector, which will impact the Oil & Gas industry negatively (Norwegian Parliament, 2020). It will also mean less investment in new Oil & Gas projects and more investment in alternative energy sources. The decommissioning of oil fields by 2050 is a part of this strategy, resulting in a higher decrease in the production for companies in the Oil & Gas industry. Additionally, stricter regulations and increased focus on safety and environmental considerations may also be implemented as part of the strategy, which could further increase costs for companies in the industry.

Overall, the emission-free strategy could significantly shift the structure and operations of Norway's Oil & Gas industry. Companies like Vår Energi must adapt its business models and operations to align with the new strategy.

On the 12th of June 2020, the Norwegian Parliament, Stortinget, decided on a new temporary tax law affecting the petroleum industry (Stortinget, 2020). The new law came, due to the Norwegian government incentivising economic activity in the sector, after the downturn and uncertainty caused by the Covid-19 pandemic. For a limited period, the tax law modifiess regulations on depreciations, uplift, and tax loss handling. Specifically, the changes entail full depreciation and a 24% uplift in the investment year within the special tax base (Stortinget, 2020). This applies to all investments made in 2020 and 2021 and investments made until the planned start of production under development plans submitted to the authorities before the 1st of January 2023 and endorsed before 1st of January 2024 (Norsk Petroleum, 2023). Additionally, companies that incurred tax losses in 2020 and 2021 are eligible to receive refunds for these losses. The temporary tax incentives provide an opportunity for Vår Energi to invest and gain higher returns on these investments.

4.1.2 Economic Factors

Economic factors may impact the economy and the financial performance of businesses. These factors can directly impact Vår Energi's business, as they can affect the cost of goods and services, consumer demand, and the availability of capital. Vår Energi must also consider the economic conditions in the countries where it operates, as these conditions can impact the ability to

compete and access resources. As explained earlier in political factors, government policies and regulations can also influence economic factors, and changes in these policies can significantly impact Vår Energi's profit.

Oil & Gas Price

As mentioned earlier, a prominent economic risk for Vår Energi is the spot price for Oil & Gas. The prices of Oil & Gas are subject to fluctuations in the global market, which can significantly impact Vår Energi's revenue and profitability. This means that just a percentage decrease in the price of these two commodities would result in millions of NOK lost in revenue. However, an increase in the price of these commodities has benefitted Vår Energi substantially in 2022, meaning that this "risk" could also be beneficial in some cases (Vår Energi, 2023). Vår Energi can hedge some of this risk by entering into forward and futures contracts, which lock in a specific price for its commodities and substantially minimise this risk.

Foreign Exchange

Another economic risk Vår Energi faces in daily operations is foreign exchange risk. Given that Vår Energi operates in Norway and uses Norwegian Kroner (NOK) as its currency for dividend payouts, a decrease in the dollar against the Norwegian Krone would weaken its revenue, as all oil sales are in USD (Vår Energi, 2023). Natural gas is, however, traded in EUR as well, creating even more foreign exchange risks for Vår Energi, as it has two currencies that could depreciate against the Norwegian Krone. The Norwegian Krone has been weak against the dollar and Euro in the last ten years, as seen in figure 6, resulting in higher profits for Vår Energi. As for foreign exchange rate risk, it can be hedged by entering into foreign exchange forward and futures contracts, where one agrees on an exchange rate between the currencies, and the risk will then be minimised.

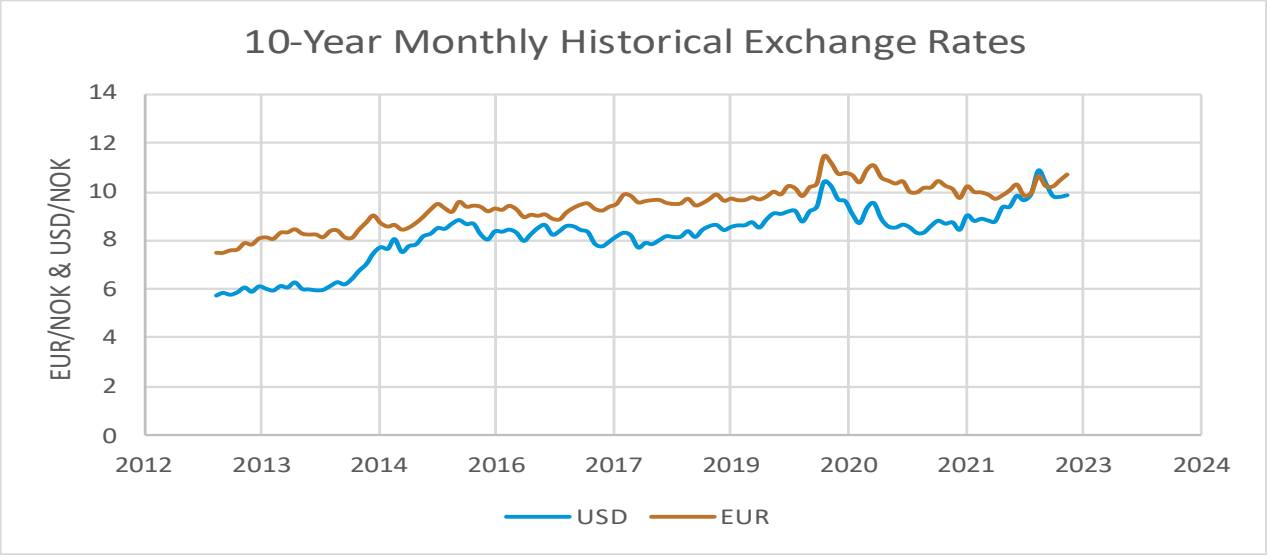

Figure 6: Own Creation. Source: (Investing, 2023)

Economic Growth

Vår Energi's performance is connected to the cycle of the economy. As the biggest part of the company's revenue stream stems from oil sales, it is naturally highly dependent on oil spending by external companies and countries. A growing economy increases spending on commodities such as oil (White, 2022). Today, 15 developed countries contribute 84.7% of all oil purchased worldwide, with China as the largest importer of 22.3%. (Workman, 2022). This means that the developed market cycles will affect Vår Energi´s profits the most, given that these countries' slow or negative economic growth will reduce the global demand for oil and lower Vår Energi's profit margins. However, it is also essential to be aware of the emerging markets, even though they only contribute to around 10% of global oil imports (Workman, 2022).

The below graphs show a six-year estimation of average GDP per capita for the top 30 developed countries and the top 20 emerging markets. The forecast for the developed markets is almost a linear increase in GDP per capita, with a yearly increase of 2.60%. The emerging markets' average annual growth is forecasted to be 4.57%, meaning that if the estimates are correct, Vår Energi's revenue will start depending more on Emerging countries in the next six years.

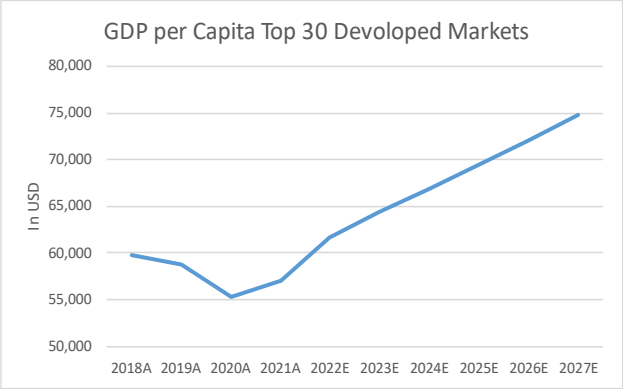

Figure 7: Own Creation. Source: (Knoema, 2022)

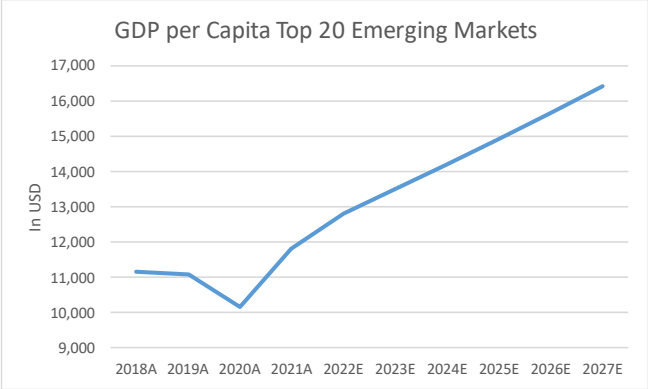

Figure 8: Own Creation. Source: (Knoema, 2022)

Inflation, Interest Rates & Fear of a Recession

Today's global economy is still suffering from high interest rates and Inflation. In June 2022, US inflation peaked at 9.1% (Trading Economics, 2023). This increase in inflation has not been seen since the 1980s, resulting in an aggressive rise in US and international interest rates (Trading Economics, 2022). National banks worldwide have kept increasing their federal fund rate, whereas the Federal Reserve in the US just increased it to 4.5% (1/04/2023), the highest seen since 2017. (Trading Economics, 2023). Given that Vår Energi has billions in interest-bearing debt, a slight increase in interest rates will affect its profitability substantially.

According to trustworthy sources such as The World Bank, the risk of a Global Recession in 2023 rises due to central banks worldwide simultaneously increasing interest rates in response to inflation, the world may be edging towards a global recession (The World Bank, 2022). A recession is a period of economic downturn characterised by a fall in GDP, a high unemployment rate and a decrease in consumer spending. If a recession was to occur, it could significantly impact Vår Energi's revenue. A recession would lower the demand for commodities such as Oil & Gas, resulting in a decrease in the price. It would also reduce investments, which would mean less capital for Vår Energi to invest in new projects and operations. Vår Energi could face capital constraints, where it may face difficulty accessing capital, making it hard to finance current and future projects. Finally, in a recession, Vår Energi could experience reduced access to resources, such as labour and materials, negatively impacting Vår Energi's production and revenue.

4.1.3 Sociocultural Factors

There are some sociocultural factors that Vår Energi may be facing, and it is important to note that the specific sociocultural conditions can change rapidly and vary depending on the location of the

company's operations. Two of these factors are public opinions and employee attributes. Public opinions and employee attributes can significantly impact Vår Energi's operations, as people's attitudes towards the Oil & Gas industry and the company itself can affect its reputation and profitability. This could happen in the form of people not wanting to work for Vår Energi anymore, as it represents a ”bad industry”. This reputational problem could be accelerated through “social activism”. Social activists put pressure on the industry, questioning the “social license” companies have, considering the environmental footprint (KPMG, 2022). The threat of social activism has increased in the later years, especially with the dominance of social media platforms. These platforms make it easier for activists to make their voices heard. The pressure from activists provides pressure on Oil & Gas companies in decision-making based on reputational fear and damage to the bottom line.

Demographic and consumer trends are two more sociocultural factors that could cause a threat to Vår Energi. In 2022, 79.3% of new cars sold in Norway were fully electric (Norsk Elbilforening, 2023). People also use fewer oil-based products, such as plastic bags, single-use plastic products and oil-based heating systems (BCG, 2023). A dropping demand for these products and electric vehicles will reduce the general demand for Oil & Gas, decreasing the price of these commodities and causing a fall in sales profit for Vår Energi.

Attitudes towards environmental issues, social movements, values and beliefs can weaken Vår Energi’s ability to raise and receive capital. Scandinavian governments, companies and households invest in green investment funds and bonds like never before. About 80% will invest in ESG assets within the next five years (Hedgenordic, 2023). Vår Energi will miss out on this investment opportunity because, as of today, it does not have a high enough ESG rating to issue green bonds or to be pooled into green investing funds.

4.1.4 Technology Factors

In the Oil & Gas industry, new technologies can offer a range of benefits, such as increased efficiency, lower costs, and a reduced environmental impact. For Vår Energi, adopting new technologies can be crucial in improving the competitiveness of its operations and addressing some of the environmental and financial challenges faced by the industry. This is because in the

Oil & Gas industry, improvements in technology is the best way to give one a comparative advantage over one's competitors.

Unlike an "ordinary business", where one can improve customer satisfaction, design new products or expand the number of retail stores, technology makes one thrive in the petroleum sector. In the Oil & Gas industry, one gets more profit if one finds new and better ways to reduce operating costs and improve one's discovery of oil fields rate, which is done by improving the existing technology. An example of one of these technologies could be automation. Vår Energi can adopt automation technologies to improve the efficiency and safety of its operations, reduce human error, and lower costs. Vår Energi can also develop digital technologies, such as artificial intelligence, machine learning, and the Internet of Things, to optimise operations, improve data management, and reduce costs.

Unfortunately for Vår Energi, today's focus on technology improvement in the energy sector is aimed towards the renewable energy sector, which Vår Energi is missing out on, as it is not investing in renewable energy. From 2020 to 2021, investments in renewable energy technologies grew by almost USD 1T to USD 4.3T (Blackrock, 2023). These investments are aimed to improve solar panels and increase efficiency in new and existing windmills. Renewable energy investments could also improve third-factor technologies, such as more advanced electric cars that could eliminate fossil fuel cars. However, if Vår Energi was to start investing in renewable energy technologies such as wind and solar power, it would reduce its carbon footprint and remain competitive in a rapidly changing energy landscape.

Instead of focusing on the technology threats Vår Energi faces from green energy companies, it could pay more attention to improve the technologies it already has, such as increasing its R&D investments into the rising demand for carbon capture technologies. Graph 7 below shows that large-scale carbon capture projects are expected to increase five times before 2030 (IEA, 2022). Project developers have announced ambitions for over 200 new capture facilities to operate by 2030, capturing over 220 Mt CO2 annually (IEA, 2022). Given that Vår Energi is already operating and investing in this CO2 capture industry, it is trying to utilise this opportunity to gain an early comparative advantage in capture technologies that could potentially increase its revenue. This

would also provide some diversifications for its revenue streams, as not all income would come purely from the sale of Oil & Gas.

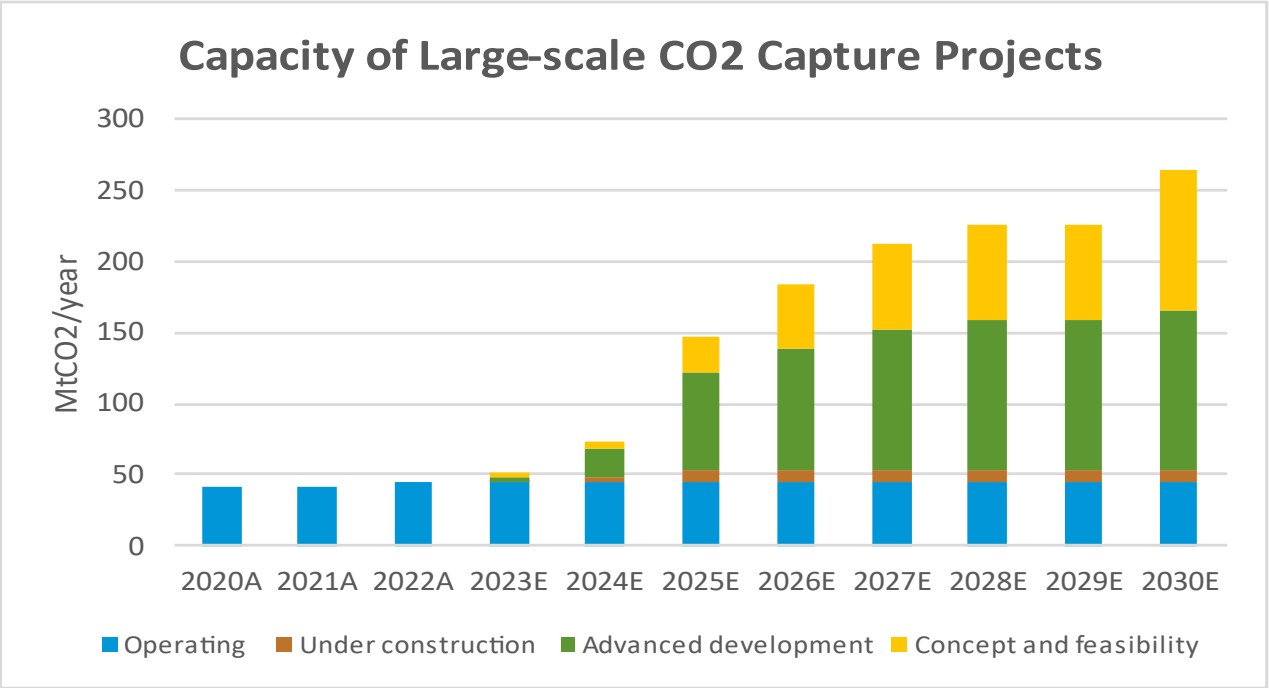

Figure 9: Own Creation. Source: (IEA, 2022)

4.1.5 Legal Factors

When it comes to legal factors regarding Vår Energi, it is crucial to assess the strict health and safety regulations that are in place for Oil & Gas companies that operate on Norwegian soil. In Norway, the health and safety regulations for the Oil & Gas industry are governed by the Norwegian Petroleum Safety Authority (PSA) and the Norwegian Labour Inspection Authority (PSA, 2023). By not complying with these processes and standards, companies face stiff fines or penalties that could derail growth, margins, and competitive advantages (BDO, 2018). Several Norwegian Oil & Gas companies have received fines for violating health and safety regulations. Examples of companies that have received fines in recent years include Equinor, Aker BP, Seadrill and ConocoPhillips, all among Vår Energi's competitors. (PSA, 2023).

Vår Energi needs to stay ahead of potential legal threats because the fines received for breaking the health and safety rules are substantial. An example of this is Seadrill's fine for not "reviewing safety-critical installation systems", where it was fined 50,000 NOK every day until it was fixed (PSA, 2023). Vår Energi must comply with all relevant laws and regulations, implement robust health and safety policies, and maintain strong relationships with its suppliers and contractors to

minimise legal threats. The company must also have a robust risk management strategy in place to identify and mitigate legal risks and be prepared to respond to legal challenges and disputes promptly and effectively.

When Russia invaded Ukraine in early 2022, Europe ended up in an energy crisis because of the restrictions against Russian energy. Multiple countries, including Norway, therefore changed its long-term view on the energy sector, where Norway reopened the search for new oil fields. (The Local, 2022). The demand for Oil & Gas in Europe was skyrocketing and is an example where a legal action was implemented, which ultimately benefitted Vår Energi.

If Vår Energi was to invest more in renewable energy, it could also receive some government funds, such as subsidies. The Norwegian government offers incentives and subsidies to companies that invest in environmentally friendly technologies and practices, such as renewable energy (Regjeringen, 2023). This creates opportunities for Vår Energi to reduce its carbon footprint and improve its reputation, potentially increasing profits.

As mentioned earlier in the political and environmental section, political laws restrict Vår Energi's ability to trade with one of its largest customers, Russia. Environmental laws reduce Vår Energi's revenue through environmental taxes, CO2 taxes and reduction in the allowance of future Oil & Gas field searches. However, given that Vår Energi is just one of many firms operating in the Norwegian Oil & Gas industry, it is difficult to change the rules. Vår Energi must be aware of these threats and always try minimise its legal exposure in order to minimise profit losses from legal actions.

4.1.6. Environmental Factors

Given that Vår Energi operates in the Oil & Gas industry,it faces multiple environmental risks in tr daily operations. Its most significant concern today is how its operation impacts the climate. Unfortunately, the production of Oil & Gas has a significant negative impact on the environment, as the production and use of fossil fuels is a major contributor to greenhouse gas emissions. As mentioned in the sociocultural factors, this contribution to greenhouse gas emissions weakens Vår Energi's image and can contribute to a lack of capital and employment contribution.

Another environmental threat Vår Energi faces due to its production is environmental regulations by the Norwegian Government, Europe Union or the United Nations. These organisations are

responsible for setting environmental standards, monitoring compliance with environmental regulations, and enforcing environmental laws. In Norway, the primary organisations responsible for environmental regulation are the Ministry of Climate and Environment, the Norwegian Environment Agency, and the Norwegian Pollution Control Authority (Norwegian Petroleum Directorate, 2023).

As mentioned earlier, several environmental factors already reduce Vår Energi's revenue, such as CO2 fees and oil tax. This means there is still a threat of an increase in these fees and taxes or a potential for imposing another fee or another tax. As several countries, including Norway, have committed to becoming net zero by 2050, future actions must be taken regarding the Oil & Gas industry (IEA, 2021). For Norway to become net zero by 2050, there is no doubt that new environmental regulations must be adopted, which will most certainly reduce Vår Energi's profitability.

Renewable energy competition is another environmental risk that concerns Vår Energi. This refers to the growing competition from companies specialising in renewable energy sources, such as wind and solar power. The increased competition from renewable energy companies can impact Vår Energi's market share and profitability as consumers, businesses, and governments increasingly shift towards renewable energy sources (BDO, 2018). These alternative energy sources contribute to a decrease in the demand for Oil & Gas, pushing the prices and Vår Energi's revenue down.

As Norway is pursuing its net zero goal, it is estimated to develop 30GW of offshore wind capacity by 2040 (Katanich, 2022). Therefore, this will create even more energy supply, and with a reduction in future oil developments, Vår Energi's profitability will suffer. Vår Energi will need to adapt to changing market dynamics and compete with the growing renewable energy sector if they want to survive by 2050.

4.1.7 Summary of Factors

Threats	Opportunities
Political factors	**Political factors**
- Changes in government policies or priorities, such as an increase in oil taxes or additional CO2 fees. - The Norwegian government can make it difficult for Vår Energi to receive the rights to explore and produce Oil & Gas and can change regulations.	- Volatile Oil & Gas prices resulting from geopolitical events such as the Russia-Ukraine conflict could increase revenue for Vår Energi. - Temporary tax incentives for investments in the petroleum industry
Economic factors	**Economic factors**
- Reducing Oil & Gas prices due to alternative energy sources. - Exchange risk in the form of USD and Euro. - Fear of global recession and lower demand for Oil & Gas.	- Growing economy and rise of emerging markets - Increasing cost of developing renewable projects, increasing demand for Oil & Gas.
Sociocultural factors	**Sociocultural factors**
- Attracting fewer applicants as the industry is considered a “bad industry” to work in - Pressure from activists - Consumer trend for electric cars	- Giving back to the community around and sponsoring local and global events could help increase its reputation.
Technology factors	**Technology factors**
- Rising of renewable energy technology - Losing out on government substitutions for technology improvement	- Comparative advantage in the Oil & Gas industry due to high investments in R&D - Carbon capture technology
Legal factors	**Legal factors**
- Strict health and safety requirements - Fines for law breaches	- More oil demand due to restrictions against Russia - Harder for competitors to enter the market due to strict legal rights
Environmental factors	**Environmental factors**
- Decrease demand due to the increase of renewable energy sources - Environmental damage taxes such as extra oil tax and CO2 emission fee.	- Not net zero before 30 years, will still be demand for Oil & Gas in many years to come

Table 1: Own Creation.

4.2 Porter’s Five Forces

Porter’s Five Forces is an analytical framework utilised to perform an industry analysis. While the PESTLE analysis focuses on the macro-environmental factors, Porter’s framework displays the micro-environmental factors influencing the industry. The five forces are used to identify the competitor intensity and the industry’s attractiveness in the long term (Porter, 2008).

4.2.1 Bargaining Power of Suppliers – Moderate

This force refers to the ability of suppliers to negotiate favourable terms with their buyers, such as prices, delivery times, and quality of goods and services (Porter, 2008). In the case of Vår Energi, the bargaining power of suppliers can have a significant impact on the company's operations. As Vår Energi is one of Norway's largest Oil & Gas companies, it is buying raw materials from numerous suppliers. These suppliers are everything from life jackets producers to helicopter and tank ship suppliers. The bargaining power of these suppliers is quite volatile because the bargaining power of the life-jacket supplier is limited, as Vår Energi can pick from numerous other suppliers if it is not happy with the price.

There are also many niche suppliers in the Oil & Gas industry, such as those supplying specific technology products only used in the Oil & Gas sector. If there are a limited number of suppliers for a particular product or service, they have more bargaining power, as buyers have fewer alternatives. These powerful suppliers can use their negotiating power to extract higher prices from Vår Energi, resulting in lower overall profitability.

An example of such a niche producer is WellPartner. WellPartner produce a product called WellSafe Explorer, which is a device designed to act as a safeguard in locked-to-bottom operations from semi-submersible rigs in live well operations, such as subsea well testing, subsea completions, well clean-up, riser-based intervention operations (wireline and coiled tubing), workover, and P&A operations (Well Partner, 2023). These suppliers have high bargaining power against Vår Energi because it is the only ones supplying the product. Vår Energi must buy this product to fulfil its health and safety obligations.

Vår Energi can minimise this bargaining power of supplier risk by building an efficient supply chain with multiple suppliers and entering into strategic partnerships with clear price and production rates. One such partnership is the one Vår Energi entered into with Aker Solution, Havfram Saipem, in 2022, covering fabrication, delivery, and installation of subsea production equipment for all Vår Energi operated assets and projects on the NCS (Vår Energi, 2022). This could reduce Vår Energi's exposure to future bargaining power by the suppliers due to long-term agreements.

Regarding the niche suppliers, Vår Energi can merge or acquire their business and operations. This would improve Vår Energi's access to its required critical materials and use its economy of scale

potential to improve its general production cycle. The acquisitions could also give Vår Energi access to new markets and create a new revenue stream apart from Oil & Gas sales. If Vår Energi own or control these niche suppliers, it will minimise its exposure to unfavourable prices and bargaining power. This sort of M&A strategy is a part of Vår Energi's business strategy (Vår Energi, 2023).

4.2.2 Bargaining Power of Buyers - Low

The bargaining power of the buyers has historically been relatively small in the Oil & Gas industry. This is due to the buyers primarily focusing on price when buying Oil & Gas, and the price is set in the market where the individual buyer has little influence on the price. Global supply and demand dynamics largely determine the price of Oil & Gas and similar commodities, and individual operators have limited ability to affect the price. Assuming buyers have bargaining power over the Oil & Gas market, it would relate to large industrial customers or organisations with significant energy needs that may have some bargaining power and can influence the price. These large customers could be the US or China, as they account for the biggest amount of Oil & Gas imports (Workman, 2022). If China refuses to buy oil from the global market and buy it from Russia instead, the price would certainly be affected as China accounts for over 22% of global oil imports (Workman, 2022). However, as of 1 of April 2023, buyers have no major barraging power as they can choose to pay the global price, as no distributor will sell for a lower price. One could argue that China can buy cheaper oil from Russia and less from the world market, but as for Vår Energi, it will continue to sell its Oil & Gas at the highest global price.

4.2.3 Threat of New Entrants - Moderate

The Oil & Gas sector is dominated by economies of scale, where a well-functioning distribution system and presence in the market are critical factors for companies. There are significant costs related to establishing a company in the industry, making the threat of new entrants for a mature company such as Vår Energi low. The regulations are demanding and contribute to high compliance costs. In addition to the major costs of establishment, there are demanding processes related to the extraction of oil and the licenses needed for searching and extraction. This results in significant investments required and a long time frame until investors can expect any returns on their investments.

The threat from renewable energy companies is expected to increase in the coming years. The size of the global renewable energy market is expected to increase its market share in energy produced each year until net zero in 2050 (Precedence Research, 2022). The expected growth of the market emphasises the future threat of new entrants. Companies in the renewable energy sector have competitive advantages related to reputation and sustainability. The establishment of new renewable energy companies can affect the profitability of Vår Energi. However, it is not a direct substitute in all instances considering numerous products are still dependent on Oil & Gas. Due to the expected growth in the renewable energy sector, the threat of new entrants is deemed to be moderate.

4.2.4 Threat of Substitutes - High

There is a real threat from alternative energy sources in the industry. The primary alternative sources to Oil & Gas are nuclear energy, hydrogen, coal and renewable energy sources such as wind and solar. There is growing pressure from climate activists and the public for more sustainable energy sources with lower carbon emission footprint (KPMG, 2022). The demand for alternative products created more sustainably has also created governmental policy changes, incentivising the production of more eco-friendly products. For example, in Norway, the use of electric cars has been incentivised for some time. The incentives include the exemption of purchase tax and VAT when buying an electric vehicle, free parking and access to bus lanes (Regjeringen, 2021).

The threat in the short term is considerably lower than in the long term. In 2022, oil and natural Gas were the sources of almost 53% of worldwide energy consumption (Ritchie, Roser, & Rosado, 2022). This indicates that oil and natural gas are still heavily relied on in energy consumption. The threat in the long term is considerably higher due to the demand for sustainable energy sources. Developing technologies and finding suitable areas for building out facilities for renewable energy sources is time-demanding and investment-heavy. Therefore, it will take significant time for the demand for renewable energy sources will be met. Still, the threat of substitutes should be considered high because of the observable trends in energy.

4.2.5 Rivalry Among Existing Competitors – Moderate to High

In the Norwegian Oil & Gas industry, Equinor is by far the biggest player. To illustrate the size difference, Equinor have 303 licenses for exploration and production on Norwegian territory, while Vår Energi have 157 (Norsk Petroleum, 2023). Behind Equinor are competitors such as Aker BP and ConocoPhillips Skandinavia. There are 39 E&P companies on Norwegian soil, whereas 18 of them are operators (Norsk Petroleum, 2023). This creates intense competition among companies. The competition will create efficiency in the exploration and production of Oil & Gas and incentivise the implementation of new cost-efficient technology. The intense rivalry can lead to the profit margins becoming hard to maintain due to the demand to match the competitors' prices and governmental regulations.

There are also some factors downplaying the intensity of the rivalry. Firstly, as mentioned, Equinor is a market leader in the industry. According to Porter (2008), the presence of a market leader weakens the intensity of the competition. This is because in the absence of a market leader, rivals are often seen poaching business from competitors, and desirable practices for the entire industry may go unenforced (Porter, 2008).

When awarding production licenses on the Norwegian territory, there is a licensing round where a group of companies is awarded exclusive rights to exploration, exploration drillings and production of petroleum (Norsk Petroleum, 2023). Among the company rewarded, one company is the operator of the exploration and production. By having several companies in one license, the Norwegian petroleum market can act differently than the general markets. This allows less experienced firms to learn from more experienced actors and allows competition and efficiency among companies of all sizes. This can be seen as factors that lower the intensity of rivalry in some areas, but it will also create an intense rivalry in the licensing rounds where there is a fierce fight for the rights to explore and produce. Due to the mentioned factors, the rivalry among competitors can be considered moderate to high.

4.2.6 Summary of Porter's Five Forces

To summarise Porter's Five Forces regarding Vår Energi, a rating system between 1-5 will be used, as seen in figure 10 below. As Vår Energi operates in a highly regulated industry, and the capital requirements for entering are extensive, the threat of new entrants has received a rating of 2. Given that Vår Energi only sell Oil & Gas on a global market, the bargaining power of buyers is low

and is given the minimum rating of 1. The bargaining power of suppliers is also limited due to multiple distributors and is therefore given a rating of 2. Rivalry among competitors is given a rating of 4, and this is because there are firms that constantly compete for the same restricted licenses and operations. Last, the threat of substitutes is given the max rating of 5 given the threat of becoming net zero by 2050, and renewables are planned to replace petroleum at some point in the future.

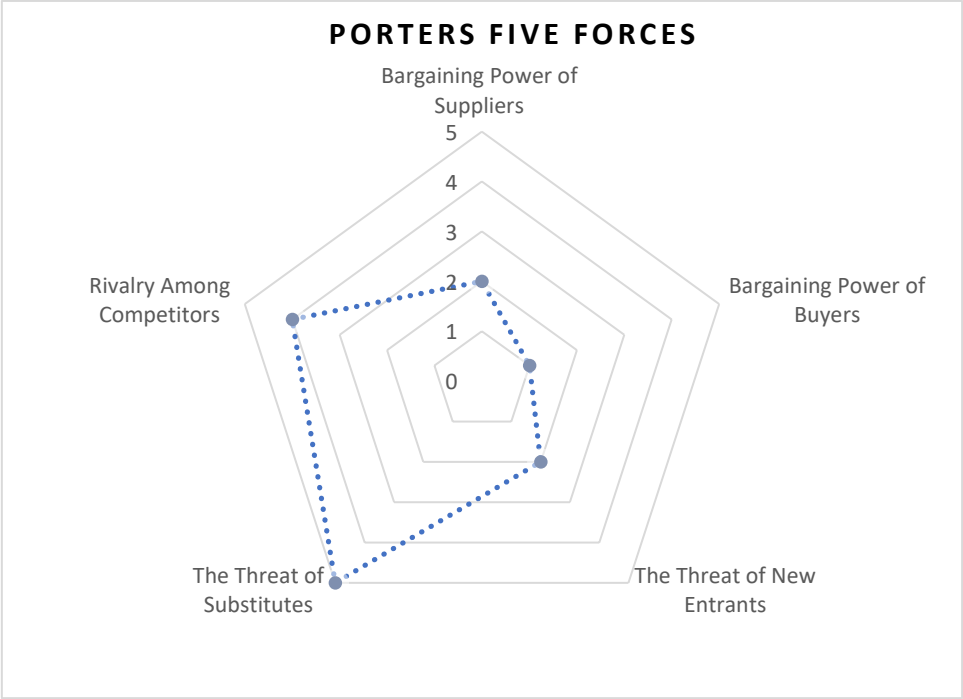

Figure 10: Own Creation.

4.3 Competitor Analysis

4.3.1 Peer Group

At the end of 2022, 39 exploration and production companies were active on the Norwegian continental shelf, where 18 companies were operators and a further 21 as partners in production licenses (Norsk Petroleum, 2023). With this many companies, it is essential to determine a peer group that can serve as a benchmark for the analysis of Vår Energi. Vår Energi generates all of its revenue from petroleum sales. As these companies are the largest Oil & Gas producers in Vår Energi's operating area, it is necessary to analyse Equinor, Aker BP, Total Energies, Shell and DNO (figure 11).

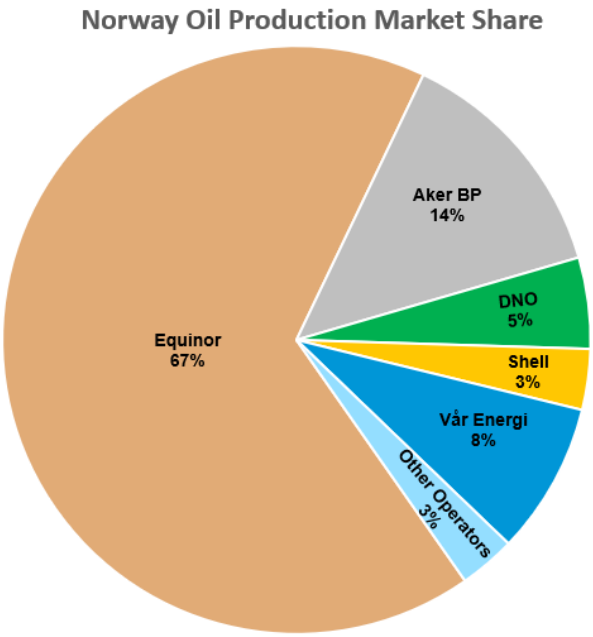

Figure 11: Own Creation. Source: (Norsk Petroleum, 2023)

Aker BP

Aker BP is a Norwegian Oil & Gas company formed in 2016 through the merger of Aker Exploration and BP Norge (Aker BP, 2023). Aker BP is an independent exploration and production company focusing on the North Sea and the Barents Sea. The company aims to increase production and reserves through exploration, development, and strategic acquisitions. Regarding production, Aker BP is one of Norway's largest Oil & Gas companies and is considered one of the most important players on the Norwegian continental shelf (Norsk Petroleum, 2023).

One reason why Aker BP is considered a competitor to Vår Energi is that both companies generate significant revenue from their exploration, development and production activities in the North Sea and the Barents Sea (Norsk Petroleum, 2023). Aker BP and Vår Energi generate revenue from the sale of Oil & Gas, as well as from the production and sale of natural gas liquids. Aker BP is considered Vår Energi's number one competitor, as it is almost equal in size and daily production. Both companies focus only on Oil & Gas, resulting in competing against each other for every operation and licensing right. Both companies also strongly focus on increasing production and reserves through exploration and development, which generates revenue from the sale of Oil & Gas. Both companies also have revenue streams from selling power and heat produced from their facilities.

Aker BP and Vår Energi have a similar focus on technology and innovation. Both companies invest heavily in technology to improve efficiency, reduce costs, and increase production. This further puts them in competition as it is trying to differentiate themselves by using the latest technology to be more competitive. Lastly, both companies are publicly traded, which means they are both subject to the same market conditions and pressures, and both companies are competing for the same investors and investors' attention.

Equinor

Equinor is a Norwegian multinational energy company headquartered in Stavanger, Norway. Equinor is one of the largest Oil & Gas companies in the world and operates in more than 30 countries. Equinor's operations include producing, transporting, and marketing oil and natural gas (Equinor, 2023). The company also has significant interests in renewable energy, including wind and hydropower. Equinor is a major player in the offshore Oil & Gas industry, focusing strongly on the North Sea and the Norwegian Continental Shelf. The company also has significant operations in Brazil, the United States, and Canada, among other countries.

Equinor and Vår Energi primarily focus on the exploration, production, transportation, and marketing of oil and natural gas, and both have operations on the Norwegian continental shelf. As such, both Equinor and Vår Energi are competitors in the Norwegian Oil & Gas market. They compete for the same resources, such as Oil & Gas fields and licenses, as well as for customers and investors. Equinor, a large multinational company, and Vår Energi, a smaller independent company, may have different strategies and capabilities, making them different in how they compete.

In terms of revenue, Equinor is one of the largest companies in Norway and among the largest publicly traded Oil & Gas companies in the world (Equinor, 2023). Equinor have more resources and a more extensive portfolio of assets, which allows them to take on larger, more complex projects. On the other hand, Vår Energi may be more agile and able to move quickly to capitalise on new opportunities. Additionally, as Equinor is also investing in renewable energy and low-emission solutions, it makes them more diverse in their portfolio and a larger threat to Vår Energi, who primarily focuses on Oil & Gas.

DNO

DNO is a Norwegian Oil & Gas company concentrates on exploration and production activities in Norway, the Middle East, and North Africa (MENA). DNO was founded in 1971 and is headquartered in Oslo, Norway. In terms of production, DNO is a significant producer of oil and natural gas in Norway and is considered one of the most important players on the Norwegian continental shelf, with a daily oil production of 100,000 barrels a day (DNO, 2022). In addition to production, the company also specialises on exploration and development, focusing on the Norwegian sector of the North Sea.

One reason Vår Energi and DNO are competitors is that both companies focus on the Norwegian sector of the North Sea. This means that they are likely to be competing for similar exploration and production opportunities in this area. They both have a track record of making discoveries and producing oil and natural gas, meaning they are actively competing to find and produce Oil & Gas resources. Lastly, both companies have a strong emphasis on cost efficiency and profitability. Both companies have implemented cost-saving measures and efficiency improvement programs to increase production and profitability. This puts them in competition with each other as they try to maximise their returns on investments.

Shell

Shell is a multinational Oil & Gas company based in the Netherlands, operating in over 70 countries (Shell, 2022). Shell are involved in a wide range of activities, including exploration and production of Oil & Gas, refining and marketing of petroleum products, and petrochemicals. Shell is considered a competitor to Vår Energi because both companies have operations in the same geographic area and are involved in similar activities, such as offshore drilling and the production of Oil & Gas.

Shell is one of the largest Oil & Gas companies in the world, with significant financial resources and expertise (Shell, 2022). Vår Energi is a smaller company but is still a major player on the Norwegian Continental Shelf. This means that both companies have the ability to invest in new technologies, exploration activities, and infrastructure, and they can compete on a similar scale, even though their operations are not necessarily all in the same geographical area. However, Shell operates primarily outside of Norway, but given Shell's enormous production size of 3.7 million

barrels a day, Shell should be considered a competitor to Vår Energi, as they sell the same products, Oil & Gas (Shell, 2022).

Total Energies

Total Energies is a French multinational company that is one of the world's largest integrated Oil & Gas companies (Total Energies, 2022). The company was founded in 1924 and is headquartered in Courbevoie, France. Total Energies operates in more than 130 countries and has a workforce of around 105,000 employees (Total Energies, 2022). The company is involved in all aspects of the Oil & Gas industry, including exploration, production, refining, marketing, and distribution. Total Energies is also in the renewable energy sector and invests heavily in developing cleaner energy solutions, such as solar, wind, and hydrogen (Offshore Energy, 2018).

As for why Total Energies is a competitor to Vår Energi as both compete in the Oil & Gas industry of Norway, which means they are vying for the same customers, resources, and markets. In addition, both companies are focused on developing new and innovative solutions to help them stay ahead of their competitors and meet the market's evolving needs. As Total Energies produces over 1.5 million barrels daily, Total Energies and Vår Energi should be considered competitors even though they are not focusing their operations in the same geographical area (Total Energies, 2022). This is because they are both producers of Oil & Gas, affecting the overall supply and demand for the commodities.

4.4 SWOT Analysis

Strengths	Weaknesses
- Strong position on the Norwegian Continental Shelf, a stable and profitable region for Oil & Gas production. - Diverse portfolio of producing fields and exploration prospects. - Operational efficiency and cost management capabilities. - Financial stability and backing from strong parent companies. - Well-educated management team and board of directors	- Underperformance in return ratios measurement compared to key competitors. - Relatively high-cost structure compared to peers. - Dependence on fossil fuels may become a challenge in a transitioning energy landscape. - Limited geographical diversity and exposure to geopolitical risks in Norway - Under-diversified operations, as it is only investing in the Oil & Gas industry and not in any form of renewable energies.
Opportunities	**Threats**
- Expanding its renewable energy portfolio and diversifying into other forms of energy. - Leveraging its existing infrastructure and expertise to develop new exploration and production projects. - Strategic partnerships and collaborations to share risk and expand capabilities. - Increasing production through improved recovery rates and more efficient operations. - Increasing amount of emerging economies that are entering the Oil & Gas market - Extension of the Russian war could lead to higher demand for Oil & Gas than earlier forecasted	- Increasing competition in the Oil & Gas industry. - Fluctuating Oil & Gas prices and demand. - Reduced Oil & Gas prices due to the rise of renewables - Exchange rate risk in the form of a weaker US dollar and Euro. - Environmental regulations and public pressure to reduce carbon emissions. - Geopolitical risks and changes in government policies in Norway and other key markets. - Has to stop producing due to net zero scenario by 2050

Table 2: Own Creation

5.0 Renewable Model

5.1 Introduction to Renewable Model

Given Vår Energi's decision not to invest in renewable energy for the next four years, assessing the potential revenue loss resulting from this choice is imperative. To this end, this study aims to estimate the impact of renewable electricity production on the future demand for Oil & Gas and

subsequently calculate the revenue loss incurred by Vår Energi as the demand for Oil & Gas decreases. The analysis will draw upon credible sources, including different forecasts and scenario estimations. Specifically, the model focuses on four renewable electricity production methods: wind, solar, hydropower, and bioenergy, collectively accounting for over 99.5% of renewable electricity production (Ember, 2022) An estimate for nuclear power production will also be included, contributing more than 10% of the world's electricity production (Ember, 2022) (Appendix 1).

Estimations on the amount of electricity generated by these renewable methods over the next four years are made, and its effect on the demand for Oil & Gas is calculated. This will involve reducing the demand for Oil & Gas in electricity generation and reducing the overall demand for fossil fuels as total electricity production increases its market share in total energy consumption. The future Oil & Gas demand will be estimated based on this reduction. Further, the demand estimation is utilised to calculate the price of Oil & Gas over the next four years. This forecast will not consider external factors such as OPEC, the Russian-Ukrainian war, and China's sanctions, as they are unpredictable and difficult to estimate. However, renewable energy production is more predictable and thus will be the primary driver for calculating the four-year price of Oil & Gas.

Each renewable energy production method will be introduced and forecasted for a four-year future production. The 2022 numbers will, however, be adjusted estimations, as the data is limited since the analysis is constructed in early 2023 before actual production numbers for 2022 are finalised. The forecast ranges four years into the future as the data for creditable and relative estimations are limited.

5.2 Wind

Introduction to the Wind Energy Market

In 2021, the wind industry experienced its second-best year, with a global capacity increase of almost 94 GW, which fell behind 2020's record growth by a mere 1.8% (IEA, 2022). Although Europe, Latin America, and Africa & the Middle East had record years for new onshore installations, the total onshore wind installations in 2021 were still 18% lower than the previous year, primarily due to the slow-down of onshore wind growth in China and the US, the world's two largest wind power markets (Ember, 2022). Conversely, 21.1 GW of offshore wind capacity was

commissioned last year, triple the amount in 2020, making 2021 the best year in offshore wind history and accounting for a 22.5% market share in global new installations in 2021 (IEA, 2022). China are leading the charge, contributing 80% of offshore wind capacity added worldwide and bringing its cumulative offshore wind installations to an impressive 27.7 GW (Ember, 2022).

The total global wind power capacity now stands at 837 GW, contributing to an annual reduction of over 1.2 billion tonnes of CO2 emissions, equivalent to the annual carbon emissions of South America (IEA, 2022). Wind auction activities surged in 2021, with over 88 GW of wind capacity awarded globally, a 153% increase from 2020 (IEA, 2022). As net zero commitments gathered global momentum and renewed urgency for achieving energy security, the market outlook for the global wind industry looks positive. Under current policies, 557 GW of new capacity is expected to be added in the next five years, equating to over 110 GW of new installations each year until 2026 (Ember, 2022). However, for the world to stay on course for a 1.5C pathway and net zero by 2050, this growth must quadruple by the end of the decade.

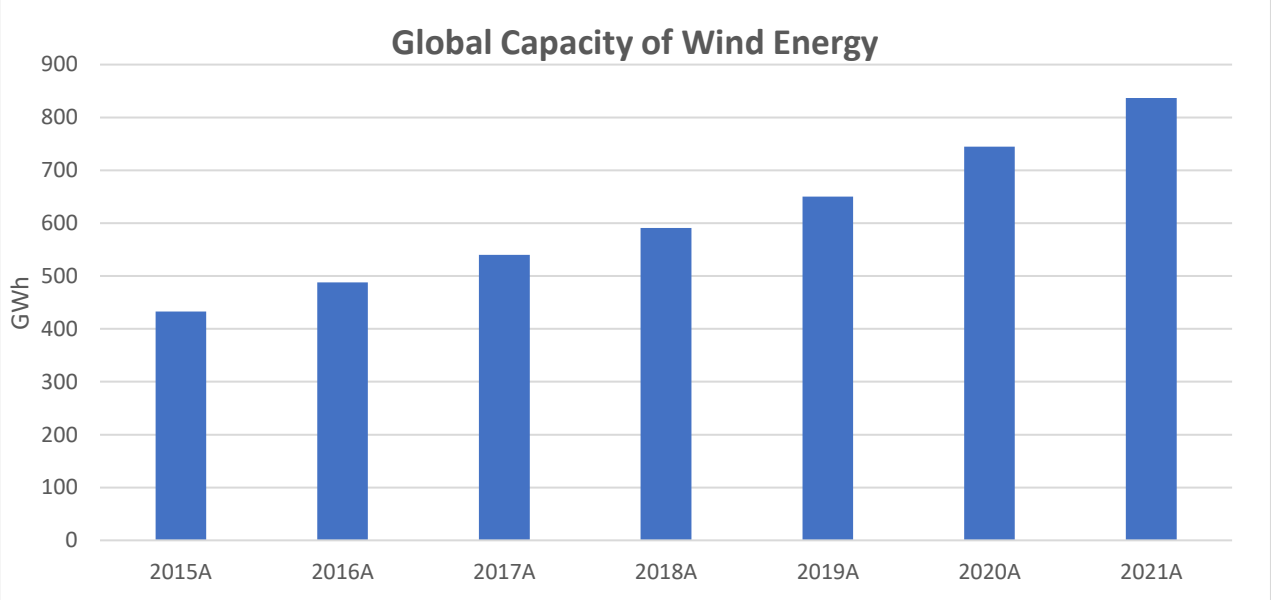

Figure 12: Own Creation. Source: (Global Wind Energy Council, 2022)

Wind Energy Forecast

The wind energy forecast is based on the Global Wind Report of 2022 from the Global Wind Energy Council (GWEC). GWEC is the global trade association for the wind power industry based in Brussels. Members of GWEC represent more than 1500 firms, organisations and institutions in over 80 countries worldwide (Global Wind Energy Council, 2023). The mission of the GWEC is to

represent the interests of the wind energy market in order to establish wind energy as a solution to energy challenges. The Global Wind Report is published to provide information and awareness of the situation in the wind energy market. At the same time, the report provides a market outlook for the future and the challenges facing the industry to reach Net Zero by 2050 and energy security.

Even though the demand for renewable energy is high, there are challenges to growth in wind energy in the short and the long term. Among the key challenges are the social acceptance and support in host communities compared to the opposition met. There are multiple examples of conflicts between local interests and wind energy companies. Ideal land and ocean areas for wind energy can be hard to find, especially without interfering with the interests of other actors. Another challenge for the wind energy industry is the timeline for cost-cutting measures and commercialisation efforts for enabling storage and green hydrogen technologies, likely amplifying the demand for wind energy (Global Wind Energy Council, 2022).

The invasion of Ukraine by Russia in February 2022 conveyed a resounding message to governments worldwide relying on imported fossil fuels is detrimental to environmental and human health and poses a severe risk to geopolitical and energy security. The growth in wind energy has been insufficient in scale and pace to achieve a secure and resilient global energy transition. The crisis has increased pressure in certain countries to transition to renewables and reduce their reliance on natural gas, primarily from Russia. However, the situation has prompted a resurgence in calls for shale gas extraction and nuclear power in other countries.

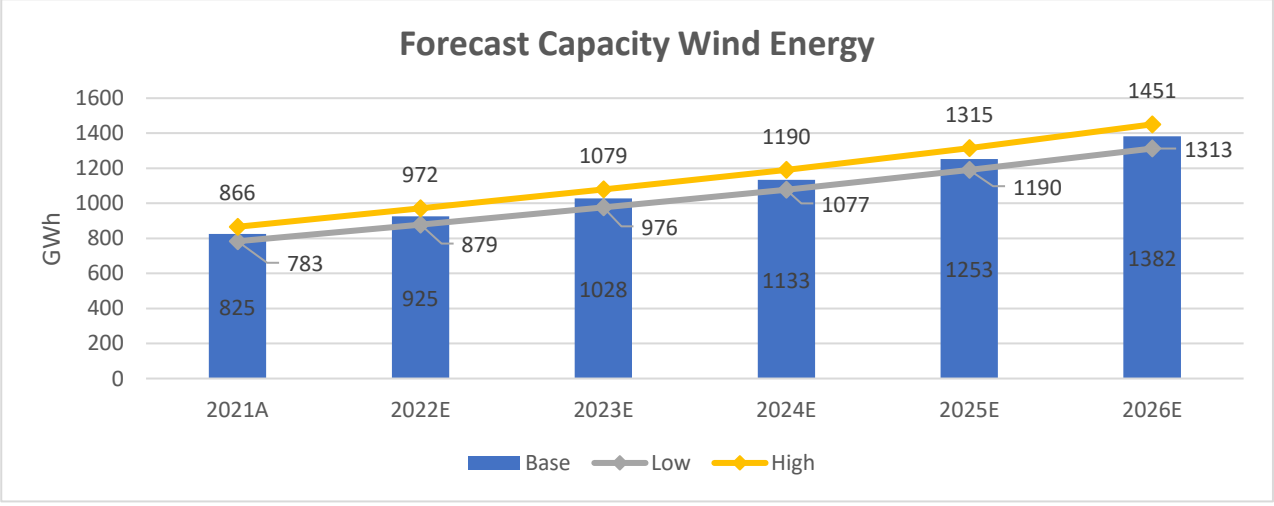

Figure 13: Own Creation. Source: (Global Wind Energy Council, 2022) & (Ember, 2022)

Figure 13 depicts three different scenarios for the estimation of wind energy capacity. The base case is based on the Annual Wind Report 2022 from GWEC and data from the energy think tank Ember. The base case for the global wind energy market gives a compounded annual growth rate (CAGR) of 6.6% on average per year. The growth of the capacity is mainly based on new installations in onshore wind, where the total expected power to be built is 466 GW in the period 2022-2026 (Global Wind Energy Council, 2022). In the offshore segment, an increase of 90 GW globally is expected from 2022 to 2026.

The high and low case scenarios are given to deal with the uncertainty in the energy markets. The Russian invasion of Ukraine and China's reopening after the Covid-19 lockdown are among the key drivers for the uncertainty in the energy market. They serve as challenges when forecasting wind energy capacity. China's reopening is set to increase demand for Oil & Gas in 2023, particularly if the Chinese authorities succeed in stimulating industrial activities (Cahill, Mazzocco, & Huang, 2023). It is difficult to determine how this will influence the development of wind energy capacity. The high demand for Oil & Gas is likely short-term, while China is working towards increasing renewable energy capacity to gain energy security. China is likely to reach their target of 33% electricity consumption from renewable sources by 2025 and is currently forecasted to obtain 36% (Yin & Yep, 2022). In 2021, 70% of the growth in wind generation came from China, where the total global capacity growth was 94 GW.

Considering the uncertainty in the market, it is difficult to forecast the future of wind energy, even in the short term. On one side, there are local, national and global challenges making it difficult to grow as fast as required to reach net zero by 2050. On the other hand, the geopolitical uncertainty surrounding the world following the Covid-19 pandemic and the Russian invasion of Ukraine has created a realisation of the importance of energy security. In many ways, energy security is a form of national security, but it is unlikely that this effect will create a significant impact in a four-year outlook. Due to the conflicting trends the high case scenario will not be used and the forecasting lands on the base case, expecting a capacity of 1382 GW in 2026.

5.3 Solar

Introduction to the Solar Market

The Solar forecast that will be used in this part comes from the Annual Global Market Outlook, produced by the organisation Solar Power Europe as well as other relevant sources. Solar Power Europe is a Brussels-based industry association representing the interests of Europe's solar power sector (Solar Power Europe, 2022). The organisation represents over 200 members from across the solar value chain, including manufacturers, developers, utilities, and research institutes. This annual Global Market Outlook (GMO) report from Solar Power Europe is a collaboration between the world's leading regional and solar industry associations to convince decision-makers of solar power's unique benefits. This GMO edition focuses on Latin America, a sunny and promising region for solar power and home to one of the rising global solar stars, Brazil. The country's different attractive policy tools have made it one of the top five global solar market prospects over the next five years. Given that there is data yet from actual installations in 2022, the forecasted values from the report from 2022-2026 will be used.

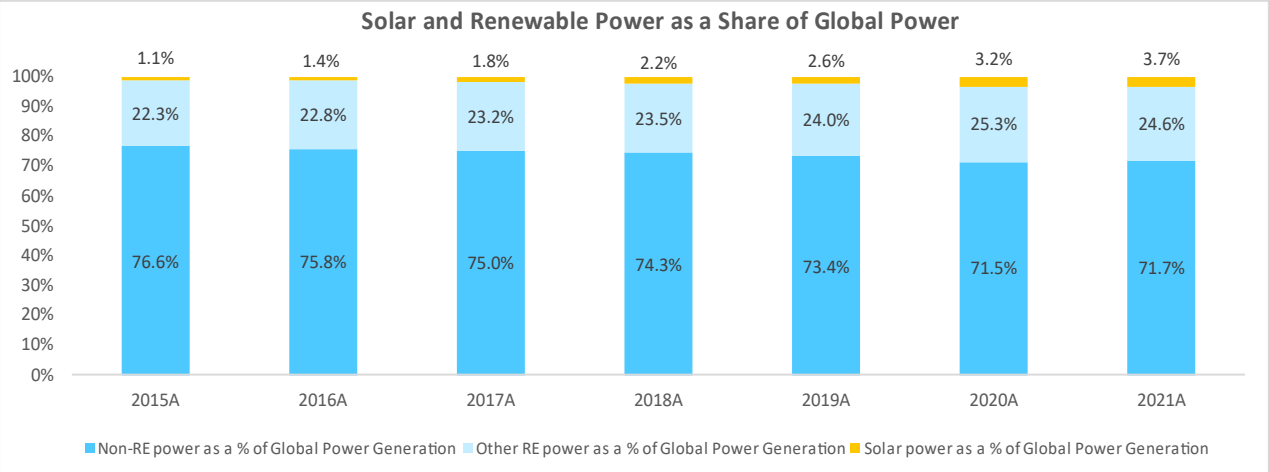

Figure 14: Own Creation. Source: (Ember, 2023).

The global solar industry reached a significant milestone, with total global installed solar capacity surpassing the 1 TW threshold (Ember, 2023). It marks a remarkable achievement considering that only 20 years ago, in early 2002, the cumulative grid-connected volume reached only 2 GW. The current installed capacity is, therefore, 500 times that amount, a testament to the rapid growth of the solar industry (Solar Power Europe, 2022). It took 16 years, until 2018, to reach the 500 GW level, but only a little over three years later, the industry has achieved a doubling of that amount to 1,000 GW or 1 TW. In 2022, more than 200 GW of solar capacity was installed in one year for

the first time. This is equivalent to the total global solar capacity in 2015. Solar panels generated 3.7% of the world's electricity in 2021, up from just 1.1% in 2015.

This rapid solar industry growth is impressive, especially considering the short history of commercial solar deployment. However, it is essential to note that flawed policy frameworks and missing visions of decision-makers have been obstacles to even faster growth. For instance, Europe's largest solar market, Germany, has not been able to repeat its record installation volume from 2012. The industry, therefore, needs the right framework conditions to tap solar's full potential, and the major obstacle to rapid solar dissemination is still the lengthy and costly permitting process.

Looking ahead, the fight against climate change has been the key driver for on-grid solar development to the TW level. However, the recent Russian invasion of Ukraine has also uncovered the geostrategic importance of solar power. Most European countries, depending on Russian Oil & Gas imports, try to detach themselves from Russia's energy strings as soon as possible. In this context, they have begun to view solar power from a different viewpoint, considering its potential for providing local and individual energy security.

Future Solar Power Forecast

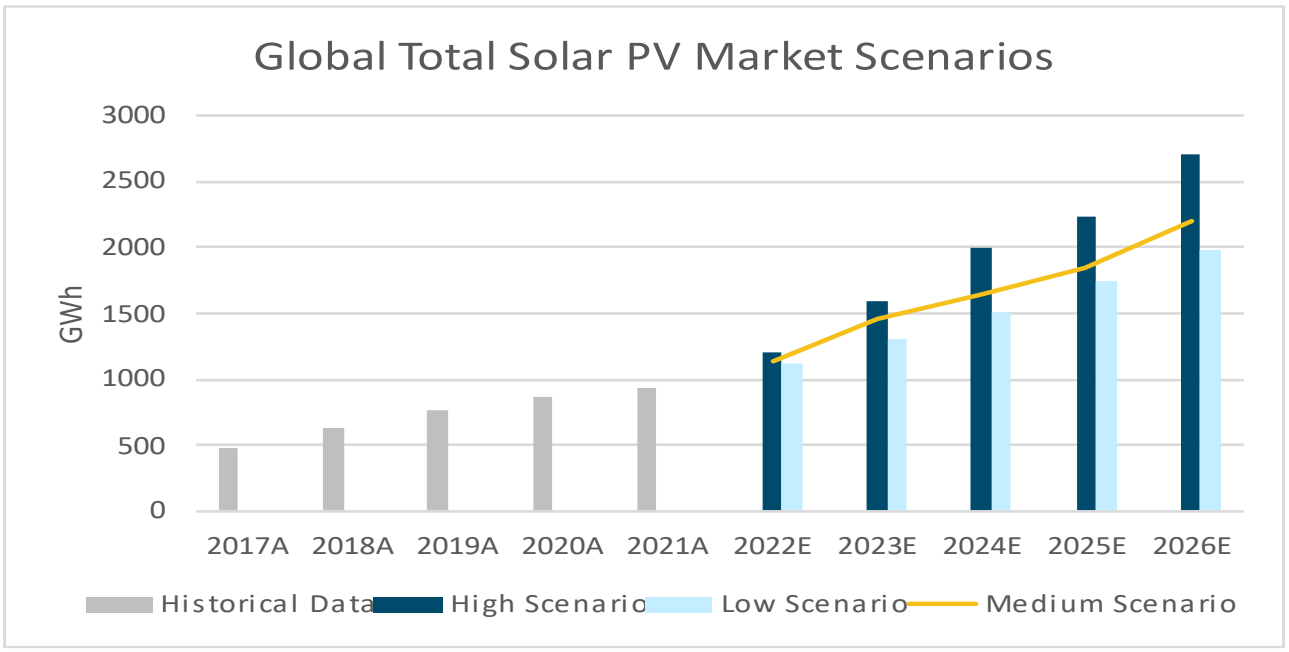

Figure 15: Own Creation. Source: (Solar Power Europe, 2022)

Figure 15 shows three different five-year forecasted scenarios for installed solar panels. Solar Europe have built their forecast in three different scenarios because there is still significant uncertainty in the market regarding China lockdowns, the Russian-Ukrainian War and the shortage of chips and components for Solar Panels.

At the beginning of 2021, there was hope that the expensive solar sector prices would decrease in 2022. However, it is now evident that the prices will not return to the low prices of 2020 anytime soon. Silicon, wafer, cell and module prices are significantly higher than at the start of 2021 (Solar Power Europe, 2022). Solar analysts predict that prices will remain high until the end of this year (Ember, 2023). The world is currently experiencing inflation, and the pandemic and events such as China's lockdowns and the Russian-Ukrainian conflict are negatively affecting the global economy, which had recently started accelerating rapidly.

Despite facing various challenges, the solar industry is predicted to experience significant growth in 2022. Solar Power Europe’s medium scenario estimates that newly installed capacities will reach 228.5 GW, reflecting a 36% growth rate compared to the 167.8 GW installed in 2020 (figure 15). Although the forecast is somewhat conservative, leading solar analysts like IHS Markit and BloombergNEF predict even higher numbers, with the latter increasing its prediction from 228 GW to 245 GW in November 2021 (BloombergNEF, 2022).

The market analysis for 2022 shows a wide range of possibilities. While the low scenario predicts a demand drop to 181.4 GW, this is highly unlikely given the strong demand for solar in recent months. However, if the pandemic worsens in China again or the Russian-Ukrainian conflict spreads to other countries, it will negatively affect market growth. On the other hand, it is more probable that the market will swing towards the high scenario, which predicts up to 270.8 GW of solar additions in 2022. This may sound optimistic, but it is not far from BloombergNEF's mid-estimate of 245 GW (BloombergNEF, 2022).

If the high scenario is realised, nearly all silicon production capacities would have to be utilised. The largest uncertainty in the industry is China, which has the power to significantly influence the solar balance even in a large market like the current one.

Solar Forecast Conclusion

As for the estimation of how many Solar Panels will be installed in 2026, it is leaning more towards Solar Power Europe's high case scenario. This is because, as Solar Power Europe explained in their forecast, they were concerned about the state of China, the Russian War and the component shortage. Now in April 2023, it is know that China has opened their country again, Russia do not seem to invade anywhere else than Ukraine and the components shortage has decreased, giving a higher probability for the high scenario case. Bloomberg has also updated the 2022 forecast with actual numbers, where 260GW solar capacity was added in 2022, resulting in an installed capacity of 1208GW as of today (BloombergNEF, 2022). Solar Panel Europe's high case scenario for 2022 was estimated to be 1211GW (3GW above the actual number) (figure 15), giving us even more confidence in using their high case scenario. The forecast will, however, stay on the more conservative side, given the high uncertainty in the economy. Thus, the forecast will take the values as a middle scenario between Solar Power Europe's medium and high scenario, resulting in an installed solar capacity of 2632 GW in 2026 (figure 16).

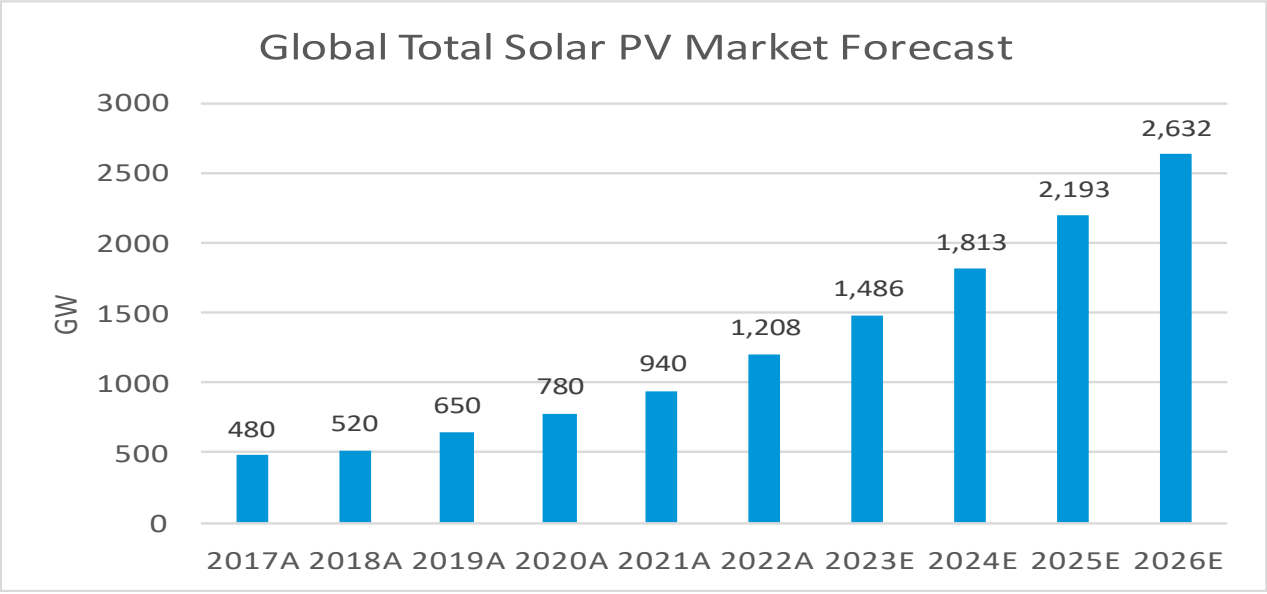

Figure 16: Own Creation. Source: (Bloomberg , 2023) & (Solar Power Europe, 2022)

5.4 Hydro Power

Hydropower generates 16% of the world´s electricity (International Hydropower Association, 2022). This means that hydropower plays a crucial role in providing low-carbon electricity at scale and free from many of the energy security concerns that plague fossil fuels, where Vår Energi operates. The deployment of large-scale hydropower projects is dominated by major countries

and regions such as China, Brazil, Canada, India, Japan, the United States and Europe (International Hydropower Association, 2022). The forecast for the growth of this segment is expected to be driven by the increasing focus on cleaner energy sources. It plans to increase the proportion of renewable energy in the total power generation mix across major developed and emerging economies worldwide.

Large-scale hydropower is a type of renewable energy that utilises the power of flowing water to generate electricity. This process involves water turbines, which are powered by the kinetic energy of the water (International Hydropower Association, 2022). To produce significant amounts of hydroelectricity, bodies of water like lakes, reservoirs, and dams store and regulate water, allowing it to be released later for power generation, irrigation, or industrial and domestic use (International Hydropower Association, 2022). As large-scale hydropower facilities can be easily activated and deactivated, they provide a reliable means of meeting peak electricity demands throughout the day, making it a popular choice among energy sources. However, in 2022, Europe faced its worst drought in at least 500 years, pushing hydro generation to its lowest level since at least 2000 (Ember, 2023) (figure 17). This low electricity generation indicates that even with increasing hydropower installations, the demand for Vår Energi's oil can still increase due to the volatility of renewable energy sources, such as Hydropower generation.

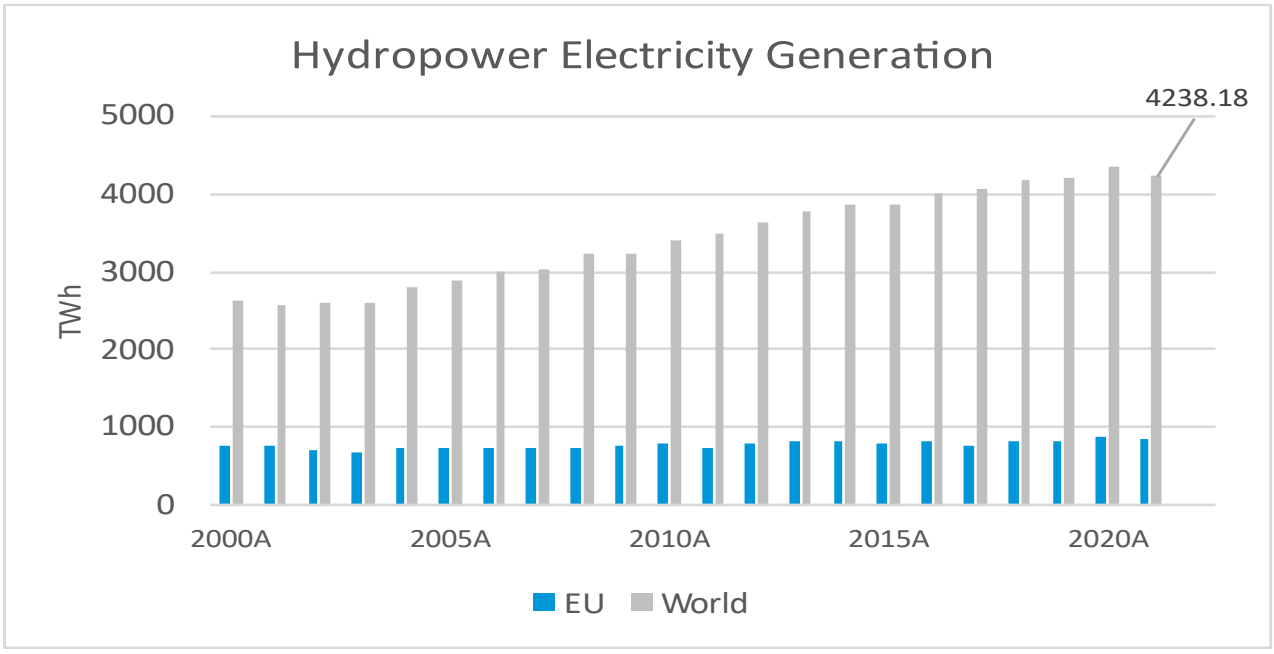

Figure 17: Own Creation. Source: (Ember, 2022)

When estimating the total installed Hydropower in 2026, a report from Mordorintelligence will be used as a proxy combined with additional sources. The COVID-19 pandemic significantly impacted the global hydropower industry, causing supply chain disruptions and reducing investment in upcoming projects. While some projects may be delayed due to COVID-19-related lockdown measures, the market is expected to be driven by an increasing number of new hydropower projects supported by governments and a growing demand for reliable electricity. However, the negative environmental impacts associated with hydropower projects could hinder the market growth during the forecast period (Mordorintelligence, 2022).

In recent years, the Asia-Pacific area has held a significant share of the hydropower market, which is expected to continue in the foreseeable future (Mordorintelligence, 2022). China is currently the leading global player in hydropower, with approximately 27.8% of the worldwide hydropower installed capacity as of 2020 (Mordorintelligence, 2022). Besides the major players in hydropower development, smaller nations in Southeast Asia are also making strides in the large hydropower sector. The growing need for energy to stimulate the Mekong economies has captured the attention of the riparian countries, leading to substantial investment in hydropower projects throughout the region in recent decades (Mordorintelligence, 2022).

The government of Laos has revealed plans to finalise 12 hydropower dam projects, which will yield a combined capacity of 1,950 MW (Mordorintelligence, 2022). To date, 20 of these dams have been reviewed, with the remaining 50 expected to be evaluated by 2021. The advancement of hydropower is a key focus of Laos' strategy to export roughly 20,000 MW of electricity to its neighbouring nations by 2030. China has also announced its plan to become carbon neutral by 2060 and peak coal consumption by 2025. This led to increased investment in the renewable sector, and in 2020, around 13.76 GW of new hydropower was installed, including 1.2 GW of pumped storage from the last four units of the Jixi project (Mordorintelligence, 2022) .

According to International Hydropower Association, the total installed hydropower capacity reached 1360 GW in 2021 (International Hydropower Association, 2022). Mordorintelligence projects installed hydropower generation to increase to around 1494 GW by 2026, with a Compound Annual Growth Rate (CAGR) of 1.93% during the forecast period 2022-2026 (Mordorintelligence, 2022). As Ember and the International Hydropower Association have roughly

the same estimates and arguments for an annual growth rate of approximately 2%, Mordorintelligence's forecast will be used to estimate the future demand for Oil & Gas due to an increase in renewables such as hydropower generation. The estimation is visualised in figure 18.

Hydropower Market Outlook

According to Mordorintelligence, the total installed hydropower capacity reached 1360 GW in 2021 and is projected to increase to around 1494 GW by 2026, with a Compound Annual Growth Rate (CAGR) of 1.93% during the forecast period of 2022-2026. (Mordorintelligence, 2022). The COVID-19 pandemic significantly impacted the global hydropower industry, causing supply chain disruptions and reducing investment in upcoming projects. While some projects may be delayed due to COVID-19-related lockdown measures, the market is expected to be driven by an increasing number of new hydropower projects supported by governments and a growing demand for reliable electricity. However, the negative environmental impacts associated with hydropower projects could hinder the market growth during the forecast period (Mordorintelligence, 2022).

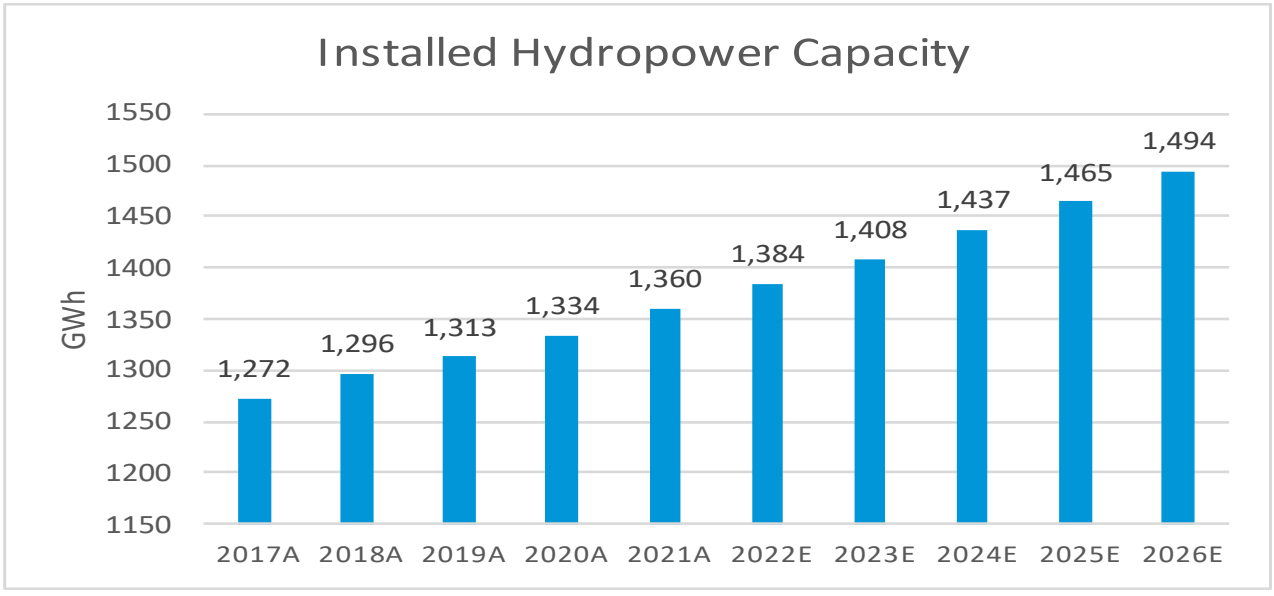

Figure 18: Own Creation. Source: (Mordorintelligence, 2022)

5.5 Bioenergy

Introduction

Despite Bio's small market share in the global electricity market, it is still worth analysing the commodity due to the substantial growth that have been seen in recent years. Bioenergy usage can be divided into two primary categories, namely "traditional" and "modern" bioenergy (Irena, 2021). The former refers to the traditional forms of biomass combustion, such as wood, animal

waste, and charcoal. On the other hand, modern bioenergy technologies involve liquid biofuels produced from plants like bagasse, bio-refineries, biogas generated through anaerobic digestion of residues, wood pellet heating systems, and other emerging technologies. For the purpose of the model, the renewable energy part of bio will be focused on.

In terms of renewable energy consumption, approximately 75% of the global renewable energy mix is derived from bioenergy, with over 50% of this coming from traditional biomass usage (Irena, 2021). Modern bioenergy is the largest renewable energy source globally, accounting for 55% of renewable energy and over 6% of the global energy supply (IEA, 2023). Over the past two decades, bioenergy generation has substantially increased, from 148 TWh in 2000 to 672 TWh in 2022, a 4.5-fold increase (Ember, 2023). As a result, the global power mix's share of bioenergy has risen from below 1% in 2000 to 2.4% in 2022 (Ember, 2023). Despite a decline in production in 2001 by 5.5 TWh (-3.7%), bioenergy generation has shown consistent growth, with an average annual growth rate of 8% (Ember, 2023).

As of 2015, bioenergy constituted approximately 10% of the world's total final energy consumption and contributed 1.9% of global power generation (Irena, 2021). However, since 2015, the growth rate of bioenergy generation has slowed, with an average annual growth rate of 4.9%, and its share has only increased by 0.4 percentage points from 2% in 2015 to 2.4% in 2022 (Irena, 2021).

Market Outlook:

According to IEA's installed Bioenergy for electricity, there is an installed capacity of 168.6GW in 2022 and is expected to increase by 23.31% to 207.9GW by 2026. This results in an average five-year increase of 5.76% from 2022 to 2026. Actual and estimated numbers can be found in the graph below:

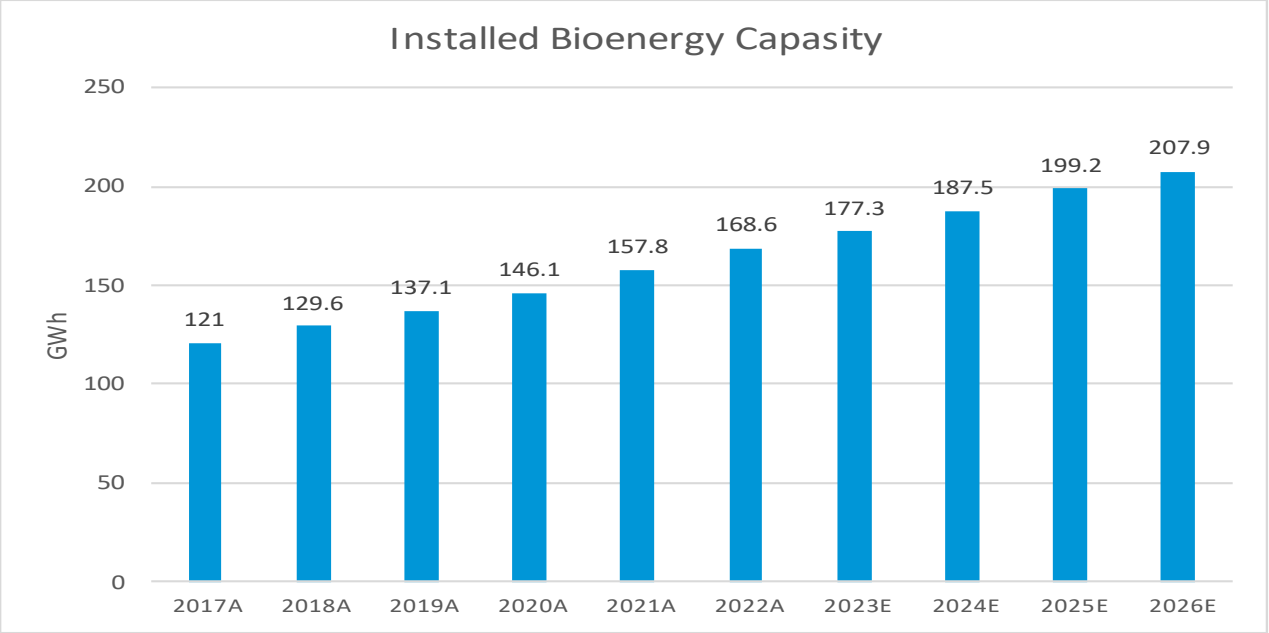

Figure 19: Own Creation. Source: (IEA, 2023)

As seen from the increasing trend in the graph above, many countries have set renewable energy targets to reduce greenhouse gas emissions and meet their energy needs from clean sources. Bioenergy is a renewable energy source that can contribute to these targets, particularly in sectors such as transport, where alternatives to fossil fuels are limited. According to the IEA's Renewable Energy Market Update, bioenergy is expected to account for around 60% of the growth in renewable energy consumption in the next five years (IEA, 2023).

Advances in technology are making bioenergy production more efficient and cost-effective. For example, the development of advanced biofuels, such as cellulosic ethanol, is increasing the availability of bioenergy from non-food sources. The IEA's forecast considers technological advances and the increasing availability of biomass feedstocks for bioenergy production. The demand for bioenergy is also expected to increase due to the growing demand for sustainable and low-carbon energy sources (IEA, 2022). According to a World Bioenergy Association report, the global bioenergy market is expected to reach USD 246 billion by 2027, driven by demand for renewable electricity, heat, and transport fuels (WBA, 2022).

Many governments worldwide are implementing policies and incentives to support the development and deployment of bioenergy technologies. For example, the European Union's Renewable Energy Directive sets a target for 14% of transport fuels to come from renewable sources by 2030, which is expected to drive demand for biofuels (European Comission, 2022). The

IEA's forecast considers the policy support for bioenergy in various countries. Overall, these factors support the IEA's bioenergy forecast for 2026, which expects continued growth in installed bioenergy capacity and an increasing role for bioenergy in meeting the world's energy demand.

5.6 Nuclear

Nuclear power plants use the heat generated from nuclear reactions to produce steam, which drives a turbine to generate electricity. The nuclear reaction occurs in the reactor core, where fuel rods containing uranium are bombarded with neutrons, causing them to split and release heat energy (Word Nuclear, 2023). Nuclear power can produce electricity with reduced carbon emissions compared to fossil fuels like coal and oil. Many nations around the world are choosing to build nuclear power plants in order to decrease carbon emissions. Moreover, nuclear energy offers predictability for electricity costs over the long term.

Nuclear energy now provides about 10% of the world's electricity from about 440 power reactors (Word Nuclear, 2023). Due to the significant contribution of fossil-based power plants to net carbon emissions, nuclear power plants are anticipated to play a role in limiting the growth of carbon emissions. While renewable energy sources offer superior alternatives to fossil fuels, their reliability is reduced by their heavy dependence on current weather conditions (Mordorintellegence, 2023).

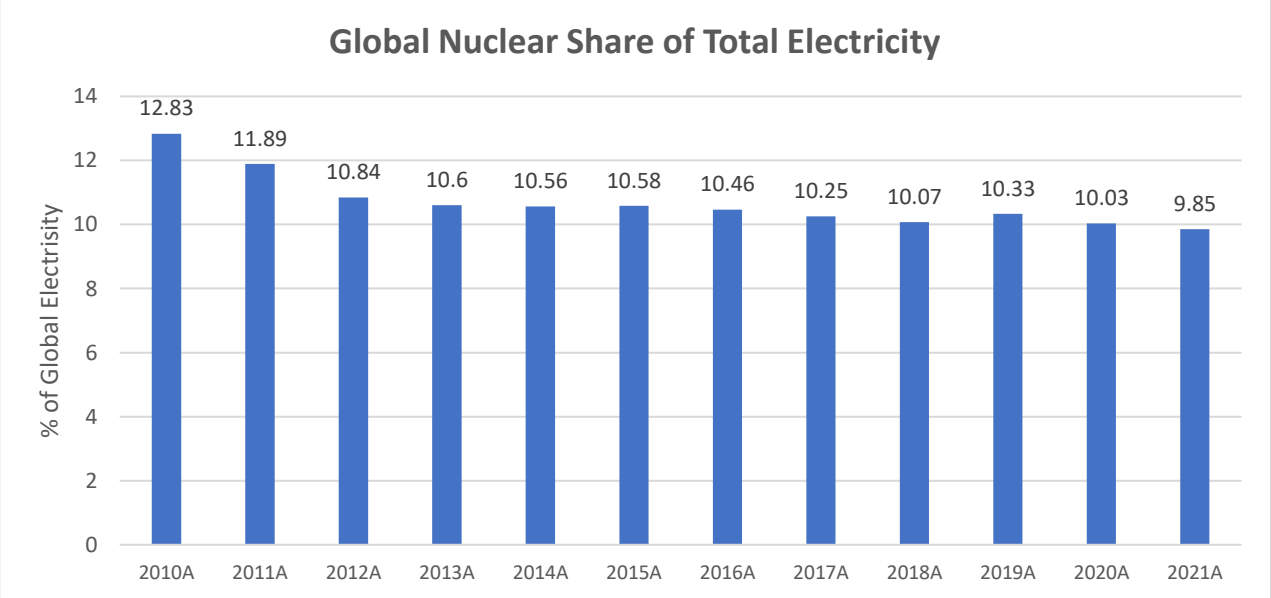

Figure 20: Own Creation. Source: (Ember, 2022)

Market Outlook

Climate change mitigation and energy security are crucial factors influencing the decision to maintain or increase nuclear power utilisation. The International Atomic Energy Agency points to various recent events, including the COVID-19 pandemic, geopolitical tensions, and military conflicts in Europe, that have adversely affected the dependability of energy systems, obstructed energy distribution across regions, and caused substantial spikes in energy costs (International Atomic Energy Agency, 2022). Nuclear energy is also driven by increased energy demands due to population growth and reduced exposure to future energy prices.

Unlike North America and Europe, which have faced limitations in expanding their nuclear electricity generating capacity for numerous years, various countries in the Asia-Pacific region are in the process of planning and constructing new nuclear power plants to fulfil their rising need for sustainable electricity (Mordorintellegence, 2023). As of January 2023, there were 21 power reactors under construction in China and 8 in India, with an additional 47 and 12 new reactors planned (World Nuclear Association, 2023). Also, Japan which had been immobilised for a decade after the Fukushima Daiichi nuclear accident has announced plans to restart many of its idle reactors (IMF, 2022).

However, as mentioned earlier, the fate of nuclear energy in the developed world has experienced a significant shift in recent months. The energy crisis caused by the Russian invasion of Ukraine, compounded by post-pandemic energy shortages, has resulted in several nuclear power plants in Europe, initially scheduled for closure, being granted a last-minute reprieve. Roughly 30 nations are currently exploring, preparing, or commencing initiatives for nuclear power, while an additional 20 countries have indicated some level of curiosity at some point (Word Nuclear, 2023).

Although numerous developing nations are entering the nuclear power arena, their impact on capacity growth in the near future is projected to be minimal, as established technology nations will lead the way. Nevertheless, the long-term effects of urbanisation in less developed nations will significantly boost electricity demand, especially for base-load plants such as nuclear power (Word Nuclear, 2023). As a result, energy consumption patterns in these countries will increasingly resemble those of Europe, North America, and Asia.

France, which had previously aimed to decrease reliance on nuclear energy under President Macron's first term, has now decided to construct six new reactors and a dozen small modular reactors (IMF, 2022). The UK has initiated an ambitious program to construct eight new reactors and 16 small modular reactors (IMF, 2022). The Slovak Nuclear Regulatory Authority has requested authorisation for construction from the Nuclear Energy Company of Slovakia. The company wants to build a power plant on the present Jaslovské Bohunice power plant site with a yearly average production of 12TWh (Hudec, 2023). Slovakia are also building their third unit at Mochovce nuclear power plant this year, and the launch of the fourth unit is planned for 2024. Even Germany, which has been historically against nuclear power, has accepted the fundamental geopolitical energy realities and extended the lifespan of the nation's last three operating nuclear power plants (IMF, 2022).

Due to several countries planning to build out their nuclear energy capacity, combined with Reporterlink and Embers's research, the forecasted nuclear capacity for the next five years is increasing. It is estimated to have a yearly capacity of 2887 TWh in 2026 (figure 21). The forecast for nuclear energy generation reveals a compound annual growth rate of 0.88%. The relatively low growth is mainly because a five-year forecasting period is short when looking at nuclear energy. Building new reactors is time-consuming, and due to the Fukushima Daiichi nuclear accident in 2011, there was a major worry about the safety of nuclear energy. Many countries are still unsure if they wish to engage in nuclear energy, but as mentioned, many new power reactors are under construction, especially in the Asian market (Word Nuclear, 2023). Therefore, it is likely that the increase in nuclear power generation will increase in the time period beyond the forecasting period.

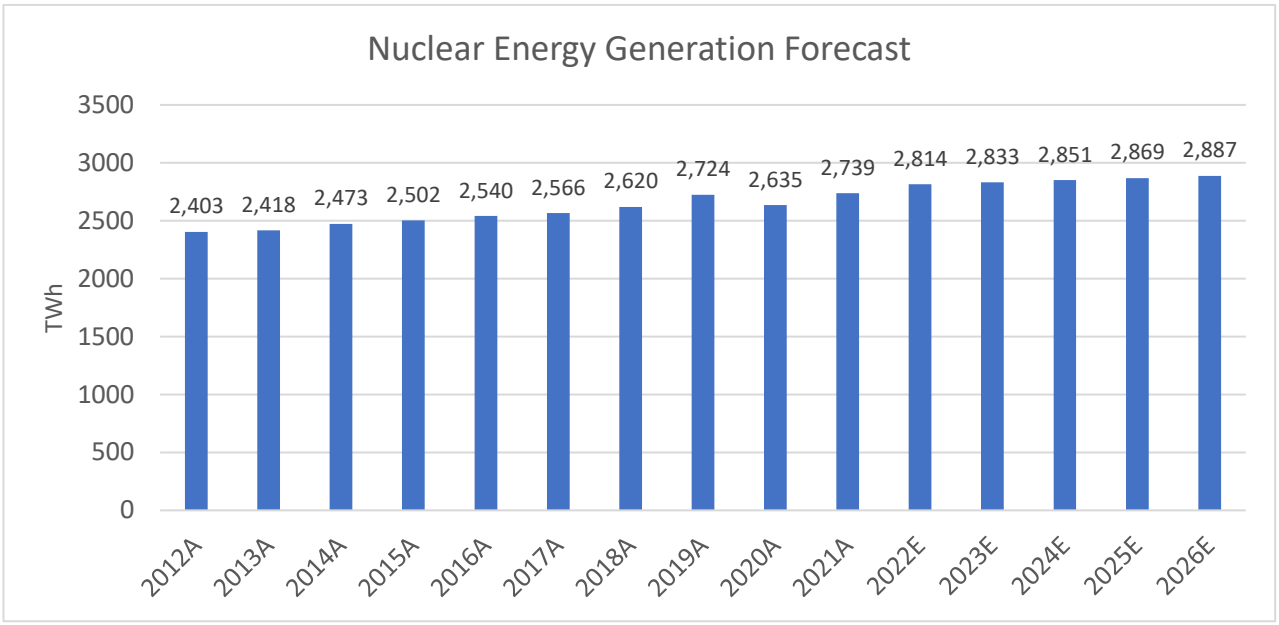

Figure 21: Own Creation. Source: (Reportlinker, 2022) & (Ember, 2022).

5.7 Capacity Factor

In the context of electricity, the capacity factor refers to the ratio of the actual output of a power plant or other electricity-generating asset over a period of time compared to its maximum possible output if it were operating at full capacity continuously over the same period (Energy, 2022). For example, suppose a wind turbine has a maximum installed capacity of 1 megawatt (MW) and operates 24 hours per day for an entire year, which is 8,760 hours. If, during that time, the wind turbine only generates 2,000 megawatt-hours (MWh) of electricity, its capacity factor can be calculated as follows:

Capacity factor = (Actual output / Maximum possible output) x 100%

Capacity factor = (2,000 MWh / (1 MW x 8,760 hours)) x 100%

Capacity factor = 22.8%

This means that the wind turbine had a capacity factor of 22.8% during that period, indicating that it generated electricity at only about one-fourth of its maximum possible output. Factors such as downtime for maintenance or repair, variations in wind speed or other weather conditions, and other operational constraints can all contribute to lower capacity factors for renewable energy sources like wind and solar.

The capacity factor is an important metric in the energy industry, especially variable energy, such as renewable energy, because it can provide insight into the efficiency and profitability of power

generation assets. Higher capacity factors generally indicate more efficient use of resources and higher profitability, while lower capacity factors can indicate operational inefficiencies or other problems that may need to be addressed.

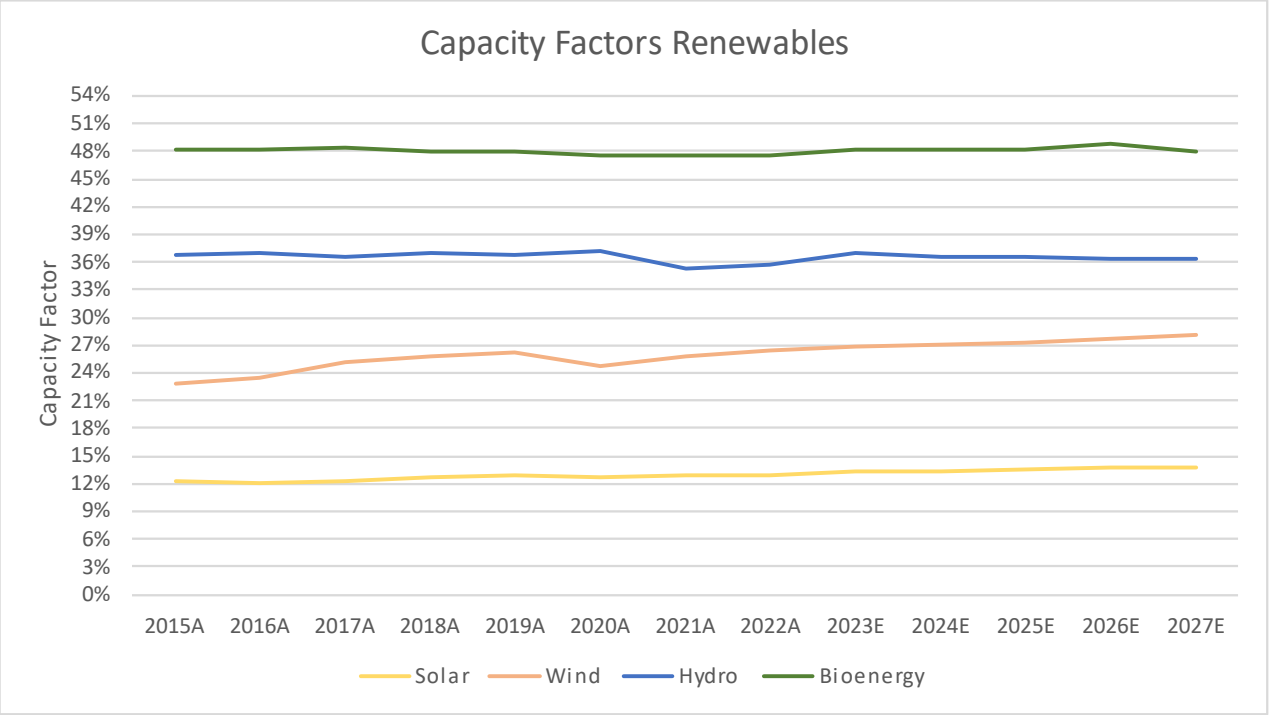

Figure 22: Own Creation. Source: (Ember, 2022)

As the graph above shows, Ember has calculated historical and estimated five-year capacity factors for solar, wind, bioenergy and hydropower (Ember, 2023). As there have been no significant technological breakthroughs, each renewable energy source's capacity factors have remained stable. However, as seen in figure 22, wind and solar have increased their capacity factor by 5% and 2%, respectively. This is due to technology advancements, better knowledge of geographical placement, and improved weather forecasting (Ember, 2023). As the capacity factor is calculated on actual historical production compared with installed maximum capacity, other factors than technology impact the output, such as low wind or low solar in that particular year.

5.8 Electricity split

To assess the impact of an increase in renewable electricity on the demand for Oil & Gas, this study will use Ember's forecasted capacity factors in combination with our estimated total installed capacity for the different renewable sources. This will allow us to determine the distribution of yearly electricity production among different sources, including renewables,

nuclear power, and fossil fuels. To achieve this, the estimated yearly maximum installed capacity will be multiplied by the capacity factor to estimate actual production levels.

To understand the scale and impact of renewable electricity production, the model will utilise data on total yearly electricity consumption from the International Energy Agency (IEA), along with data on small electricity production sources. This data will enable us to estimate the amount of electricity consumed globally over the next one to four years based on the average yearly growth rate in total electricity consumption, which is approximately 3% (IEA, 2023).

Having estimated the total electricity consumption, it is then possible to estimate the portion that will be produced by fossil fuels, by subtracting the estimated production from renewables, nuclear power, and other small energy sources from the total amount of electricity produced.

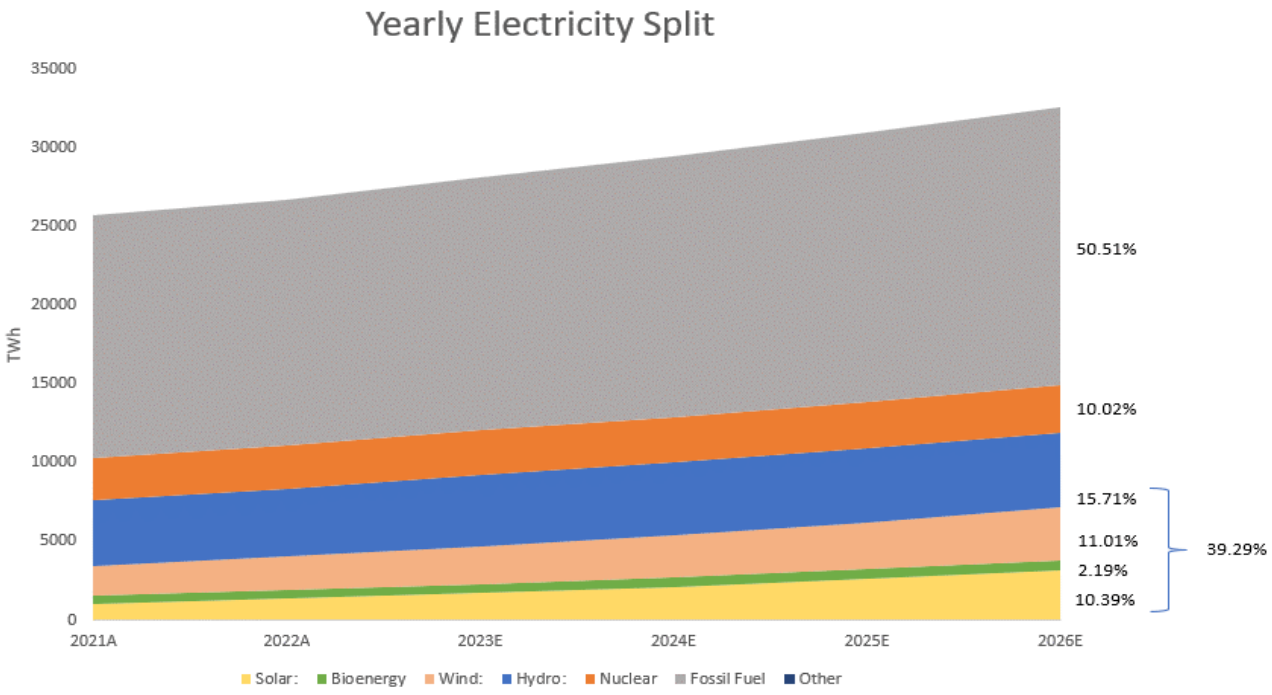

Figure 23: Own Creation.

As the graph above shows, the expected fossil fuel production in 2026 will account for 50.51% of the total electricity produced. Moreover, in 2026 renewable energy production will contribute to 39.29% of all electricity consumed worldwide. This is an increase of over 10% from 2021, where renewables only accounted for 28.68% of the electricity produced, and fossil fuels accounted for over 60% (Ember, 2022).

The data in the graph below from IEA illustrated that when electricity production from fossil fuels decreases, each fossil fuel commodity (oil, gas, coal) decreases approximately the same amount

(IEA, 2023). The model will therefore use this approximation and conclude that if electricity produced by fossil fuels decreases by 1% yearly, Oil & Gas will also decrease with this amount. In 2021, oil only accounted for 2.75% of total electricity produced, whereas natural gas accounted for 22.79% of total electricity produced (Ourworlddata, 2023) (figure 24). By applying this rule, a 1% decrease in fossil fuel electricity would result in a 1% decrease in the Oil & Gas demand.

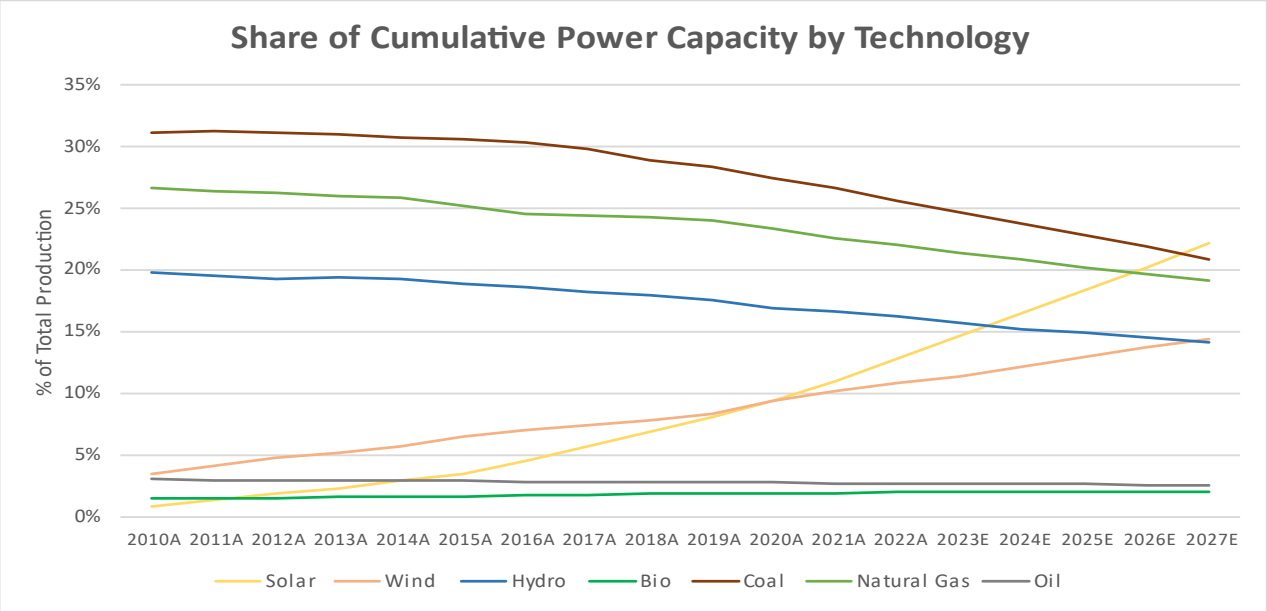

Figure 24: Own Creation. Source: (Ourworlddata, 2023).

An estimated new Oil & Gas demand for electricity production is calculated below:

Year	% Fossil Fuels from Total	% Decrease in Fossil Fuels from Total	Oil Demand	% Decrease in Oil Demand	% Gas Demand	% Decrease in Gas From Total
2021A	61.3027%		**2.7489%**		**22.79%**	
2022A	58.6976%	-2.6050%	2.6773%	-0.0716%	22.1951%	-0.5937%
2023E	56.4599%	-2.2377%	2.6174%	-0.0599%	21.6984%	-0.4967%
2024E	54.9235%	-1.5364%	2.5772%	-0.0402%	21.3650%	-0.3334%
2025E	52.9912%	-1.9323%	2.5274%	-0.0498%	20.9522%	-0.4128%
2026E	50.5100%	-2.4812%	2.4646%	-0.0627%	20.4323%	-0.5199%

Table 3: Own Creation.

With this renewable energy electricity increase in total electricity demanded, fossil fuel will decrease its market share in total electricity production by an average of 2.16% from 2021 - 2026. As presented in table 3 above, the demand for oil in electricity production in 2021 is 2.7489% and will decrease to 2.4646% in 2026. This decrease in demand for oil in electricity production is due to fossil fuel decreasing its production share of total production as renewables replace it. This would result in a yearly average oil demand decrease of 0.0568% from 2021-2026. Applying the same

calculation to gas demand, the demand for this commodity will decrease by 0.4713% yearly from 2021-2026.

5.9 Total Energy Consumption Split

To thoroughly examine the impact of renewable electricity production on the demand for Oil & Gas, it is essential to consider the entire energy split rather than just the electricity split. According to data from the International Energy Agency (IEA) shown in the graph below, electricity has increased its market share of all energy produced worldwide, rising from 18.5% in 2015 to over 23% in 2022 (IEA, 2022). Meanwhile, oil has experienced a decrease in market share, dropping from 40.66% in 2015 to 38.26% in 2022, and natural gas has also decreased from 16.22% to 15.06% (IEA, 2023). This implies that over the past five years, the average decrease in demand for Oil & Gas for total energy production is 1.403% and 0.567%, respectively. In contrast, electricity used for energy has seen an average increase of 4.283% of total energy production over the same period.

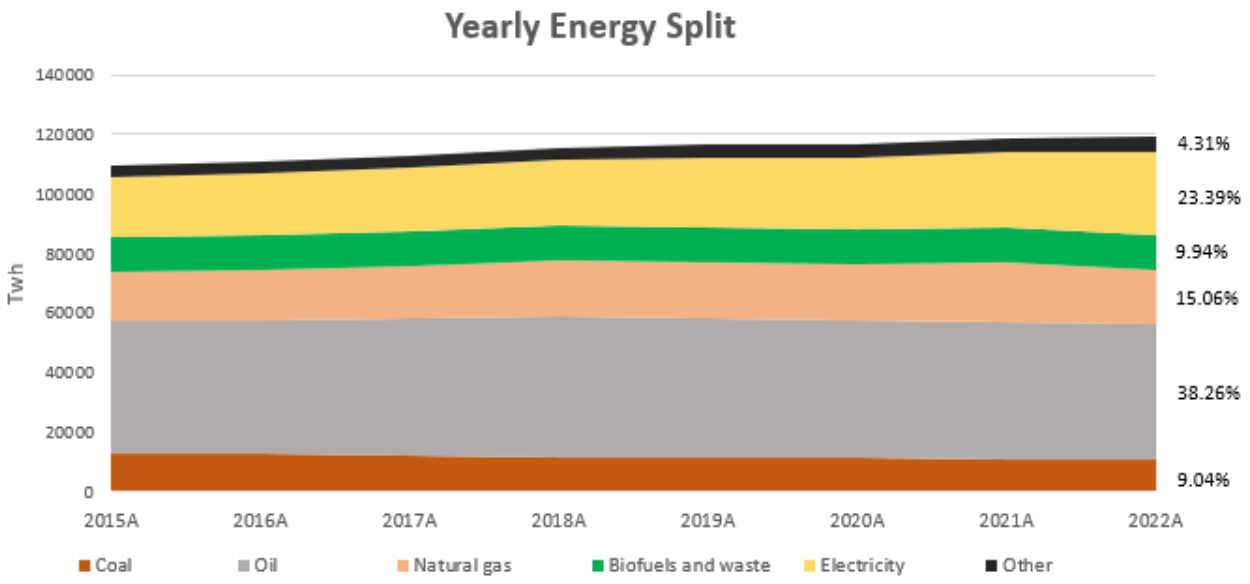

Figure 25: Own Creation.

5.10 Oil & Gas Demand Forecast

Notably, the decline in demand for Oil & Gas is not only limited to electricity production but also to total energy production, as electricity is gradually replacing these fossil fuels. Therefore, the negative impact of renewable electricity production on demand for Oil & Gas is twofold: it leads to less demand for Oil & Gas in the production of fossil fuels and less demand for Oil & Gas in

electricity production. The forecasted decrease in Oil & Gas demand from both electricity and total energy consumption can be found in table 4 below (Appendix 2):

Year	2023E	2024E	2025E	2026E
Oil Decrease in Total Electrisity Consumption	-0.0599%	-0.0402%	-0.0498%	-0.0627%
Average 5-year Growth from Total Energy Consumption	-1.4034%	-1.4034%	-1.4034%	-1.4034%
Total Decrease in Energy Oil Demand	-1.4634%	-1.4437%	-1.4532%	-1.4662%
Gas Decrease in Total Electrisity Consumption	-0.4967%	-0.3334%	-0.4128%	-0.5199%
Average 5-year Growth from Total Energy Consumption	-0.5673%	-0.5673%	-0.5673%	-0.5673%
Total Decrease in Energy Gas Demand	-1.0640%	-0.9007%	-0.9801%	-1.0872%

Table 4: Own Creation.

5.11 Oil & Gas Price Forecast

Using the decreasing percentages in Oil & Gas demand from above, a four-year annual Oil & Gas price will be estimated. As of 31 December 2022, the crude oil price was $78.55, and the EU natural gas price was £45.02 (Trading Economics, 2023). As Vår Energi report earnings in $USD, the 2022 EU natural gas price will be converted to $48.09 as the EUR/USD rate on 1. April 2022 was 1.0687 (Investing, 2023). The estimated Oil & Gas price can be found in table 5 below:

Year	2022A	2023E	2024E	2025E	2026E	2027T
Oil Price in $	78.55	77.40	76.28	75.17	74.07	71.98
Gas Price in $	48.09	47.58	47.15	46.69	46.18	40.13

Table 5: Own Creation.

As table 5 shows, the oil price will decrease from $78.55 in 2022 to $74.07 in 2026. The EU natural gas price will experience a decrease from $48.09 to $46.18. These prices are calculated by reducing the Oil & Gas price by the amount the demand for each commodity decreases due to the renewable energy increase (table 5). As for 2027, the terminal year of the upcoming DCF valuation, the forward price as of 31 December 2027 will be used as there is limited and creditable expected energy consumption data after 2026 (Theice, 2023).

5.12 Renewable Energy Model Conclusion

The model suggests that Oil & Gas demand will weaken as renewable electricity production increases. By 2026, renewable electricity is expected to increase by over 4300 TWh annually, contributing to electricity production that once relied on Oil & Gas. This 2.2% average yearly increase in renewable electricity in total electricity produced will also boost electricity demand in

total energy consumption worldwide. The increase in renewable energy production comes from a five-year average increase in solar energy by 23.16%, wind by 11.71%, hydropower by 2.52%, and bioenergy by 4.77%. Nuclear energy is expected to maintain its electricity market share of approximately 10%.

Over the next four years, renewable capacity factors are expected to experience a slight increase due to technology advancements, better knowledge of geographical placement, and improved weather forecasting. Consequently, the installed renewable energy capacity will result in more electricity production, further reducing the demand for Oil & Gas in electricity production. Fossil fuels accounted for 61.31% of all electricity produced worldwide in 2021, and the study predicts this will decrease to 50.51% by 2026 as renewables replace them. Currently, Oil & Gas accounts for 2.75% and 22.79% of all electricity produced, respectively. The estimates show that this will decrease by an average of 0.06% and 0.47% annually, reducing the demand for Oil & Gas to 2.46% and 20.43% by the end of 2026. Historical data shows that when fossil fuel production decreases, all commodities experience a similar decrease, and oil, gas, and coal follow this trend.

Electricity has increased its market share in total yearly worldwide energy production by an average of 4.283% over the last five years. This increase results in lower demand for Oil & Gas as the increase in electricity production outweighs the annual increase in total energy consumed, resulting in a loss of market share for Oil & Gas. Other smaller technologies, such as hydrogen, bioenergy and waste, are also improving their market share in worldwide yearly energy production. As a result, Oil & Gas are expected to experience a decrease in demand for energy production by 1.403% and 0.567%.

Combining these two reductions in demand factors creates a yearly decrease of approximately 1.463% in oil and 1.01% in natural gas. Applying this demand decrease to today's Oil & Gas prices (1/4/2023) would result in a yearly decrease of approximately $1.12 in the oil price and $0.48 in the gas price. As future production data is limited to four years, the Oil & Gas prices for the terminal year will be estimated based on the forward prices from 31. December 2027, which are $69.2 and $37.5, respectively (Theice, 2023). These prices will be used with Vår Energi's estimated production to determine the revenue for the next four years.

6.0 Financial Analysis

The financial analysis will explore the underlying economic conditions of Vår Energi. Quantitatively analysing the company's financial statements aims to gain insights into its strategic position, performance, and risks. The financial analysis is based on the financial statements of Vår Energi, gathered from the annual reports from 2018 to 2022. Understanding the financial conditions of Vår Energi can contribute to a better understanding of the past and thus provide a good foundation for future forecasts. The financial analysis, in combination with the strategic analysis, will be the basis for budgeting future cash flows.

6.1 Quality of Financial Statements

It is an integral part of the valuation to assess the financial statements' accounting quality to create a reliable forecast of future earnings. Good accounting quality is defined as "financial statements that provide an objective (neutral) picture of a firm's financial position and is free of manipulation" (Petersen & Plenborg, 2012). If the accounting quality is not up to standard, it can lead to an incorrect reflection of the historical and current financial situation. Accounting flaws may further lead to errors in considerations and result. Thus, it is essential that the financial statements correctly reflect Vår Energi's activities to forecast future earnings accurately. On the 16th of February 2021, Vår Energi conducted its IPO, requiring them to follow the International Financial Reporting Standards (IFRS), a demand for all companies noted on Oslo Stock Exchange (Euronext, 2023). For the years 2018-2020, Vår Energi followed the Norwegian General Accepted Accounting Principles (NGAAP) following the Norwegian Accounting Act of 1998 for private companies (Vår Energi, 2021). The change in accounting standards could be a challenge due to potential differences in principles. Still, the differences in accounting are considered low due to the last three years of financial reports previously to the IPO, 2018-2020, being approved by the Oslo Stock Exchange (Oslo Stock Exchange, 2021). In other words, the financial statements from the historical period from 2018 to 2022, which are utilised in the thesis, are approved by the Oslo Stock Exchange as sufficient (Vår Energi, 2019). The corporation underwent audits by EY in 2018 and by PwC subsequently. Throughout the entire analysis period, the auditors confirm that the financial statements were formulated in accordance with pertinent regulations and statutes, implying that the statements accurately portray the company's financial position. To sum up, the

financial statements are considered to give an accurate and fair depiction of the firm's financial situation, despite the change in accounting standards.

6.2 Exchange USD/NOK

The financial statements of Vår Energi are given as 1,000 USD for 2020-2022 and 1,000 NOK previously in 2018 and 2019. The stock of Vår Energi is traded in NOK. Due to it being industry standard, numbers will be delivered in USD unless anything else is mentioned. To exchange the currency, the yearly exchange rates provided by Norges Bank are utilised. For 2018 the USD/NOK rate is 8.1338, and for 2019 the rate is 8.8037 (Norges Bank, 2023).

6.3 Income Statement

The income statement aims to provide an overview of a company's revenues and expenses in an accounting year and is included as part of the company's annual financial statements. It indicates whether the company has generated a profit or a loss during the period. In table 6 below, the income statement according to Vår Energi's own annual reports is displayed.

Income Statement Vår Energi					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
Total Revenue	**9,827,630**	**6,072,732**	**2,893,840**	**2,864,250**	**2,718,662**
Cost of Goods and Services	-1,143,139	-1,141,021	-1,028,506	-1,024,534	-643,104
Gross profit	**8,684,491**	**4,931,711**	**1,865,334**	**1,839,716**	**2,075,557**
Exploration costs	-72,063	-57,138	-57,183	-105,879	-27,791
Other Operating Expenses	-137,721	-110,483	-176,204	-46,018	-11,606
Impairment Loss and Reversal	-657,922	-982	-2,178,108	65,096	0
Depreciation and Amortization	-1,447,966	-1,704,561	-1,706,740	-980,828	-986,116
Operating Profit	**6,368,820**	**3,058,546**	**-2,252,901**	**772,088**	**1,050,044**
Net Financial Income (Expenses)	-115,889	-269,489	-238,058	-125,034	-59,348
Net Foreign Exchange Gains (Losses)	-397,039	-142,371	286,955	137,663	6,246
Profit Before Tax	**5,855,891**	**2,646,687**	**-2,204,004**	**784,717**	**996,942**
Income Tax Expense	-4,919,489	-1,992,331	577,380	-487,159	-704,520
Net Profit After Tax	**936,402**	**654,356**	**-1,626,624**	**297,558**	**292,422**
Net gain (loss) on Put Options used for Hedging	5,173	6,919	-11,617	3,204	2,406
Currency Translation Differences	-203,234	-63,113	-114,548	-42,515	-39,784
Total Comprehensive Income	738,342	598,162	-1,752,789	258,247	255,044

Table 6: Income Statement. Source: Annual Reports Vår Energi 2018-2022

Vår Energi have been profitable in all five last years except 2020, where it suffered a significant loss heavily dependent on an impairment loss of almost $2.2bill. In 2021 and 2022, there has been a significant increase in revenue driven by a large increase in Oil & Gas prices and an increase in production. The costs have not increased at the same rate due to the majority of costs being fixed

for the company. In table 7 below, the revenue streams are sorted for the source to showcase the origin of the revenue.

Revenue by End Product Market					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
Revenue from Crude Oil Sale	4,669,095	3,448,158	1,945,462	2,215,794	1,873,296
Revenue from Gas Sales	4,732,282	2,227,332	540,995	445,472	642,813
Revenue from NGL	379,166	367,885	213,561	163,336	202,552
Gains on Cash Flow Hedge - Crude Put Option			168,617	3,433	
Total Petroleum Revenues	**9,780,543**	**6,043,375**	**2,868,635**	**2,828,035**	**2,718,662**
Gain (loss) from Sale of Assets	300	2,232	1,044	18,266	
Other Operating Income	46,788	27,125	24,161	17,948	
Total Other Operating Income	**47,088**	**29,357**	**25,205**	**36,214**	
Total Revenue	9,827,630	6,072,732	2,893,840	2,864,250	2,718,662

Table 7: Revenue Split. Source: Annual Reports Vår Energi 2018-2022

An absolute majority of Vår Energi's revenue stream comes from the sale of crude oil and natural gas. Crude oil sales have largely increased in 2021 and 2022, while natural gas sales have increased even more. Uncertainty and supply decrease from the Russian invasion of Ukraine have played a large part in the increase in Oil & Gas prices, providing significant income for Vår Energi. The decrease in oil revenue in 2020 is the result of a slight decrease in production from 295 kboepd to 265 kboepd, combined with a low oil price during 2020 due to a decrease in demand for oil after the Covid-19 pandemic shut down travelling and closed down businesses (Vår Energi, 2021). There has also been a significant increase in the sale of Natural Gas Liquids (NGL), but the share of NGL is considerably lower than crude oil and natural gas.

6.3.1 Tax Rate Calculations

Existing accounting practice does not distinguish between tax implications on operations and financing, necessitating the need to segregate income tax expenses based on these categories. This differentiation can be achieved by computing the tax shield generated by net financial expenses. The tax benefits originating from net financial expenses can be determined as follows (Petersen & Plenborg, 2012):

$$Tax\ Shield = Net\ Financial\ Income * Corporate\ Tax\ Rate$$

The corporate tax rate in Norway was 23% in 2018 and 22% in the remaining years 2019-2022 (Regjeringen, 2022). In table 8, the tax rate on ordinary activities is calculated to adjust the tax on

special items that are not deemed part of the company's core activity. Due to Vår Energi operating as an Oil & Gas company in Norway, it is subjected to special taxes related to petroleum activities.

Tax Calculations					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
Income Tax Rate	22.00%	22.00%	22.00%	22.00%	23.00%
Net Financial Income (expenses)	-115,889	-269,489	-238,058	-125,034	-59,348
Net Foreign Exchange Gains (losses)	-397,039	-142,371	286,955	137,663	6,246
Total Net Financial Income	**-512,928**	**-411,860**	**48,897**	**12,629**	**-53,102**
Tax Shield (cost)	112,844	90,609	-10,757	-2,778	12,214
Income Tax Expense from IS	-4,919,489	-1,992,331	577,380	-487,159	-704,520
Tax expenses Related to Operations	-5,032,333	-2,082,940	588,137	-484,381	-716,734
Operating Profit	6,368,820	3,058,546	-2,252,901	772,088	1,050,044
Effective Core Activity Tax Rate	79.02%	68.10%	26.11%	62.74%	68.26%

Table 8: Tax Calculations. Source: Annual Reports Vår Energi 2018-2022

The tax rate on core activities varies through the period, where the 2020 rate of 26.11% stands as an outlier. The low rate is due to the company not making a profit in the year, thus, not being affected by the petroleum tax rate to a substantial degree. The median tax rate is 68.10%, while the mean is 60.84%. Due to 2020 serving as a clear outlier, the median tax rate of 68.10% will be used as the best estimate in further calculations. The tax rate of 68.10% is high, but considering the petroleum tax rate of 56% in addition to the 22% regular corporate tax rate, the estimate seems reasonable (Norsk Petroleum, 2023).

6.3.2 Special Items

The next step is to identify special items in the income statements for 2018-2022. In order to provide a more accurate representation of a company's historical and future profitability, financial statements are typically modified to exclude unique items and those that are not part of its ongoing operations. Following these adjustments, the income statements are reorganised to accurately depict the company's operations (Petersen & Plenborg, 2012).

Special Items					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
Other Income	-10,882				
Production Cost			-22,782		
Impairment Loss and Reversal	657,922	982	2,178,108	-65,096	0
Total Special Items	647,040	982	2,155,326	-65,096	0

Table 9: Special Items. Source: Annual Reports Vår Energi 2018-2022

Other Income

The first item chosen to be defined as not related to core business is under other income in 2022. The income stems from a settlement payment from ExxonMobil in 2019 (Vår Energi, 2023). The settlement stems from Vår Energi acquiring ExxonMobil's upstream activities on the Norwegian continental shelf. Due to the non-recurring nature of the item, the item is considered not part of the company's core business and, thus, is removed when reformulating the income statement.

Cost of Goods and Services

The cost of goods and services contains an item considered to be unrelated to core business for Vår Energi. The item in question is pension costs, where the company included a reversal of pension liability recognised going into 2020. The reversal is a result of going from a defined benefit pension scheme in 2019 to a defined contribution pension plan in 2020. The item is non-recurring and not deemed part of the operations of Vår Energi. Therefore, the cost of goods and services will be increased in 2022 to represent the company's core business.

Impairment Loss and Reversal

Impairment loss and reversal will also be removed from the analytical income statement of Vår Energi. The reason behind the removal is that impairments vary significantly from year to year. In 2019, the impairments are a net reversal, while the following year, Vår Energi had an impairment loss of more than $2bill. The significant variation in the item can deflect the attention from the core business related to production, and the item is, thus, removed to depict a result more related to operations.

6.3.3 Tax Adjustments

Table 10 below depicts the adjustments made for the taxes due to the removal of special items. The reported tax expense is adjusted for the tax shield, tax on special items and core activities. The tax on special items is calculated using the median tax rate on core activity. The tax adjustment on core activity is given to adjust for the unique taxation on core activities from the difference between the yearly and median tax rates. This way, it is possible to adjust for the tax on special items and core activity to find an adjusted tax expense to use in the analytical balance sheet.

Tax Adjustments for Special Items					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
Reported Tax Expense	-4,919,489	-1,992,331	577,380	-487,159	-704,520
Tax Shield	112,844	90,609	-10,757	-2,778	12,214
Tax on Special Items	-448,060	-669	-1,483,342	44,332	0
Tax Adjustment on Core Activity	695,020	0	946,140	-41,429	1,629
Adjusted Tax Expense	-4,559,685	-1,902,391	29,421	-487,034	-690,677

Table 10: Tax Adjustments. Source: Annual Reports Vår Energi 2018-2022

The adjusted tax expense is fairly similar to the reported tax expense from the income statements. The significant differences are found in 2020 and 2022. This is due to the size of the impairment losses in the respective years being significantly higher than the remaining year, especially in 2022. Removing the impairment losses of the years will then naturally have a larger effect on the tax adjustments.

6.3.4 Reformulating Income Statement

The purpose of restructuring the company's income statement is to separate the operating and financing activities, enabling a more effective evaluation of the company's profitability and predicting its forthcoming free cash flows with greater accuracy (Petersen & Plenborg, 2012). Building on the calculations and assessments above, the following analytical income statement for Vår Energi is presented:

Analytical Income Statement					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
Revenue	9,816,749	6,072,732	2,893,840	2,864,250	2,718,662
Cost of Goods and Services	-1,143,139	-1,141,021	-1,051,288	-1,024,534	-643,104
Gross Profit	**8,673,610**	**4,931,711**	**1,842,552**	**1,839,716**	**2,075,557**
Exploration Costs	-72,063	-57,138	-57,183	-105,879	-27,791
Other Operating Expenses	-137,721	-110,483	-176,204	-46,018	-11,606
EBITDA	**8,463,826**	**4,764,090**	**1,609,165**	**1,687,819**	**2,036,160**
Depreciation and Amortization	-1,447,966	-1,704,561	-1,706,740	-980,828	-986,116
Operating Profit (EBIT)	**7,015,860**	**3,059,529**	**-97,575**	**706,991**	**1,050,044**
Income Tax Expense	-4,559,685	-1,902,391	29,421	-487,034	-690,677
NOPAT	**2,456,175**	**1,157,138**	**-68,154**	**219,957**	**359,367**
Net Financial Income	**-512,928**	**-411,860**	**48,897**	**12,629**	**-53,102**
Net Financial Income (expenses)	-115,889	-269,489	-238,058	-125,034	-59,348
Net Foreign Exchange Gains (losses)	-397,039	-142,371	286,955	137,663	6,246
Tax on Financial Income	112,844	90,609	-10,757	-2,778	12,214
Net Income	**2,056,091**	**835,888**	**-30,014**	**229,807**	**318,478**
Net Gain (loss) on Put Options used for Hedging	5,173	6,919	-11,617	3,204	2,406
Currency Translation Differences	-203,234	-63,113	-114,548	-42,515	-39,784
Total Comprehensive Income	1,858,030	779,694	-156,179	190,496	281,100

Table 11: Own Creation. Source: Annual Reports Vår Energi 2018-2022

The analytical income statement results have certain differences from the reported income statement. The largest difference stems from the removal of impairment losses and reversal when

assessing what is core to the operations. The removal of impairments has created the largest difference in 2020 and 2022, significantly improving the results in the respective years. In 2022 the total comprehensive results increased by more than $1 bill, while in 2020, the loss is reduced by more than $1.5 bill, compared to Vår Energi's income statement (table 6). In the remaining years, the total comprehensive income is relatively similar to the income observed in the reported income statement of Vår Energi. It is clear from the analytical income statement that Vår Energi have been very profitable over the last two years. The revenue has increased significantly in the period while the costs have remained relatively flat. The increase in profit has been possible due to high petroleum prices and a large number of fixed costs related to the exploration and production of petroleum.

6.4 Balance Sheet

In table 12 below, you can find the balance sheet of Vår Energi as presented in the annual statements for 2018-2022.

Balance Sheet Vår Energi					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
ASSETS					
Non-Current Assets					
Intangible Assets					
Goodwill	2,019,512	2,531,897	2,820,840	644,400	29,058
Capitalized Exploration Wells	225,287	199,981	113,327	87,303	70,721
Other Intangible Assets	93,515	104,520	107,732	104,714	
Tangible Fixed Assets					
Property, Plant and Equipments	14,562,237	15,188,917	15,593,975	12,729,266	8,301,825
Rights of use Assets	175,423	298,432	133,846	0	0
Financial Assets					
Investments in Shares	763	853	881	854	261
Other non-Current Assets	532	1,809	2,694	7,974	137,302
Total non-Current Assets	**17,077,268**	**18,326,409**	**18,773,295**	**13,574,512**	**8,539,167**
Current Assets					
Inventories	265,811	301,329	283,199	196,546	94,192
Tax Receivables	0	0	522,854	0	0
Other Receivables and Financial Instruments	213,286	201,809	241,938	676,578	133,876
Trade Receivables	796,317	745,921	165,984	513,337	257,135
Cash and Cash Equivalents	444,607	223,588	272,411	203,427	1,079,041
Total Current Assets	**1,720,020**	**1,472,647**	**1,486,385**	**1,589,888**	**1,564,244**
Total Assets	18,797,288	19,799,056	20,259,680	15,164,400	10,103,411

Balance Sheet Vår Energi					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
EQUITY					
Share Capital	45,972	45,972	45,972	45,370	49,107
Share Premium	1,868,181	2,643,181	3,593,181	2,402,540	2,600,413
Other Equity	-432,582	-1,173,324	-1,784,276	63,649	0
Total Equity	**1,481,571**	**1,515,828**	**1,854,877**	**2,511,559**	**2,649,520**
LIABILITIES					
Non-Current Liabilities					
Interest Bearing Loans and Borrowings	2,452,589	4,493,426	5,583,552	4,596,071	656,256
Deferred Tax Liabilities	8,127,971	7,953,676	7,342,952	1,899,431	1,911,353
Non-Current Abandonment Obligation	3,156,126	3,235,640	4,260,181	3,364,839	2,307,413
Other non-Current Liabilities	269,878	379,078	280,269	126,433	122,231
Total non-Current Liabilities	***14,006,564***	***16,061,820***	***17,466,952***	***9,986,775***	***4,997,253***
Current Liabilities					
Accounts Payable	368,589	422,155	252,801	252,816	222,464
Taxes Payable	1,778,222	801,432	16,505	1,148,485	109,392
Current Abandonment Obligation	60,012	61,536	26,270	100,207	53,603
Interest Bearing Loans, Current	500,000	333,149	0	204,020	36,755
Other Current Liabilities	602,331	603,136	642,275	960,538	2,034,423
Total Current Liabilities	***3,309,154***	***2,221,408***	***937,851***	***2,666,065***	***2,456,638***
Total Liabilities	**17,315,718**	**18,283,228**	**18,404,803**	**12,652,841**	**7,453,891**
Total Equity and Liabilities	18,797,288	19,799,056	20,259,680	15,164,400	10,103,411

Table 12: Balance Sheet Vår Energi. Source: Annual Reports Vår Energi 2018-2022

The main point to draw from the balance sheet of Vår Energi is the large degree of current to non-current assets and liabilities. The share of current assets has averaged at about 10% of total assets in the period. This is to be expected since the majority of assets of Oil & Gas companies are long-term. The current liabilities comprise almost 20% of the total liabilities on average in the period, indicating a majority of long-term liabilities, where taxes payable are a large share of the short-term liabilities. It is also worth noting that the equity is decreasing throughout the period. The total assets increased significantly from 2018 to 2020 and have since decreased slightly. A large part of the increase in total assets stems from the acquisition of the partner-operated ownership assets of ExxonMobil (Vår Energi, 2021).

6.4.1 Reformulating the Balance Sheet

When reformulating the balance sheet, the items are separated into financial and operational items. The rationale for segregating operating items from financing items is rooted in the fact that a company's operations are the principal driver of value creation and, therefore, essential to isolate (Petersen & Plenborg, 2012). The definition of operational items is not clear-cut, and thus,

the classification of items must be determined based on firm-specific characteristics. As a rule of thumb, financial items are interest-bearing or require a return, but there are situations where you can argue for classifications contradicting this "rule" (Petersen & Plenborg, 2012). Further, notable posts will be discussed and explain the rationale of the classification. The reformulated balance sheet shows how the invested capital is calculated by the operational assets minus operational liabilities, and by total equity and net financial liabilities. The comprehensive analytical balance sheet is shown in table 13 below.

Analytical Balance Sheet					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
Non-Current Operational Assets	17,075,974	18,323,747	18,769,720	13,565,683	8,401,604
Goodwill	2,019,512	2,531,897	2,820,840	644,400	29,058
Capitalized Exploration Wells	225,287	199,981	113,327	87,303	70,721
Other Intangible Assets	93,515	104,520	107,732	104,714	-
Property, Plant and Equipments	14,562,237	15,188,917	15,593,975	12,729,266	8,301,825
Rights of Use Assets	175,423	298,432	133,846	-	-
Non-Current Operational Liabilities	3,426,004	3,614,718	4,540,450	3,491,273	2,429,644
Non-Current Abandonment Obligation	3,156,126	3,235,640	4,260,181	3,364,839	2,307,413
Other non-Current Liabilities	269,878	379,078	280,269	126,433	122,231
Net non-Current Operational Assets	**13,649,970**	**14,709,029**	**14,229,270**	**10,074,410**	**5,971,960**
Current Operational Assets	1,062,128	1,047,250	972,037	709,883	351,327
Inventories	265,811	301,329	283,199	196,546	94,192
Tax Receivables	-	-	522,854	-	-
Trade Receivables	796,317	745,921	165,984	513,337	257,135
Current Operational Liabilities	2,809,154	1,888,259	937,851	2,462,045	2,419,883
Accounts Payable	368,589	422,155	252,801	252,816	222,464
Taxes Payable	1,778,222	801,432	16,505	1,148,485	109,392
Current Abandonment Obligation	60,012	61,536	26,270	100,207	53,603
Other Current Liabilities	602,331	603,136	642,275	960,538	2,034,423
Net Current Operational Assets	**- 1,747,026**	**- 841,009**	**34,186**	**- 1,752,162**	**- 2,068,556**
Invested Capital	11,902,944	13,868,020	14,263,456	8,322,248	3,903,404

Analytical Balance Sheet					
Amount in USD 1000	**2022**	**2021**	**2020**	**2019**	**2018**
Financial Liabilities	11,080,560	12,780,251	12,926,504	6,699,523	2,604,364
Interest Bearing Loans, Current	500,000	333,149	-	204,020	36,755
Interest Bearing Loans and Borrowings	2,452,589	4,493,426	5,583,552	4,596,071	656,256
Deferred Tax Liabilities	8,127,971	7,953,676	7,342,952	1,899,431	1,911,353
Financial Assets	659,188	428,059	517,924	888,834	1,350,480
Investments in Shares	763	853	881	854	261
Other non-Current Assets	532	1,809	2,694	7,974	137,302
Other Receivables and Financial Instruments	213,286	201,809	241,938	676,578	133,876
Cash and Cash Equivalents	444,607	223,588	272,411	203,427	1,079,041
Net Financial Liabilities (NFL)	**10,421,373**	**12,352,192**	**12,408,579**	**5,810,689**	**1,253,884**
Share Capital	45,972	45,972	45,972	45,370	49,107
Share Premium	1,868,181	2,643,181	3,593,181	2,402,540	2,600,413
Other Equity	- 432,582	- 1,173,324	- 1,784,276	63,649	-
Total Equity	**1,481,571**	**1,515,829**	**1,854,877**	**2,511,559**	**2,649,520**
Invested Capital (EQ+NFL)	11,902,944	13,868,021	14,263,456	8,322,248	3,903,404

Table 13: Own Creation. Source: Annual Reports Vår Energi 2018-2022

Deferred Tax Liabilities

Deferred tax liabilities are a large item in the balance sheet of Vår Energi. Deferred tax liabilities or assets emerge when there is a discrepancy between the recognition of taxable income and the recognition of income in the financial statement. This disparity in the timing of recognition leads to temporary differences between the book values in the financial statements and those reported in the tax returns (AKER BP, 2023). The deferred tax liabilities of Vår Energi mainly stem from PPE, capitalised exploration cost, other intangible assets and abandonment obligation (Vår Energi, 2023). The depreciation of long-term assets generates a tax deduction that diminishes the company's taxable income. Nevertheless, due to the tax deduction being greater than the actual reduction in the asset's value, the company ends up deferring taxes on the difference.

Usually, deferred taxes would be categorised as an operational item according to the rule of thumb, due to not being interest-bearing. However, due to certain factors, deferred tax liabilities will be classified as a financial position. Deferred tax liabilities can be recognised as a financial item in the balance sheet as they signify a forthcoming financial obligation that the company is required to pay (IFRS, 2023). This classification is justified as the balance sheet depicts a company's financial standing at a specific time, and deferred tax liabilities indicate a future liability the company will have to settle.

Other Non-Current Assets

Other non-current assets are not explained in depth in the financial statements of Vår Energi. It is, therefore, hard to elaborate on the content of the item. On the other hand, the financial statements categorise other non-current assets as financial assets. Thus, the item is considered a financing item in the analytical balance sheet.

Investment in Shares

Investment in shares entails Vår Energi's holding in the three companies Norpipe Oil AS, Tjeldebergodden Utvikling AS and Ormen Lange Eiendom DA (Vår Energi, 2023). The post will be categorised as a financial asset due to the rule of thumb previously mentioned. Since Vår Energi is buying equity to require a return from the companies, the item is classified as financial. Additionally, Vår Energi regards the item as a financial asset in its balance sheet, confirming the classification of the asset (Vår Energi, 2023).

Cash and Cash Equivalents

Cash and cash equivalents are often difficult to classify. In practice, the item can often be divided into operating cash and excess cash. The balance sheet does not distinguish between the two categories, and Vår Energi does not specify through the notes the purpose of the cash and cash equivalents. When deciding the treatment of cash and cash equivalents, it demands knowledge and insights in the company that are not publicly available. Thus, the cash position will be treated as excess cash in accordance with Petersen and Plenborg (2012). The cash and cash equivalents are thus categorised as a financial item.

6.5 Liquidity Analysis

An important aspect of financial analysis is assessing liquidity risk, both in the short and long term. The analysis of short-term liquidity risk reveals a company's capacity to meet its immediate financial obligations. Conversely, long-term liquidity risk, also known as solvency risk, pertains to a company's financial health and ability to fulfil its future financial obligations. These two liquidity risks are crucial in evaluating a company's credit risk. A firm's liquidity risk depends on its ability to generate positive net cash flows in both the short and long term. For a company to operate freely and capitalise on profitable business opportunities, it must be able to fulfil all of its short- and long-term commitments. Therefore, it is essential for a company to maintain adequate liquidity in both the short and long term (Petersen & Plenborg, 2012).

It is also worth mentioning that there are weaknesses in the liquidity ratios, mainly that they are based on historical numbers. Thus, the ratios are backwards-looking and cannot predict the future. In the following, three short-term and three long-term ratios relevant to the liquidity of Oil & Gas companies will be deployed. The ratios of Vår Energi will be compared to its competitors Equinor and AkerBP to gain insight into the state relative to peers. Equinor and AkerBP are chosen due to them being part of the same industry and operating in the same country.

6.5.1 Short-Term Liquidity

Liquidity ratios are important financial metrics that measure a company's ability to meet its short-term financial obligations. Short-term liquidity ratios provide insight into the company's ability to meet its immediate financial obligation (Petersen & Plenborg, 2012). Further, the analysis aims to provide an overview of some of the most commonly used short-term liquidity ratios in the Oil &

Gas industry and their significance in assessing a company's financial strength and potential for future growth.

Current Ratio

The current ratio is a financial ratio that measures a company's ability to pay its short-term liabilities using its short-term assets. It is calculated by dividing a company's current assets by current liabilities. A high current ratio indicates that the company is in a better position to pay their short-term liabilities.

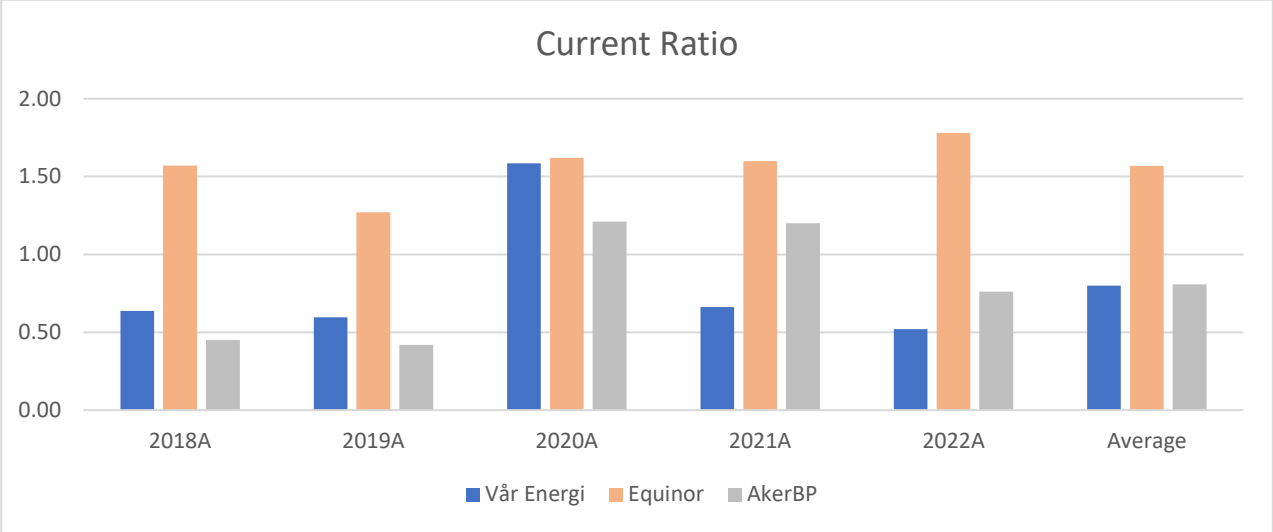

Figure 26: Current Ratio. Source: Source: Annual Reports Vår Energi 2018-2022 & (Bloomberg , 2023)

Figure 26 indicates that the current ratio, on average, is considerably higher for Equinor than for Vår Energi, which is more similar to AkerBP. Additionally, the ratio of Vår Energi have been lower in the 2021 and 2022 than for AkerBP. This indicates that the short-term debt of Vår Energi is considerably higher than the current assets, causing a possible concern for the company's short-term liquidity.

Quick Ratio

The quick ratio is often used in addition to the current ratio to get a more accurate description of the company's financial situation. The quick ratio is similar to the current ratio but only contains the most liquid current assets. The ratio excludes the impact of inventory, and is a more conservative indicator of liquidity since it only considers the most liquid assets (Petersen & Plenborg, 2012). The ratio is calculated by:

$$Quick\ Ratio = \frac{Cash + securities + receivables}{Current\ liabilities}$$

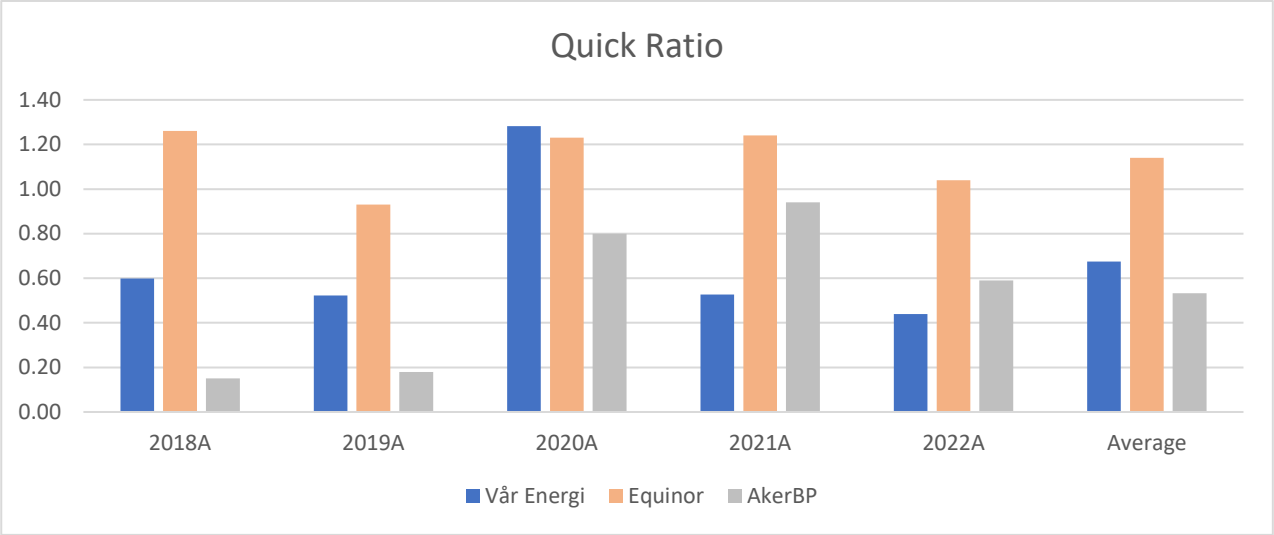

Figure 27: Quick Ratio. Source: Source: Annual Reports Vår Energi 2018-2022 & (Bloomberg , 2023)

As for the current ratio, Equinor have a considerably higher ratio than Vår Energi and AkerBP. When comparing Vår Energi and AkerBP, Vår has a higher ratio, indicating that it holds more liquid current assets than AkerBP on average. Both for the current and quick ratio, Vår Energi have very high ratios in 2020, which stems from lower current liabilities due to the company holding no current interest-bearing loans in 2020.

Cash Flow from Operations to Short-Term Debt Ratio

The cash flow from operations (CFO) to short-term debt ratio distinguishes from the current ratio by using the actual generated cash flow from operations, thus, avoiding the issue of conversion of assets to cash (Petersen & Plenborg, 2012). CFO can be a better indicator of available cash to cover the current liabilities considering that the CFO is available on an ongoing basis. The ratio is calculated by:

$$CFO\ to\ Short - Term\ Debt\ Ratio = \frac{Cash\ Flow\ from\ Operations}{Current\ Liabilities}$$

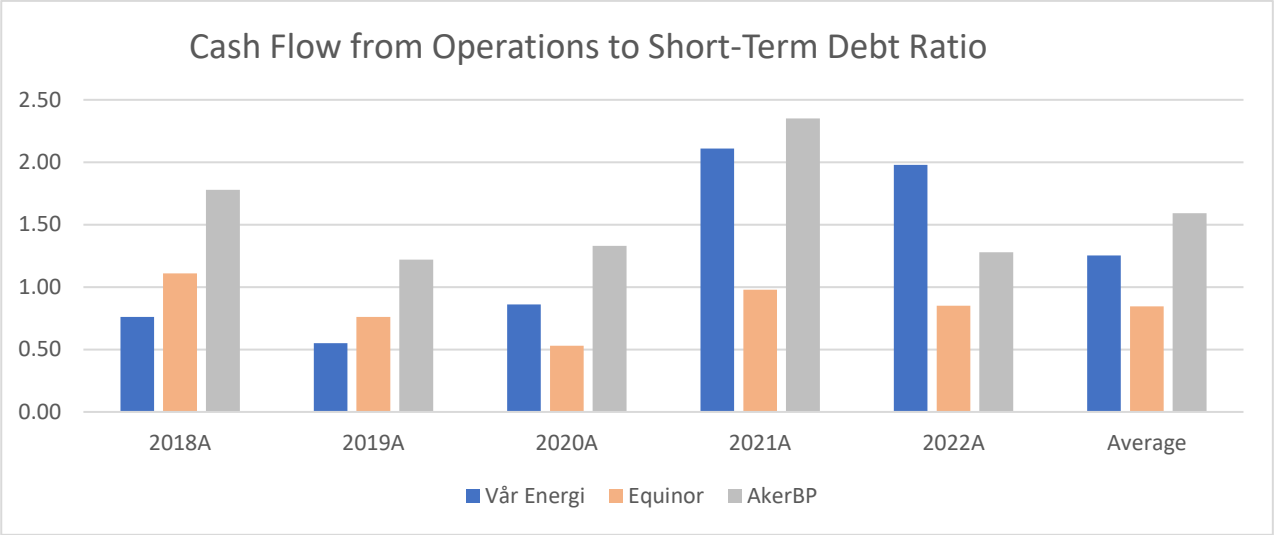

Figure 28: CFO to Short-Term Debt. Source: Annual Reports Vår Energi 2018-2022 & (Bloomberg , 2023)

In contrast to the other short-term liquidity ratios, Equinor, on average, have a lower score than Vår Energi and AkerBP. This indicates that the Vår Energi can take better take care of the current liabilities by using the cash flow from operations. Vår Energi scores well above 1.00 on average in the ratio suggesting that the current liabilities can be more than covered by the CFO. 2021 and 2022 have been especially good for Vår Energi, with about 2.00 ratios driven by high revenues caused by increased Oil & Gas prices. It is difficult to know whether the increase in the last two years goes the average too high, or if the previous years were too low, the conclusion will likely be drawn by the energy prices in the coming years.

6.5.2 Long-Term Liquidity

The liquidity analysis will now focus on the long-term liquidity of Vår Energi. The analysis will be looking at the two most commonly used long-term liquidity ratios in interest coverage and capital expenditure ratios. Lastly, the debt-to-EBITDA ratio will be calculated as a useful ratio for an Oil & Gas company, measuring the ability of a company to pay off incurred debt.

Interest Coverage Ratio

The interest coverage ratio is a measure of the ability of a company to meet its interest expenses. The ratio shows how often the EBIT can cover the interest expenses, and the higher the ratio, the lower the long-term liquidity risk. The following formula calculates the ratio:

$$Interest\ Coverage\ Ratio = \frac{EBIT}{Interest\ Expenses}$$

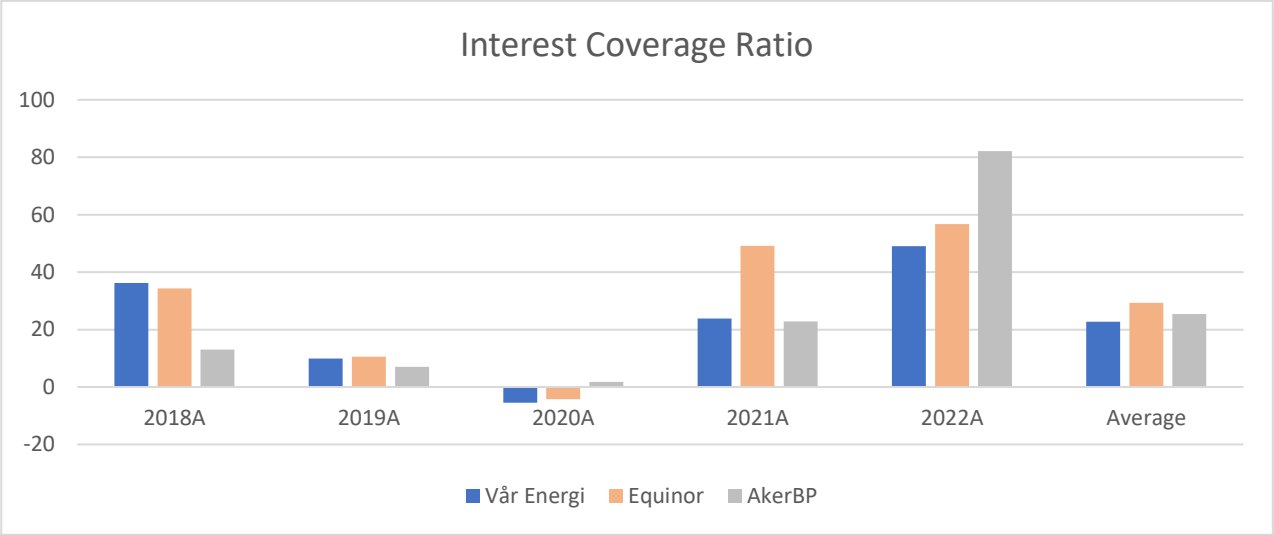

Figure 29: Interest Coverage Ratio. Source: Annual Reports Vår Energi 2018-2022 & (Bloomberg , 2023)

The interest coverage ratio, on average, is very solid for Vår Energi, with an average of 22.7 over the last five years. In other words, the EBIT of Vår Energi covers the interest expenses 22.7 times. This indicates that Vår Energi has a low risk of defaulting on its interest-bearing loans. It holds a reasonably similar average compared to its peers, with all three companies scoring between 20-30. The interest coverage ratio varies considerably in the period, with the ratio being negative in 2020, aligning with the EBIT being negative. This suggests that the ratio is sensitive to year-to-year variations and that the historical data does not necessarily represent the future. Nevertheless, Vår Energi delivers a high ratio when the revenue is high.

Capital Expenditure Ratio

The capital expenditure ratio demonstrates the company's ability to finance its capital expenditure from its operations. If the ratio is more significant than 1.0, it suggests that the company's operating cash flows are adequate to fund its capital expenditures (Petersen & Plenborg, 2012). As capital expenditures differ throughout the various stages of a company's lifecycle, the ratio will naturally fluctuate accordingly. The formula calculates the ratio:

$$Capital\ Expenditure\ Ratio = \frac{Cash\ Flow\ from\ Operations}{Capital\ Expenditure}$$

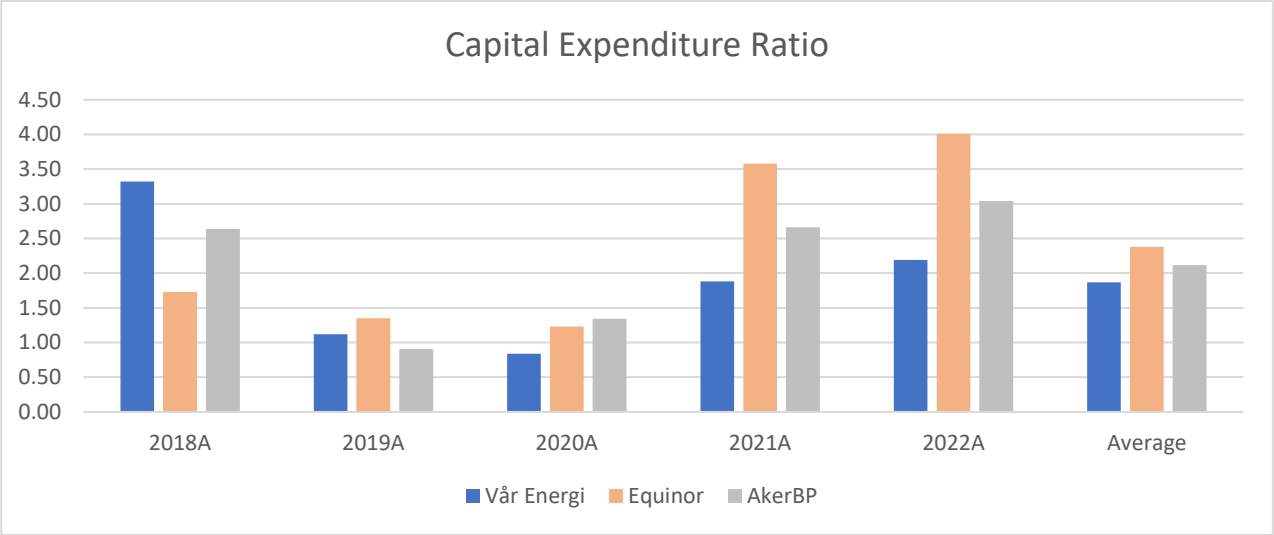

Figure 30: Capital Expenditure Ratio. Source: Annual Reports Vår Energi 2018-2022 & (Bloomberg , 2023)

As shown in figure 30, the ratio is higher than 1.0 in all years except 2020, averaging at 1.78. This suggests that Vår Energi are able to fund its capital expenditures with its operating cash flow, indicating a positive sign for the long-term liquidity of the company. When comparing AkerBP and Equinor, the average ratio has been slightly lower, but the three companies all have a solid score.

Debt-to-EBITDA

The Debt-to-EBITDA ratio is a financial metric that evaluates a company's capacity to repay its outstanding debt obligations. This ratio is frequently employed to assess the likelihood of default on issued debt. The ratio is commonly used for evaluating the long-term liquidity of energy companies. Since energy companies often carry significant debt on their balance sheets, this ratio is particularly relevant in determining the number of years of earnings before interest, taxes, depreciation, and amortisation (EBITDA) are required to pay off all outstanding debt. The ratio is calculated by dividing total debt by EBITDA.

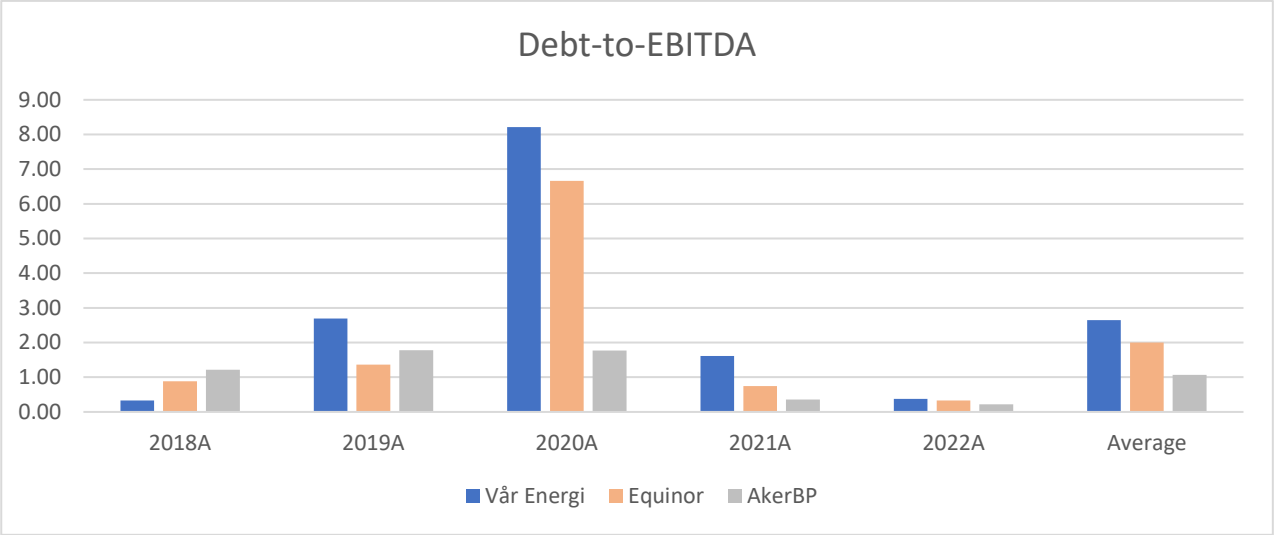

Figure 31: Debt-to-EBITDA. Source: Annual Reports Vår Energi 2018-2022 & (Bloomberg , 2023)

Vår Energi has an average ratio of 2.65 compared to 2.00 and 1.07 from Equinor and AkerBP, respectively. A ratio of more than 3.0 is a weak ratio, and as seen Vår Energi scores below this (Dumont, 2022). Despite this, it can be considered worrying that Vår Energi has a noticeably higher ratio than Equinor and AkerBP. Especially compared to AkerBP, which has a similar size as Vår Energi and less than half the ratio. This might suggest some level of liquidity risk, but it is still below the rule-of-thumb threshold of 3.0. Vår Energi's ratio is coloured by the high ratio of 2020 on 8.21. This outlier significantly impacts the five-year average, caused by low EBITDA in 2020, mainly driven by the low energy prices and low demand for Oil & Gas.

6.5.3 Partial Conclusion Liquidity

The short-term liquidity risk indicated by the current and quick ratios suggests that Vår Energi have more considerable liquidity risks than Equinor, while it is on the same level as AkerBP. When looking at the cash flow from operations to short-term debt ratio, Equinor seems to have weaker liquidity. This can indicate that the cash flow of Vår Energi is solid compared to the short-term liability, despite the current liquid assets not covering current debt at the same rate as Equinor. In long-term liquidity measures, Vår Energi seems to be slightly less solid than Equinor and AkerBP. Despite the competitors delivering more solid long-term standards for liquidity, Vår Energi is providing ratios on average sufficient for the universal rules-of-thumb in the respective ratios. Still, giving too much meaning to these thresholds is essential because they are generic and not industry specific. Thus, there can be some signs of liquidity risk for Vår Energi, especially in the long term.

6.6 Profitability Analysis

This study aims to conduct a profitability analysis of Vår Energi's financial performance using data from the analytical income statement and balance sheet. The primary objective of this analysis is to determine whether the company is maximising its profitability and to compare these measures with those of the industry average and main competitors. Specifically, Vår Energi's return on equity will be examined and used in the DuPont model to decompose this measure and identify the proper profit drivers. Additionally, the analysis will include five other Oil & Gas companies in the analysis and compare the findings with industry average data from Aswath Damodaran (Damodoran, 2022). To obtain better benchmarks for Vår Energi and other Oil & Gas companies, it will collect competitor and industry average data from the companies annual reports, Bloomberg, and Damodaran's website. It is also worth mentioning that there are weaknesses in the profitability ratios, mainly that they are based on historical numbers. Thus, the ratios are backwards-looking and cannot predict the future.

The figure 32 below shows an overview of the DuPont analysis by Sørensen from his book "Regnskabsanalyse og Værdiansættelse" (Sørensen, 2021). The DuPont analysis is a financial analysis framework that breaks down a company's return on equity (ROE) into three components: net profit margin, asset turnover, and financial leverage. This breakdown of Return on Equity will be used to assess which factors drive Vår Energi's profitability and compare this with its main Oil & Gas industry competitors.

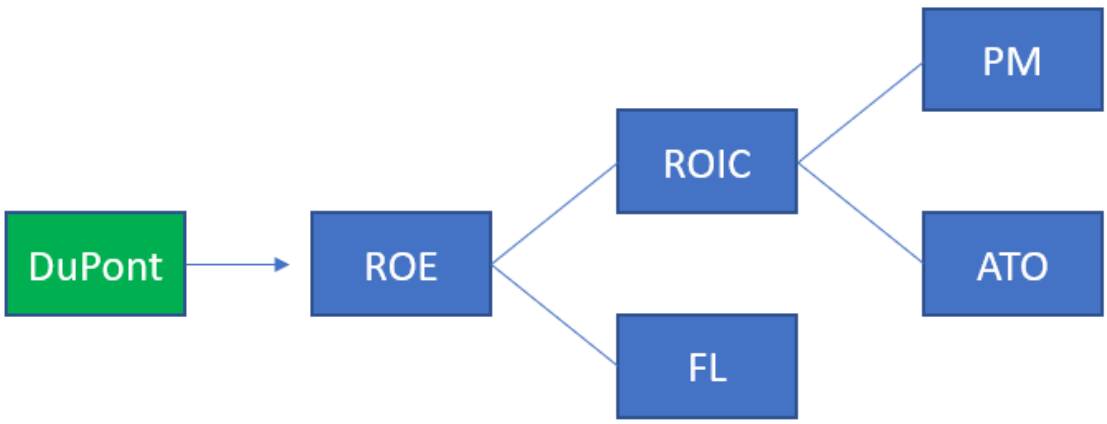

Figure 32: Own Creation. Source: Sørensen

6.6.1 Return on Equity

Figure 33 describes Vår Energi's ROE development from 2018 to 2022, comparing it to its peers and the industry average. As seen in figure 33, Vår Energi had a weak ROE in 2018 compared to the peers and experienced the lowest ROE during the downtime of the Oil & Gas industry in 2020, with a ROE of -33%. Despite this, Vår Energi has managed to improve its returns massively, and in 2022, it has a Return on Equity of 22.3 %, outperforming several peers and the industry average. Equinor still has the highest average ROE over the last five years, with an average of 19%, compared with Vår Energi's average of 7,6%. In order to understand how Vår Energi has managed to increase its returns dramatically, ROE has to be decomposed into Return on Invested Capital (ROIC) and Financial leverage.

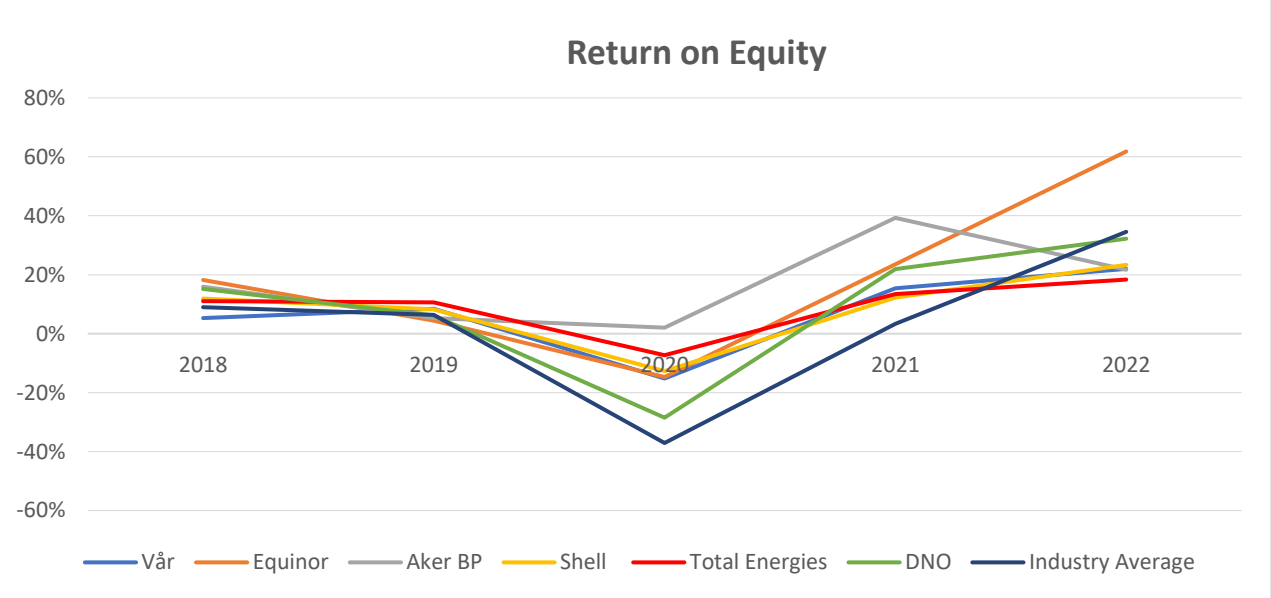

Figure 33: Return on Equity. Source: Annual Reports Vår Energi 2018-2022, (Bloomberg , 2023) , (Damodoran, 2022)

Financial Leverage

Financial Leverage or equity multiplier is a financial ratio used to measure the extent to which a company uses debt financing to fund its operations relative to its equity financing. It is calculated by dividing the company's total assets by its shareholder's equity. Financial Leverage is a valuable tool for investors and financial analysts to evaluate a company's financial leverage and risk profile. A higher equity multiplier indicates that a company relies more heavily on debt financing, which can increase its financial risk in the event of an economic downturn or other adverse events. However, a high equity multiplier can also indicate that a company uses debt financing effectively

to generate higher returns on equity, which can benefit shareholders. Therefore, it is crucial to consider a company's overall financial position and profitability when evaluating its equity multiplier.

Sørensen's (Sørensen, 2021) Financial Leverage or Equity Multiplier formula will be used:

$$Financial\ Leverage = \frac{Average\ Total\ Assets}{Average\ Total\ Equity}$$

Regarding Vår Energi, the data presented in figure 34 demonstrates that the company exhibited a low level of financial leverage in 2018, with a ratio of merely 1.55, which was among the weakest of its comparable companies. However, Vår Energi's reliance on debt financing increased over time, resulting in the highest financial leverage among its peers in 2022, with a ratio of 3.29. This suggests that Vår Energi relies more heavily on debt financing than its peers. Despite this increase, Vår Energi's financial leverage remains close to its peers, indicating that further investigation into other factors, such as Return on Invested Capital (ROIC), is necessary to ascertain the sources of the company's Return on Equity (ROE).

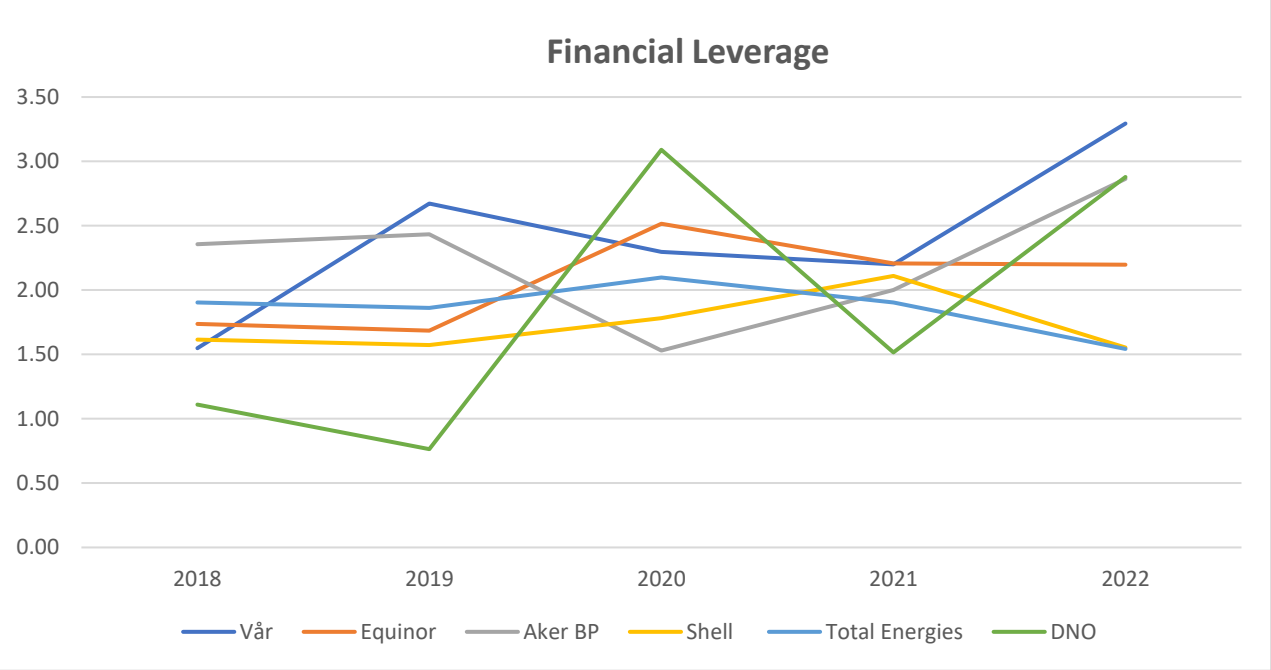

Figure 34: Financial Leverage. Source: Annual Reports Vår Energi 2018-2022, (Bloomberg , 2023) , (Damodoran, 2022)

6.6.2 Return on Invested Capital

Return on invested capital (ROIC) is a widely utilised metric for evaluating a firm's profitability and operational efficiency. ROIC measures how effectively a company employs its invested capital to generate income. The analysis will calculate ROIC using the reconstituted income statement and balance sheet figures. The formula for calculating ROIC is as follows:

$$ROIC = \frac{Net\ Operating\ Profit\ After\ Tax\ (NOPAT)}{2\ year\ Average\ Invested\ Capital}$$

Following Sørensen (2021), the two-year average is used for invested capital, which is thought to represent better the assets creating value in the current period (Sørensen, 2021).

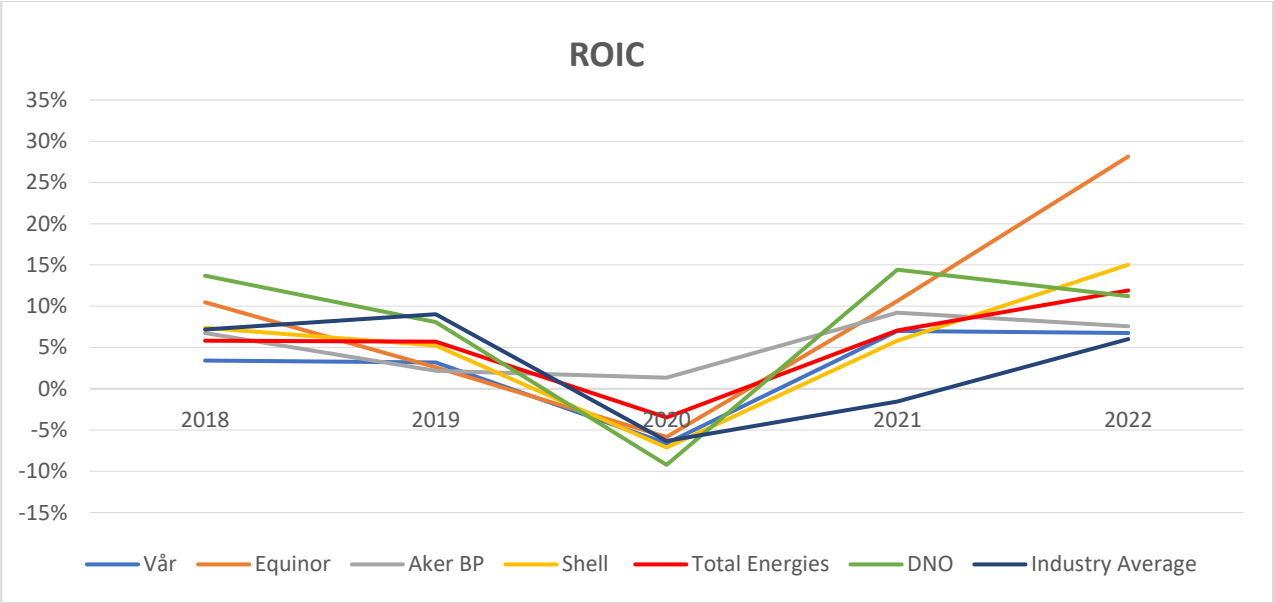

Figure 35: Return on Invested Capital. Source: Annual Reports Vår Energi 2018-2022, (Bloomberg , 2023) , (Damodoran, 2022)

The above graph shows Vår Energi´s five-year return on invested capital compared with its main peers and the industry average. In the early years, Vår Energi struggled to keep its ROIC on an industry average; however, trailing from 2021, Vår Energi started to outperform the industry average but is still not generating enough return on its investments compared with its main competitors. The energy crisis and the Russian invasion of Ukraine resulted in a rapid increase in Oil & Gas companies' profits. In 2022, Vår Energi only managed to generate $0.07 per dollar invested (ROIC of 7%), less than four times Equinor's $0.28 per dollar invested (ROIC of 28%). Aker BP also generated $0.08 per dollar invested, which is good news for Vår Energi, given that Aker is its closest competitor in operations and size.

To understand why Vår Energi underperformed in the industry, it is necessary need to future decompose ROIC. This is because ROIC cannot explain whether the relation between revenue and expense or an improvement in capital utilisation drives profitability. The ROIC formula below will therefore be decomposed into Profit Margin and Turnover Rate of Invested Capital (Sørensen, 2021):

$$ROIC = Profit\ Margin\ x\ Asset\ Turnover\ ratio$$

6.6.3 Profit Margin

Operating profit margin is a valuable metric for assessing a company's profitability. This section will utilise this measure to understand Vår Energi's revenue and expenses better and compare the relationship with its competitors. To calculate the profit margin, it is necessary to use the following formula (Sørensen, 2021):

$$Profit\ Margin = \frac{NOPAT}{Revenue}$$

The below graph shows how the profit margin of Vår Energi and its peers have developed over time:

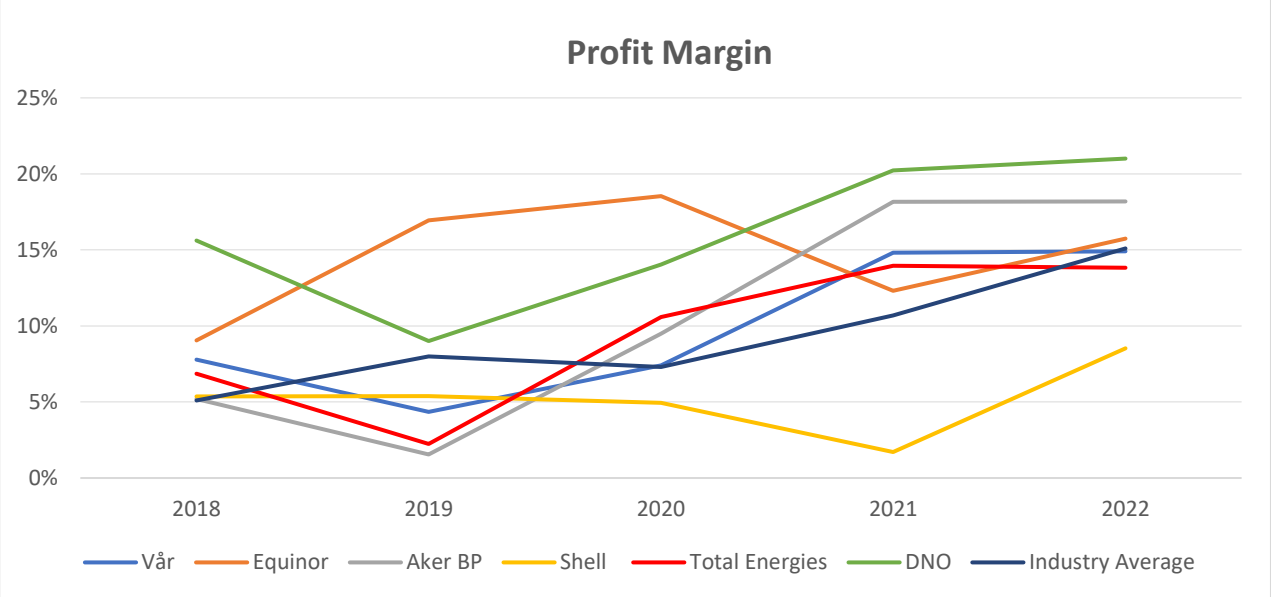

Figure 36: Profit Margin. Source: Annual Reports Vår Energi 2018-2022, (Bloomberg , 2023) , (Damodoran, 2022)

Vår Energi experienced a decline in profit margin between 2018 and 2019. However, the company recovered from this setback and recorded a peak profit margin of nearly 15% in 2021. This implies

that Vår Energi presently earns a net profit of $0.15 for each dollar spent. With this improvement, Vår Energi has achieved similar profitability levels as Equinor, Total Energies, and the broader industry. Nevertheless, despite this considerable progress, Vår Energi remains behind its key competitor Aker BP and significantly trailing DNO, which boasts a profit margin of over 20%. Vår Energi's remarkable profit margin growth can be attributed to higher Oil & Gas prices, which overweighted the increase in operating costs. Despite this strong performance in profit margin, Vår Energi's underperformance in ROIC suggests that the asset turnover rate needs to be examined more closely to fully comprehend the factors driving the company's profitability.

6.6.4 Asset Turnover

The turnover rate of invested capital is used to express a company`s ability to utilise invested capital. This measure will be used to indicate the efficiency with which a company uses its invested capital to generate revenue. The following formula will be used to calculate asset turnover (Sørensen, 2021):

$$Asset\ Turnover = \frac{Revenue}{2\ year\ Average\ Invested\ Capital}$$

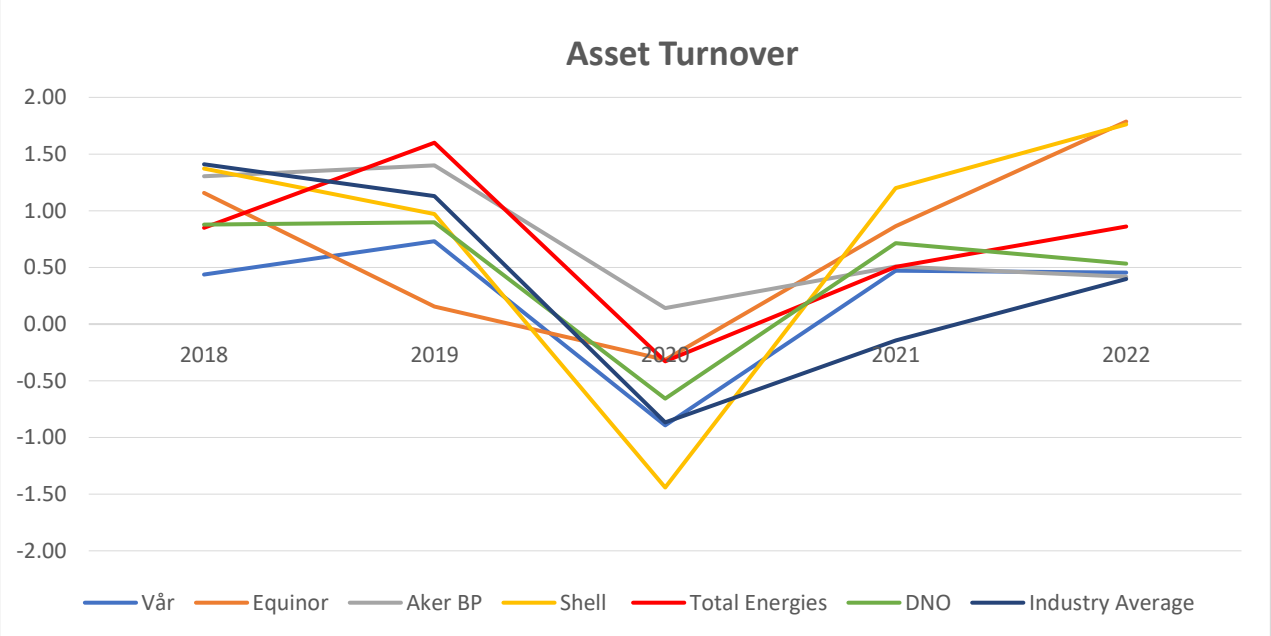

Figure 37: Asset Turnover. Source: Annual Reports Vår Energi 2018-2022, (Bloomberg, 2023), (Damodoran, 2022)

The graph above shows a clear picture of Vår Energi being outperformed by its competitors and industry average. In 2018, Vår Energi managed to have a turnover on invested capital of 0.44,

which conveys that for each dollar invested, 0.44 dollars is generated. This turnover rate increased in 2019 but fell dramatically in 2020 before it rose back to 0.45 in 2022. If this turnover rate was compared with Equinor, of 1.79 in 2022, Vår Energi is underperforming this competitor by almost 300%. Vår Energi manages to utilise its invested capital slightly better than Aker BP. However, given Aker BP's substantial profit margin, it is still generating more return on its invested capital (figure 35). The analysis can now clearly state that Vår Energi`s underperformance in ROIC is driven by a weak asset turnover rate on investments that overweight the healthy profit margin.

6.6.5 Return on Assets

Given that Vår Energi and the Oil & Gas industry are asset-heavy, evaluating its Return on Assets (ROA) is essential. As the graph below demonstrates, Vår Energi is not performing well in this measurement. In 2018, it experienced the lowest return on its assets compared with its main competitor, with a return of only 2.6%. Vår Energi did not perform as poorly as its competitors during the Covid-19 pandemic but where quickly outperformed again and ended 2022 with a ROA of only 4.85%. Equinor topped the chart once again with a return on its assets of 18.84% in 2022, and Aker BP also beat Vår Energi with a return of 6.16%. The following formula has been used when calculating ROA (Sørensen, 2021):

$$ROA = \frac{Net\ Income}{Average\ Total\ Assets}$$

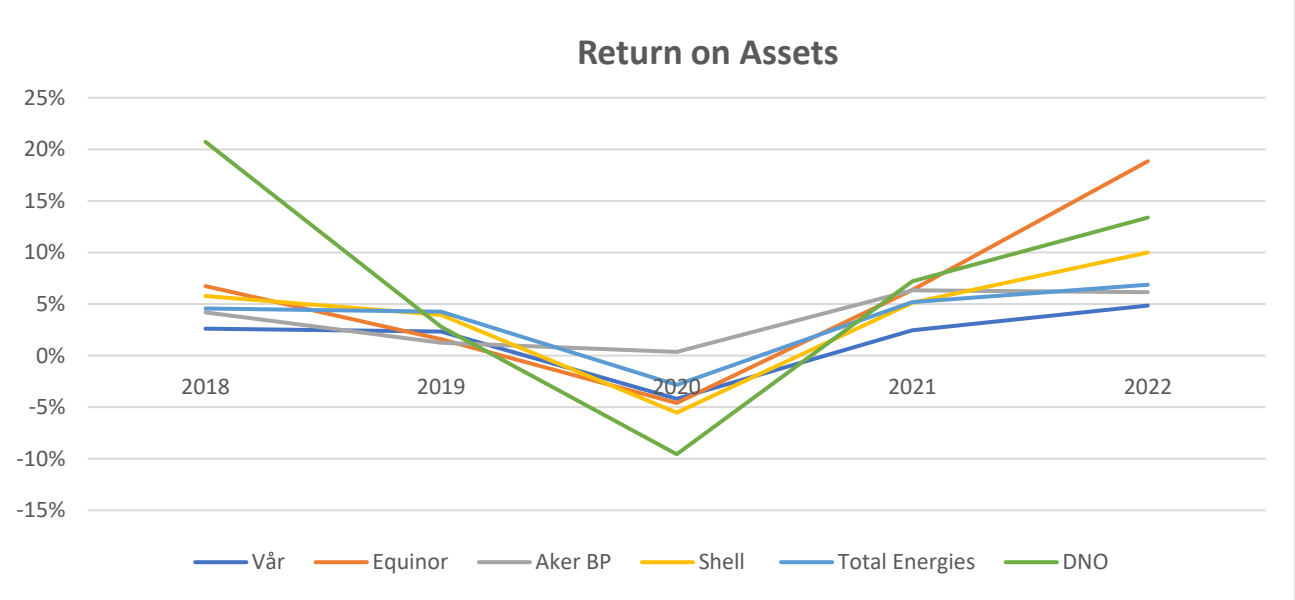

Figure 38: Return on Assets. Source: Annual Reports Vår Energi 2018-2022, (Bloomberg , 2023) , (Damodoran, 2022)

6.6.6 Partial Conclusion Profitability

According to an analysis of various performance metrics, Vår Energi has substantially enhanced its return on equity (ROE) since 2018. In 2022, the company outperformed several of its peers as well as the industry average, with a ROE of 22.3%. However, Vår Energi continues underperforming its primary competitors and the industry average regarding return on invested capital (ROIC), asset turnover rate, and return on assets (ROA). Furthermore, the company relies on debt financing to achieve its ROE, whereas its competitors perform nearly the same ROE with considerably lower financial leverage.

Despite recent improvements in its profit margin and ROE, Vår Energi is still not generating enough return on its investments compared to its main competitors and industry average. The company has encountered difficulties in fully capitalising on the energy crisis situation. Moreover, Vår Energi's underperformance in ROIC can be attributed to a weak asset turnover rate, suppressing its substantial profit margin. While the company is utilising its invested capital somewhat better than Aker BP, Aker BP's robust profit margin ensures that it is still generating a greater return on its invested capital.

Lastly, Vår Energi's performance in terms of return on assets is also unsatisfactory, with significantly lower returns compared to its competitors. In summary, despite some progress, Vår Energi is still lagging behind its competitors and the industry average in several critical performance metrics.

7.0 Forecasting

The financial projections for Vår Energi are grounded on both strategic and financial analyses. These projections are designed to approximate the future revenue and expenses of the company. The pro forma statements were developed based on assumptions and predictions from the earlier analyses. The future earnings of Vår Energi are contingent upon the prices of Oil & Gas in the future, as well as its production levels. The anticipated revenue forecast will be established using a renewable energy model constructed to gauge future Oil & Gas prices. This section also estimates the company's future production and determines the terminal production rate. In contrast, future expenses are more predictable since most of Vår Energi's costs are fixed, with only some variable costs tied to production.

7.1 Revenue

7.1.1 Oil & Gas price

Oil & Gas prices are among the most important factors to consider when forecasting future revenue for an Oil & Gas production company. These prices are known to fluctuate and can significantly impact the revenue and profitability of such a company. It is, therefore, crucial to integrate the anticipated future prices of these commodities into the DCF model. To estimate the future prices of Oil & Gas, the renewable energy model will be employed, as earlier presented:

Year	2022A	2023E	2024E	2025E	2026E	2027T
Oil Price in $	78.55	77.40	76.28	75.17	74.07	71.98
Gas Price in $	48.09	47.58	47.15	46.69	46.18	40.13

Table 14: Own Creation.

7.1.2 Oil, Gas and NGL Production

Vår Energi, a company primarily engaged in Oil & Gas production, derives a significant portion of its revenue from this activity. Per the company's annual report, the production split is presented in figure 39, indicating that on average, 57% of the production comprises oil, 37% is natural gas, and 7% NGL (Vår Energi, 2023) (Appendix 3). This production split has remained consistent in previous years, implying it will likely persist. Vår Energi also states in its annual report that it expects to keep approximately the same production split in the coming years, and this split will be used when estimating the production until 2027 (Vår Energi, 2023).

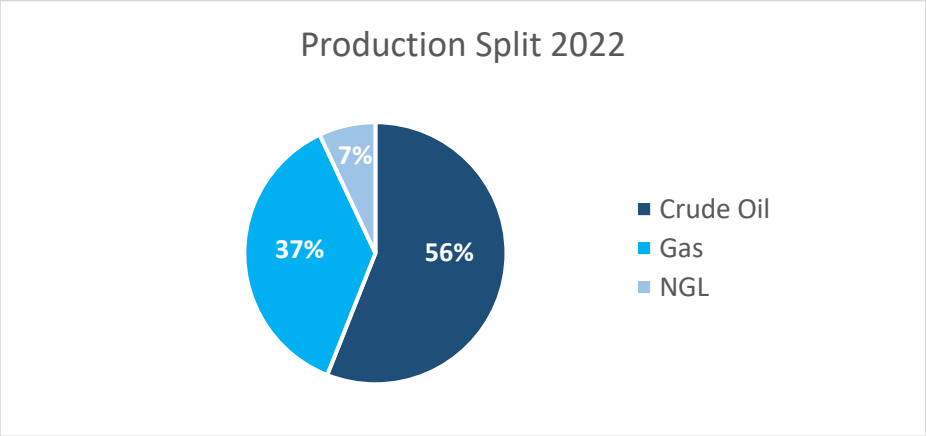

Figure 39: Own Creation. Source: (Vår Energi, 2023)

In BOE	2022E	2023E	2024E	2025E	2026E	2027T
Daily Oil Production	123,229	123,229	147,875	177,450	212,940	229,740
Yearly Oil Productuon	44,978,629	44,978,629	53,974,355	64,769,225	77,723,071	83,855,071
Daily Gas Production	81,419	81,419	97,703	117,244	140,692	151,792
Yearly Gas Production	29,718,023	29,718,023	35,661,627	42,793,953	51,352,743	55,404,243
Daily NGL Production	15,404	15,404	18,484	22,181	26,617	28,717
Yearly NGL Production	5,622,329	5,622,329	6,746,794	8,096,153	9,715,384	10,481,884
Daily Total Production	220,052	220,052	264,062	316,875	380,250	410,250
Yearly Total Production	80,318,980	80,318,980	96,382,776	115,659,331	138,791,197	149,741,197

Table 15: Production Estimation. Source: (Vår Energi, 2023)

According to Vår Energi's most recent annual report, the company produced an average of 220,052 barrels of oil equivalent (BOE) in 2022 (Vår Energi, 2023). Vår Energi forecast daily production to remain relatively stable in 2023 before increasing to over 350,000 BOE per day by the end of 2025, with an additional yearly increase of 30,000 BOE. This aggressive production growth is driven by the company's recent discoveries of the Alke field and restart of its existing field, Balder (Vår Energi, 2023). The production growth towards 350,000 BOE per day is also driven by building out the John Casberg field together with Equinor. To achieve this increase, Vår Energi would need to increase production by approximately 20% from 2023. According to the graph provided, this would result in an average daily production of 316,875 BOE per day in 2025, with all fields in operation leading to a daily production of 380,250 BOE in 2026. A more conservative approach was taken for the terminal production in 2027, with production increasing by 30,000 BOE per day from 2026 to 2027 and maintaining this level in the future. This is due to the fact that future production estimates are currently based on discovered fields and building plans only. Beyond 2027, there may be restrictions on building additional oil fields, or Vår Energi may opt to invest in renewable energy instead of Oil & Gas production.

7.1.3 Oil, Gas and NGL Revenue

USD 1000	2023E	2024E	2025E	2026E	2027T
Revenue Oil	3,481,370	4,117,333	4,868,998	5,757,133	5,594,507
Revenue Gas	1,413,978	1,681,492	1,998,013	2,371,550	2,060,786
Revenue NGL	84,335	106,262	133,890	168,702	177,137
Total Revenue	4,979,683	5,905,087	7,000,901	8,297,385	7,832,429

Table 16: Own Creation.

The table 16 displays Vår Energi's total revenue from its various revenue streams. For the Oil & Gas revenue, the estimation of the yearly price is multiplied by the estimated total production for the corresponding year. The NGL price is projected to continue increasing by approximately 5%, as

it has done over the last five years. The model estimates the total revenue in 2027 is nearly $500 million less than in 2026. This is due to 2027 being the estimated terminal revenue year, computed using a more conservative Oil & Gas price, as previously explained in the pricing section. In 2022, Vår Energi generated nearly $10 billion in annual revenue. However, in the estimated revenue, it is not even close to this figure, despite anticipating an increase in production. This is because 2022 experienced exceptionally high Oil & Gas prices, which the model do not anticipate to reoccur. The revenue estmate only relies on the renewable energy model to project the commodity prices.

7.2 Operating Expenses

Four operating expense items need to be forecasted to forecast the EBIT of Vår Energi. The items are the cost of goods and services, exploration costs, other operating expenses, and depreciation and amortisation. Different methods will calculate the items based on the item's characteristics. Further, the calculations and considerations of each of the operating expenses will be explained. The forecasted operating expenses will provide the margins displayed in figure 40 below. The margins are given as a percentage of the revenue in the given year due to the transparency it provides in the graph.

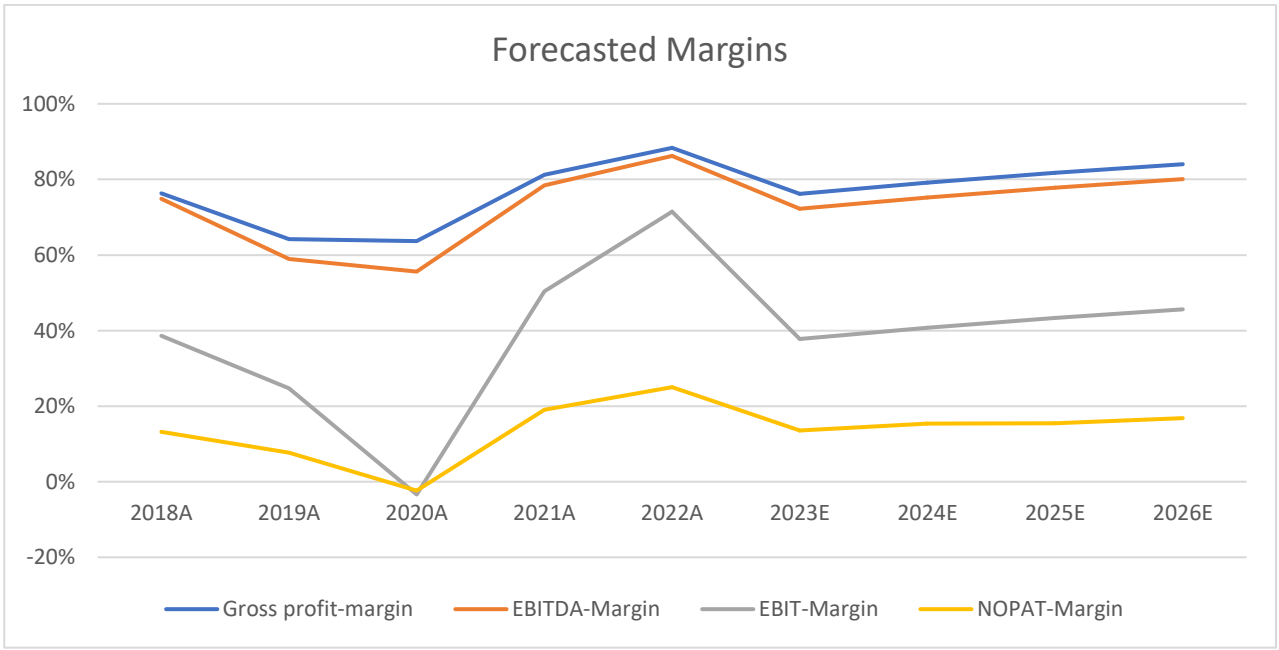

Figure 40: Own Creation. Source: (Vår Energi, 2023)

7.2.1 Cost of Goods and Services Sold

Costs of goods and services sold are a significant expense for Vår Energi and entail a cost of operations, transportation and processing, and environmental taxes, among other things. The item has relatively consistently low growth in the period from 2019-2022, despite the revenue of Vår Energi increasing significantly. This is due to a large degree of fixed costs in the company's expenses. High fixed costs are standard in the Oil & Gas industry due to significant investments in infrastructure and instalments for explorations and production of petroleum. These fixed costs are incurred regardless of the production level and petroleum prices. There is still growth in the item, which needs to be accounted for. Due to the expenses in 2018 being significantly lower than the later years, this serves as an outlier and will not be considered when forecasting. The average growth from 2019-2022 is 3.78% and will be utilised when calculating the forecasted cost of goods and services sold. The item is, thus, forecasted to increase by 3.78% from the 2022 expense in each of the forecasted years, providing the size observed in table 17 below.

Amount in USD 1000	2018A	2019A	2020A	2021A	2022A	2023E	2024E	2025E	2026E
Cost of Goods and Services	643,104	1,024,534	1,051,288	1,141,021	1,143,139	1,186,321	1,231,134	1,277,640	1,325,903
Exploration Costs	27,791	105,879	57,183	57,138	72,063	73,269	74,496	75,743	77,011
Other Operating Expenses	11,606	46,018	176,204	110,483	137,721	112,986	133,983	158,846	188,263
Depreciation and Amortization	986,116	980,828	1,706,740	1,704,561	1,447,966	1,716,132	2,035,051	2,412,697	2,859,500

Table 17: Own Creation.

7.2.2 Exploration Costs

Exploration costs include seismic, area fees, field evaluations, and dry well expenses. The item is similarly to the cost of goods sold, not directly related to the revenue of Vår Energi. This is due to the exploration not yielding any revenue in years after the expenses are made. Additionally, much of the expenses are not contributing to revenue at any time, such as explorations and evaluations of dry wells. The driver of exploration costs is the awarding of exploration licenses on the Norwegian continental shelf. Future awarded licenses are unknown, and cannot be deployed in the forecast. Despite the exploration costs not being directly linked to the revenue, it serves as a good proxy of the exploration costs in the historical data. Therefore, the average percentage of 1.67% of the revenue is used to forecast the exploration costs of 2023-2026.

7.2.3 Other Operating Expenses

Other operations expenses are an item containing R&D expenses, pre-production costs, legal provisions and administration expenses. In the period 2018-2022, the post increased significantly, similar to the revenue, except in 2020, when the post was considerably higher than the remaining years. The increase in 2020 stems from a value adjustment contingent consideration related to the updated reserve estimate in the Forseti structure (Vår Energi, 2021). The relation between the expense and the revenue provides the case for using a percentage of the revenue to forecast the other operating expenses. Thus, the 2018-2022 average percentage of the revenue of 2.27% is deployed to forecast other operational expenses based on the forecasted revenue in the given year.

7.2.4 Depreciation and Amortization

Depreciation and amortisation is a large item for Vår Energi. This is due to the substantial investments in long-term assets which is needed for the exploration and production of petroleum. The investment in long-term assets generates large depreciations of the assets. This cannot be considered directly related to revenue in the long term but is a driver in the long term. Depreciation stems from long-term assets directly related to the level of petroleum production, which is a main driver in the revenue of the Vår Energi. Subsequently, a forecast of the long-term level of depreciation can be constructed based on a percentage of the revenue. The five-year average of depreciation as a percentage of revenue is calculated to be 34.46%. The percentage is used to forecast the depreciation and amortisations displayed in table 17 above.

7.3 Tax Rate

The corporate tax rate in Norway was 23% in 2018 and 22% in the following years, 2019-2022 (Regjeringen, 2022). Further, the petroleum industry in Norway is subject to a special petroleum tax of 71.8% on the profits, giving a marginal tax rate of 78% due to the corporate tax being written off when calculating the special tax base (Norsk Petroleum, 2023). Additionally, a cash-flow-based tax was introduced in 2022, allowing investments in operations to be immediately deducted from the special tax base. Regular pricing is utilised when calculating the companies' revenues to ensure no tax revenue is lost to the state. This ensures that petroleum is not sold to affiliated companies for a price lower than the market price, ensuring fair taxation (Norsk Petroleum, 2023).

Due to the advanced tax rules on petroleum revenues, an effective core activity tax rate is calculated for further use. The tax rate was calculated in chapter 6 and is showcased in figure 41 below. Based on the same calculations and considerations as previously, the median tax rate of 68.10% will be deployed in the remainder of the thesis.

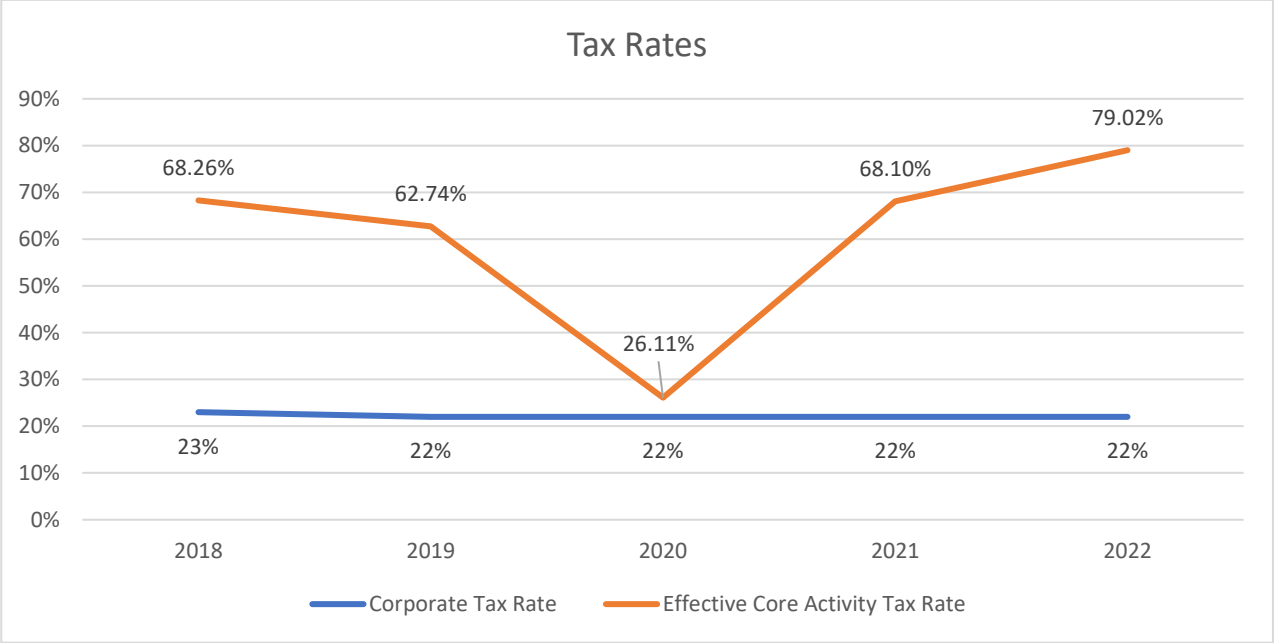

Figure 41: Own Creation. Source: (Vår Energi, 2023).

7.4 Assets

In order to forecast the invested capital of Vår Energi, the company's assets must be forecasted. Invested capital can be calculated by adding net operating working capital (net current assets) and net non-current operating assets. This information is utilised when forecasting the assets by separating the existing and non-current assets when forecasting. According to Plenborg & Kinserdal (2020, p. 290), the turnover rate of assets can be used to forecast future assets. Revenue divided by assets gives the turnover rate. Due to the different characteristics of current and non-current assets, these will be calculated separately in order to forecast more accurately. The liabilities are accounted for by using the net assets. After forecasting the current and non-current assets, these are added to obtain the forecasted invested capital. Further, the change in invested capital will be withdrawn from NOPAT in order to get the free cash flow to the firm (FCFF). The calculations are displayed in table 18 below and will be described further in the following.

Amount in USD 1000	2018A	2019A	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027T
Revenue	2,718,662	2,864,250	2,893,840	6,072,732	9,816,749	4,979,683	5,905,087	7,000,901	8,297,385	7,832,429
Net Operating Working Capital	-2,068,556	-1,752,162	34,186	-841,009	-1,747,026	-1,261,569	-1,496,013	-1,773,630	-2,102,085	-1,984,292
Turnover Rate NOWC	-1.31	-1.63	84.65	-7.22	-5.62	-3.95	-3.95	-3.95	-3.95	-3.95
Net Operating Non-Current Assets	5,971,960	10,074,410	14,229,270	14,709,029	13,649,970	12,145,569	13,057,145	14,145,425	15,478,963	14,784,741
Turnover Rate NONCA	0.46	0.28	0.20	0.41	0.72	0.41	0.41	0.41	0.41	0.41
Invested Capital	3,903,404	8,322,248	14,263,456	13,868,020	11,902,944	10,319,090	10,084,646	9,807,029	9,478,574	9,596,367

Table 18: Own Creation. Source: (Vår Energi, 2023).

7.4.1 Net Working Capital

The turnover rate of net operating working capital has been in the area of -1 to -7 in the period 2018-2022, except for the outlier in 2020 of 84.65. The outlier in 2020 is primarily driven by the low taxes payable due to the net loss and no current interest-bearing loans in the year. The turnover rate varies in the period, and thus, it is reasonable to use an average to determine the future turnover rate to forecast the net working capital. As a consequence of the 2020 turnover rate being a significant outlier, it is removed when calculating the average since the impact would give an inaccurate description of the normal situation of the company and industry. The average remaining years is calculated to be -3.95, providing the net operating working capital displayed in table 18 above.

7.4.2 Net Non-Current Assets

The turnover rate of the net non-current operating assets deviates less in the period 2018-2022. Long-term assets and revenue are more correlated than the net working capital. This is because long-term investment is needed to increase production, which further can increase the revenue of Vår Energi. Considering that investments in long-term assets are a value driver in the industry, the five-year average relation between revenue and long-term assets for a mature company can serve as a proxy for future relation. Additionally, due to a less deviating turnover rate in the period, it is reasonable to use the five-year average of the turnover rate to forecast the net non-current assets. The five-year average is calculated to be 0.41, which gives the net operating non-current assets displayed in table 18. The assets are forecasted to increase in the period 2023-2026, consistent with the planned production increase to 350,000 barrels of oil equivalents per day to the end of 2025 (Vår Energi, 2023).

7.5 Free Cash Flow to Firm (FCFF)

The FCFF can be calculated by net operating profits after tax (NOPAT) less the change in invested capital (Sørensen, 2021). The revenue is multiplied by the NOPAT margin and the change in invested capital is subtracted, leaving the FCFF. The FCFF from the firm is displayed in table 19 below:

Amount in USD 1000	2023E	2024E	2025E	2026E	2027T
Free Cash Flow to Firm	1,390,562	1,142,694	1,360,119	1,724,699	1,195,565

Table 19: Own Creation

8.0 Valuation

Several factors are important to investigate when forecasting inputs for a discounted cash flow (DCF) model in the Oil & Gas production industry. These factors include the production profile, commodity prices, operating costs, capital expenditures, and discount rate (CFI, 2023). In this valuation model, different factors that drive Vår Energi's free cash flows to the firm will be broken down. Further, the calculated discount rate, terminal value, net interest-bearing liabilities, total shares outstanding and the USD/NOK rate will be used in order to estimate an implied share price for Vår Energi.

There are multiple methods for estimating a company's value, which is crucial for determining whether a stock is over- or underpriced based on historical performance and current financial and strategic factors. This study will primarily focus on the absolute present value approach using the discounted cash flow (DCF) model discussed in Chapter 2. This model involves discounting future cash flows with a rate that reflects the underlying risk of the cash flows. The analysis will begin by estimating the applicable discount rate, which will be used in the DCF model, along with the forecasted values from Chapter 7. A terminal value growth will also be estimated and used to determine the terminal value of Vår Energi. Vår Energi's recent NIBL and shares outstanding will also be used in the model in order to calculate the equity value on a share basis. Lastly, an exchange rate between USD and NOK will be used to calculate the implied share price in local and exchange-listed currencies.

In addition, a relative valuation approach is conducted to compare the current market multiples in the industry where the stock is traded to the valuation. A sensitivity analysis will then be conducted to determine the potential impact of inaccuracies in calculating the discount rate and terminal growth rate on the valuation. Finally, a scenario analysis is performed based on the possible future performance of the emerging renewable energy, which is expected to be disruptive to the industry. The growth of this segment and the company's ability to increase its production will significantly impact the stock's overall valuation.

8.1 Discount Rate

8.1.1 CAPM

As previously mentioned, the discount rate is utilised to reflect the time value of future cash flows while considering the risk and opportunity cost of alternative investments for the investor. It is worth noting that Vår Energi has a positive NIBL due to its debt payments being more significant than what it receives from its financial income. As a result, Vår Energi's enterprise value (EV) is higher than its equity value (EQ), as EQ equals EV minus NIBL. This also means that the weighted average cost of capital (WACC) is a more reasonable discount rate than the return on equity. Vår Energi has indicated that it does not anticipate taking more significant debt to finance its operations in the future (Vår Energi, 2022).

First, the discount rate will be estimated using the capital asset pricing model (CAPM), which compensates investors for systemic risk and the time value of money. Idiosyncratic risk is not compensated for, as it can be eliminated through differentiation. To calculate the cost of equity in the CAPM, it is necessary to first estimate the values for the risk-free rate, market risk premium, and beta of the asset. After that, Vår Energi's cost of debt will be estimated in order to calculate how much the cost of Vår Energi's capital is. The following formula will be used to calculate CAPM (Sørensen, 2021):

$$R_i = R_f + \beta_i * (R_m - R_f)$$

8.1.2 Risk Free Rate

The risk-free rate is the rate of return an investor can expect from a risk-free investment. Such an investment could be a zero-coupon bond with no risk of default or reinvestment (Sørensen, 2021). Since Vår Energi operates in Norway, the Norwegian government bonds denominated in local

currency will be used as a benchmark. The risk of inflation is eliminated by utilising bonds denominated in the same currency as the cash flows from operations. Norwegian government bonds have the highest credit rating from the leading credit rating agencies, as shown in Appendix 4. Therefore, these bonds are deemed risk-free and a suitable measure for the risk-free rate. While theoretically, bonds with different maturities should be used to match the cash flow horizon, this would result in different rates for various projects. This would create a mismatch between the duration of the risk-free asset, the stock market, and the typical budget horizon.

As a result, the 10-year government bond rate is deployed as the risk-free rate (Sørensen, 2021). As of December 31st, 2022, the 10-year Norwegian government bond rate stood at 3.17% (World Government Bonds, 2023). This high yield or risk-free rate is suffering from the rapid increase in Inflation that hit the world economy in late 2022.

8.1.3 Market Risk Premium

Risk premium is the additional return that investors demand to invest in a portfolio and index relative to investing in risk-free assets (Sørensen, 2021). There are several ways to estimate the market risk premium. One approach is to convey surveys, asking investors what they consider a suitable MRP for the respective market, and then take an average. The disadvantage of this type of estimation is that there is often a large spread in answers. A recent survey from 2021, with 4607 responses from 88 different countries estimated an average MRP of 5.4% for Norway (IESE, 2022).

Another approach is to estimate through credit rating companies and their take on default spread for different markets. Aswath Damodaran has estimated MRP for the Norwegian market to be 4.24%, obtained using Moody's rating for default spread (Damodoran, 2022).
To get the most describing result, an average of these two methods will be used in the calculation of CAPM where the market risk premium is calculated to be **4.82%**

8.1.4 Beta

When estimating Vår Energi´s beta, it will be used 1.1-year daily returns on Vår Energi´s stock and 1.1-year returns on the Oslo Stock Exchange Benchmark index. The reason why 1.1-year returns will be used is because Vår Energi did not become a public company before February 2022, and therefore it is not possibility to use 5-year weekly or 2-year daily returns to calculate Vår Energi's beta. By using daily returns, one gets the advantage of having as much observations as possible in

the regression model (Damodaran, Estimating Risk Parameters, 1999). However, using daily returns instead of weekly returns it has the possibility to experience nonsynchronous trading. Most of the returns include the Covid-19 pandemic and the results will therefore not be as robust as wanted. It is therefore necessary to make a small adjustment to the beta estimate by also using industry average data from Damodaran.

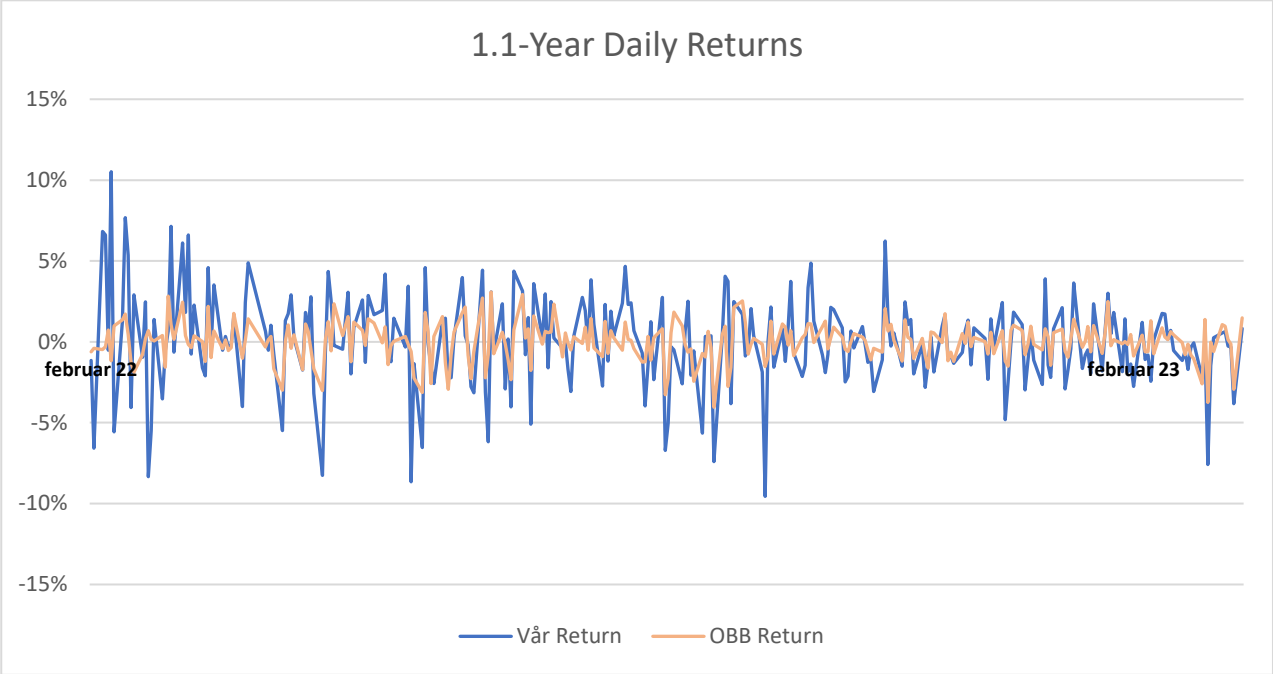

Figure 42: Own Creation. Source: (Yahoo Finance , 2023).

Vår Energi managed to have a 1.1-year daily average return of 0.0017%, whereas the Oslo Stock Exchange Benchmark only managed a return of -0.0056%. Despite this, the graph above shows that Vår Energi´s return is much more volatile, which indicates a beta higher than 1. The graph also shows that Vår Energi's average returns are well affected by the volatility in February 2022, which can be explained by the IPO launch, where investors often speculate and trade the stock more than usual activity (Lowery, 2010).

To calculate Vår Energi's beta against the Norwegian stock exchange, the following formula for the beta will be used (Appendix 5):

$$\beta_p = \frac{Cov(r_p, r_b)}{Var(r_b)}$$

Beta Vår Energi	
Average Return OBB	-0.0056%
Average Return Vår Energi	0.0017%
Covariance	0.000189854
Variance Market	0.000142694
Beta	1.3305

Table 20: Own Creation. Source: (Yahoo Finance , 2023).

Referring to table 20 above, Vår Energi´s beta turns out to be 1.33, which is realistic given that Vår Energi has only been in the market for one year, and its returns are more volatile than the index. However, a tiny adjustment will be made to the beta as the industry average is 1.31 (Damodoran, 2022). The mid-a of these two will be used, resulting in a beta for Vår Energi of **1.32.**

8.1.5 Cost of Equity

The cost of equity is the return a company requires to compensate its shareholders for the risk they undertake by investing in the company's stock. It represents the minimum rate of return that a company must generate on its equity to satisfy the expectations of its investors. There are numerous methods of calculating a company's cost of equity, but for Vår Energi, it will use the one from Sørensen's textbook (Sørensen, 2021):

$$Cost\ of\ Equity = Risk\ Free\ Rate + (\beta * Equity\ Risk\ Premium)$$

As calculated in previous sections, this will result in the following cost of equity (Appendix 6):

$$Cost\ of\ Equity = 0.0317 + (1.32 * 4.82) = \mathbf{9.5324}\%$$

According to data from Damodaran, the industry average cost of equity in Oil & Gas (Production and Exploration) is 11.35% (Damodoran, 2022). This means that investors require slightly less return on Vår Energi and this can be explained by analysing how the cost of equity is calculated.

First, the risk-free rate in Norway is 3.17%, which is lower than the Eurozone yield of 3.36% and the US 10-yeard yield of 3.88% (Ycharts , 2023). Given the formula for calculating the cost of equity and investors requiring higher returns than the risk-free rate, this would result in a higher cost of equity and is why Vår Energi's return is a bit lower as it is based in Norway and calculated with Norwegian rates.

The market risk premium that has been used for Norway is only 4.82%, as explained in the market risk premium section. To understand the low cost of equity, the market risk premium of Norway can

be compared with other continents and countries in order to understand investors required returns for different countries. The average market risk premium for the Eurozone is approximately 5%, and for the US, it is 5.6% (Statista, 2023). As the rate in Norway is only 4.82, this means that investors view Norway as a “safer” investment country and, therefore, do not require as much return as they might have done in another country or economy.

8.1.6 Cost of Debt

The cost of debt is the effective interest rate a company pays on its debt obligations. It is the return that creditors demand, providing the company with the funds it needs to operate or expand its business. It is an essential component of a company's overall cost of capital. There are several methods of calculating the cost of debt, and one of these is estimating the yield to maturity (YTM) method. This method involves calculating the expected return on a company's debt by considering the bond's coupon rate, maturity date, and market price. However, given that Vår Energi has not issued any bonds, and there Is no information about the maturity date or market price, this method cannot be used in this case.

In some cases, it can be possible use the debt rating method: This method involves using the credit rating of a company's debt to estimate its cost of debt. A higher credit rating generally implies a lower risk of default and, therefore, a lower cost of debt. Conversely, a lower credit rating typically implies a higher risk of default and, therefore, a higher cost of debt. This method can be used to calculate Vår Energi’s cost of debt as it has obtained a public investment grade credit rating from S&P Global and Moody’s. S&P Global has assigned Vår Energi ASA a ‘BBB‘ Stable Outlook rating; Moody’s has assigned a ‘Baa3‘ long-term issuer rating with a stable outlook (Vår Energi, 2023).

As Moody’s or S&P’s report does not provide any cost of debt indicators, but it can confirm they are stable, it is possible to estimate Vår Energi’s cost of debt by using the book value of debt and its interest payments. In some cases, one could argue to use the book value of debt to calculate the cost of debt, especially for companies that have not recently issued new debt or have not experienced significant changes in its debt structure (Sørensen, 2021). Using the book value of debt assumes that the market value of Vår Energi’s debt is equal to its book value. However, this assumption may not always hold, especially for companies with complex debt structures or recently issued new debt. Regarding Vår Energi, it has not issued any new significant debt newly,

and has generated stable cash flow and never missed a debt payment, and also being able to pay out over 10% in dividends to shareholders yearly (Vår Energi, 2023).

Given these arguments for how financially stable Vår Energi is, the following formula provided by Sørensen will be used to calculate Vår Energi's cost of debt (:

$$\text{Pre-Tax Cost of Debt} = \frac{Annual\ Interest\ Expense}{Total\ Interest\ bearing\ Debt}$$

Using numbers from Vår Energi's recent annual report for 2022, this would give a cost of equity of (Appendix 7):

$$\text{Pre-Tax Cost of Debt} = \frac{129{,}782{,}000}{2{,}952{,}589{,}000} = \mathbf{4.3955\%}$$

According to data from Damodaran, the Industry average cost of debt in Oil & Gas (Production and Exploration) is 5.88%. (Damodoran, 2022). This means creditors require less interest on their loans to Vår Energi and consider them "Safer" than its industry competitors. This ratio can again be traced back to the risk-free rate, which is lower in Norway compared with other countries where Vår Energi's competitors operate. Vår Energi has also just become a public company, resulting in huge inflows of equity financing, lowering Vår Energi's debt to equity ratio. This ratio will be discussed future in the weighted cost of capital, but given that Vår Energi has low debt compared with equity and has been entirely financially stable in recent years, a lower cost of debt is expected.

8.1.7 WACC

WACC (Weighted Average Cost of Capital) is a financial metric used to calculate a company's average cost of capital. It determines the minimum return the company must earn on its investments to satisfy its investors and lenders. The WACC formula takes into account both the cost of equity and the cost of debt, and is calculated by taking a weighted average of the two. The formula that will be used to calculate Vår Energi's weighted average cost of capital is the one Sørensen provides in his book (Sørensen, 2021):

$$WACC\ = \frac{E}{V} *\ R_e\ + \frac{D}{V} * R_d * \ (1\ -\ T_c)$$

where:

$$E\ =\ Market\ value\ of\ the\ company's\ equity$$
$$V\ =\ Total\ market\ value\ of\ the\ company\ (equity\ plus\ debt)$$

$$D = Market\ value\ of\ the\ company's\ debt$$
$$R_e = Cost\ of\ equity$$
$$R_d = Cost\ of\ debt$$
$$T_c = Corporate\ tax\ rate$$

To find Vår Energi's market value of equity, one needs to multiply the total shares outstanding by the share price of Vår Energi. The rest of the components for the formula are calculated and explained above, which will give Vår Energi a WACC of (Appendix 8):

$$WACC = 0.96600 * 0.0953 + 0.0340 * 0.04396 * (1 - 0.22) = \mathbf{9.3573}\%$$

According to data from Damodaran, the Industry average WACC in Oil & Gas (Production and Exploration) is 10.19%. (Damodoran, 2022). As explained earlier, this lower ratio was expected as Vår Energi has a lower cost of debt and lower cost of equity than the industry average. However, given that Vår Energi has such a low debt ratio, it is not fully utilising its debt financing, where it can deduct interest payments and pay less tax. If Vår Energi were to increase its debt, the weighted average cost of capital would decrease, as investors would require less return due to the cheaper financing mechanism through debt.

8.2 Terminal Growth Rate

The terminal growth rate is a critical factor in determining the terminal value of a company. The terminal value represents the present value of all cash flows beyond the forecast period and is often the most significant component of the overall valuation. The growth in Vår Energi has been prominent in the short term, but a company's growth is difficult to retain and the risks are many. The terminal value in the valuation is usually a large part of the company value, and it is important carefully consider a conservative growth value (Petersen & Plenborg, 2012).

In valuations, the local inflation target is often deployed as a conservative level of growth beyond the forecast period. The inflation target of Norway is 2% yearly (Norges Bank, 2020). This could also be a fair minimum threshold for companies to sustain long-term viability. Vår Energi has exhibited strong growth, which may be anticipated to disappear. The strategic analysis has also emphasised several industry challenges in the forthcoming period. Predicting the state of the Oil & Gas industry in five to ten years is exceedingly difficult, as it could be pretty similar to the present, but there may also be scenarios in which demand declines sharply. The geopolitical and local

Norwegian political landscape creates uncertainty towards the expected production of Oil & Gas, especially in the long term. Vår Energi has a clear prognosis of the expected production, but the uncertainty increases after 2026. The significant uncertainties regarding the industry as a whole, makes the inflation target seem like a reasonable prediction to perpetuity.

The historical inflation rate of a country is also utilised when calculating a terminal growth rate (Corporate Fincance Institute, 2023). Based on the data from Norges Bank, the historical average inflation in Norway was 1.78% yearly in the previous ten years (Norges Bank, 2021) (Norges Bank, 2023). Considering the historical inflation rate, the inflation target and the uncertainty in the Oil & Gas industry, a terminal growth rate based on the equally-weighted inflation target and historical inflation rate for the last ten years will be used. By equally weighing the inflation target and historical inflation, Vår Energi are left with a terminal growth rate of **1.89%**.

8.3 Debt, Shares Outstanding & Exchange Rate

In projecting debt, it is crucial to consider a company's historical debt levels and potential changes that may occur due to expected investments or alterations in the capital structure. Regarding Vår Energi's historical liabilities, its debt-to-equity ratio has been high. The book value of Vår Energi's debt is significant compared to its book value of equity. This is because Vår Energi hold a significant amount of debt in the form of defined taxes as explained earlier. Norwegian accounting regulations allow them to defer payment to the following year, resulting in a substantial deferred tax liability account. This capital is not distributed to Vår Energi's shareholders, so it must be excluded from the enterprise value calculation to determine the total equity value. Vår Energi's share count has remained unchanged since its IPO in 2022, and it will thus be assumed to remain constant when estimating the share price. Considering the USD/NOK exchange rate, the exchange rate recorded as of April 1, 2023, will be utilised. The inputs for the model, such as revenues, costs, debts, and others, are based on the 2022 figure. However, to obtain the share price as of 01.04.23 the equity value found 31.12.21 will be undiscounted 4 months with the calculated discount rate. Finally, it is deemed appropriate to employ the most current exchange rate as of 1 of April 2023.

8.4 Discounted Cash Flow Model – Main Scenario

The discounted cash flow (DCF) model is a widely recognised and commonly used tool for valuing equities. This model calculates the present value of future free after-tax cash flows to the firm

(FCFF), and applies a discount rate to each element to account for the time value of money. The result is the enterprise value of the firm at the time of assessment. In this analysis, a modified version of the DCF model will be used to discount FCFFs using the required rate of return on equity. To estimate Vår Energi's enterprise value, the following two formulas will be applied (Sørensen, 2021):

$$Enterprise\ value_0 = \sum_{t=1}^{n} \frac{FCFF_t}{(1+r_e)^t} + \frac{FCFF_{t+1}}{r_e - g} * \frac{1}{(1+r_e)^n}$$

$$FCFF = NOPAT - \Delta Invested\ capita$$

The DCF model discounts FCFFs from the end of the year back to year "0", or in this case December 31, 2022. To determine the share price as of April 1, 2023, the undiscounted equity value from December 31, 2022 will be used, and apply the same discount rate for the following four months. This generates a new equity value, converted using the USD/NOK spot rate on the relevant date to obtain a comparable share price to the one observed on the Oslo Stock Exchange. Finally, it is now possible to summarise the discounted values to calculate the enterprise value and share price.

Terminal Growth	1.89%					
WACC	9.32%					
Year		**1**	**2**	**3**	**4**	**5**
Amount in USD 1000		2023E	2024E	2025E	2026E	2027T
FCFF		1,390,562	1,142,694	1,360,119	1,724,699	1,195,565
Discount Factor		*0.9147*	*0.8367*	*0.7653*	*0.7000*	
Prevent Value		1,271,954	956,075	1,040,927	1,207,363	
PV Budget Period		4,476,319				
Terminal Value		16,077,056				
PV Terminal Value		11,254,625				
Date		**31/12/2022**	**1/4/2023**			
Enterprise Value		15,730,944				
- Debt		10,421,373				
Equity Value		5,309,571	5,469,727			
#Shares		2,496,406	2,496,406			
USD/NOK		9.62	10.39			
Implied Share Price	NOK	20.47	**NOK** **22.77**			
Trading Price		29.57	25.52			
Change		-30.77%	**-10.76%**			

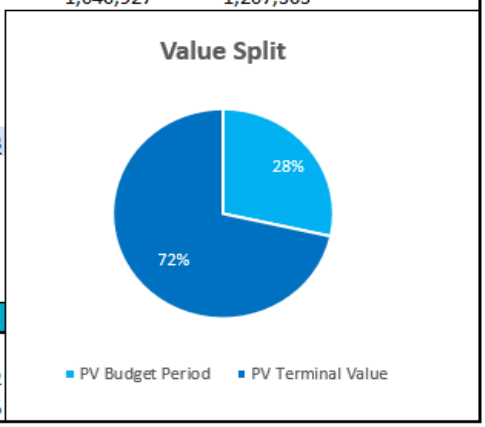

Table 21: Own Creation.

After applying all the relevant inputs discussed in this thesis, the discounted cash flow model implies a fair value of NOK 22.77 for Vår Energi's share. This means downside potential of 10.76%

from the share's trading price of NOK 25.52 on April 1, 2023. Based on the revenue projection from the renewable energy demand model, it is recommended selling or shorting Vår Energi's share, as this model believe it is overvalued due to its lack of future renewable energy projects. Furthermore, the terminal value is estimated based on an oil price of $71.98 and a gas price of $40.13, retrieved from the 2027 forward price. As net zero emissions are expected to be achieved by 2050, it is important to note that these commodity prices are not expected to remain at their current levels indefinitely due to decreasing demand and limited resources.

8.5 Best Case Scenario

8.5.1 Revenue

In the context of Vår Energi's revenue, a best-case scenario has been considered whereby the inputs for renewable energy demand have been adjusted to reflect a more optimistic outlook. Specifically, the growth rates for each renewable energy technology have been reduced from the main case scenario, and the capacity factor for each technology has been estimated from a more pessimistic perspective. This results in a lower level of electricity and energy being produced from renewable energy, leading to increased demand for Oil & Gas, and consequently higher prices for these commodities. A more optimistic outlook has also been applied to the terminal Oil & Gas price. The estimated demand and prices for Oil & Gas resulting from the revised renewable energy growth model are presented in table 22 below:

Year	2022A	2023E	2024E	2025E	2026E	2027T
Oil Price in $	78.55	77.94	77.34	76.75	76.15	74.12
Gas Price in $	48.09	47.82	47.60	47.36	47.09	42.88

Table 22: Own Creation.

8.5.2 Oil, Gas and NGL Production

As for production, Vår Energi is estimated to keep its production split as in the main case scenario, where 57% is oil, 37% is natural gas and 7% is used for NGL. Vår Energi estimated a rise in production of 20% yearly until 2026, as it expects to be producing over 350,000 barrels by the end of 2025 as the main case scenario suggests is true (Vår Energi , 2023). For Vår Energi's best-case scenario, the production is expected to increase by 25% yearly, boosting production by 5% for four years, before increasing it by 30,000 barrels from 2026 to 2027 as suggested Vår Energi in its annual report (Vår Energi, 2023). The yearly estimated production in Vår Energi's best-case scenario is presented in table 23 below:

In BOE	2022E	2023E	2024E	2025E	2026	2027T
Daily Oil Production	220,052	220,052	275,065	343,831	429,789	459,789
Yearly Oil Productuon	80,318,980	80,318,980	100,398,725	125,498,406	156,873,008	167,823,008
Daily Gas Production	123,229	123,229	154,036	192,546	240,682	257,482
Yearly Gas Production	44,978,629	44,978,629	56,223,286	70,279,108	87,848,884	93,980,884
Daily NGL Production	81,419	81,419	101,774	127,218	159,022	170,122
Yearly NGL Production	29,718,023	29,718,023	37,147,528	46,434,410	58,043,013	62,094,513
Daily Total Production	15,404	15,404	19,255	24,068	30,085	32,185
Yearly Total Production	5,622,329	5,622,329	7,027,911	8,784,888	10,981,111	11,747,611

Table 23: Own Creation.

8.5.3 Oil, Gas and NGL Revenue

Based on the anticipated decrease in renewable energy capacity installations and Vår Energi's projected production increase, there is an expected rise in the company's revenue. In the best-case scenario, Vår Energi is forecasted to achieve higher revenue than the base-case scenario over the next four years. Additionally, the company is projected to generate higher revenue in the terminal state due to the implementation of more optimistic estimates for Oil & Gas prices. The predicted revenue for each year is tabulated below:

USD 1000	2023E	2024E	2025E	2026E	2027T
Revenue Oil	3,505,660	4,348,499	5,393,836	6,689,587	6,511,359
Revenue Gas	1,421,078	1,768,209	2,199,042	2,733,478	2,329,266
Revenue NGL	84,335	110,690	145,280	190,680	200,214
Total Revenue	5,011,073	6,227,398	7,738,158	9,613,745	9,040,840

Table 24: Own Creation.

8.5.4 Discounted Cash Flow Model

Terminal Growth	1.89%					
WACC	9.32%					
Year		1	2	3	4	5
Amount in USD 1000		2023E	2024E	2025E	2026E	2027T
FCFF		2,301,471	1,216,396	1,465,242	1,871,411	1,162,624
Discount Factor		*0.9147*	*0.8367*	*0.7653*	*0.7000*	
Prevent Value		2,105,167	1,017,741	1,121,380	1,310,067	
PV Budget Period		5,554,356				
Terminal Value		15,634,090				
PV Terminal Value		10,944,529				
Date		**31/12/2022**	**1/4/2023**			
Enterprise Value		16,498,885				
- Debt		10,421,373				
Equity Value		6,077,512	6,260,833			
#Shares		2,496,406	2,496,406			
USD/NOK		9.62	10.39			
Implied Share Price	NOK	23.43	**NOK** **26.07**			
Trading Price		29.57	25.52			
Change		-20.76%	**2.15%**			

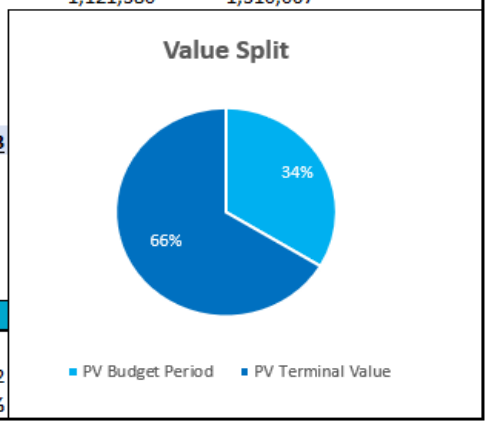

Table 25: Own Creation.

Given all inputs being the same as Vår Energi's base case scenario, except for the revised revenue estimation from the renewable energy model, the discounted cash flow model computes a fair value of NOK 26.07 for Vår Energi's share. This value reflects an increase of 3.30 NOK as compared to the base case scenario, indicating a modest upside of 2.25% in the share. Considering the limited upside and the optimistic cost and revenue estimates, it is not recommended buying the share but rather suggest a hold recommendation.

8.6 Worst-Case Scenario

8.6.1 Revenue

In Vår Energi's revenue, a pessimistic scenario has been considered, whereby the renewable energy demand inputs have been modified to portray a more optimistic outlook. Specifically, the growth rates for each renewable energy technology have been increased compared to the main scenario, and the capacity factor for each technology has been estimated from a more hopeful standpoint. This results in a higher level of electricity and energy being produced from renewable energy sources, leading to a further reduction in the demand for Oil & Gas, and hence a decrease in prices for these commodities. In addition, a more pessimistic view has been taken into account for the terminal Oil & Gas price. The estimated demand and prices for Oil & Gas, resulting from the revised renewable energy growth model, are presented in the following table 26:

Year	2022A	2023E	2024E	2025E	2026E	2027T
Oil Price in $	78.55	76.83	75.15	73.52	71.91	69.88
Gas Price in $	48.09	47.37	46.78	46.15	45.45	39.28

Table 26: Own Creation.

8.6.2 Oil, Gas and NGL Production

In BOE	2022E	2023E	2024E	2025E	2026	2027T
Daily Oil Production	220,052	220,052	253,060	291,019	334,672	364,672
Yearly Oil Productuon	80,318,980	80,318,980	92,366,827	106,221,851	122,155,129	133,105,129
Daily Gas Production	123,229	123,229	141,713	162,971	187,416	204,216
Yearly Gas Production	44,978,629	44,978,629	51,725,423	59,484,237	68,406,872	74,538,872
Daily NGL Production	81,419	81,419	93,632	107,677	123,828	134,928
Yearly NGL Production	29,718,023	29,718,023	34,175,726	39,302,085	45,197,398	49,248,898
Daily Total Production	15,404	15,404	17,714	20,371	23,427	25,527
Yearly Total Production	5,622,329	5,622,329	6,465,678	7,435,530	8,550,859	9,317,359

Table 27: Own Creation.

Regarding Vår Energi's production, it is projected that the production split will remain unchanged from the main case scenario, with 57% being oil, 37% being natural gas, and 7% being used for

NGL. In the worst-case scenario, production is expected to increase by only 15% annually, with production decreasing by 5% for four years before increasing by 30,000 barrels from 2026 to 2027, as stated in Vår Energi's annual report (Vår Energi, 2023). The estimated yearly production for Vår Energi's best-case scenario is presented in table 27 above.

8.6.3 Oil, Gas and NGL Revenue

The potential increase in renewable energy technology adoption and Vår Energi's planned reduction in production are likely to lead to a decline in the company's revenue. In the worst-case scenario, Vår Energi is expected to generate lower revenue than the base-case scenario over the next four years. Furthermore, the company's revenue is predicted to decrease in the terminal state due to the utilisation of more pessimistic estimates for Oil & Gas prices. The projected revenue for each year is presented in the following table 28:

USD 1000	2023E	2024E	2025E	2026E	2027T
Revenue Oil	3,455,834	3,887,327	4,373,052	4,918,971	4,780,272
Revenue Gas	1,407,661	1,598,617	1,813,712	2,054,094	1,775,354
Revenue NGL	84,335	101,834	122,965	148,480	155,904
Total Revenue	4,947,830	5,587,779	6,309,730	7,121,545	6,711,530

Table 28: Own Creation.

8.6.4 Discounted Cash Flow Model

Terminal Growth	1.89%					
WACC	9.32%					
Year		**1**	**2**	**3**	**4**	**5**
Amount in USD 1000		2023E	2024E	2025E	2026E	2027T
FCFF		811,096	943,265	1,265,403	1,601,911	1,207,071
Discount Factor		*0.9147*	*0.8367*	*0.7653*	*0.7000*	
Prevent Value		741,913	789,216	968,439	1,121,406	
PV Budget Period		3,620,975				
Terminal Value		16,231,783				
PV Terminal Value		11,362,940				
Date		**31/12/2022**	**1/4/2023**			
Enterprise Value		14,983,915				
- Debt		10,421,373				
Equity Value		4,562,542	4,700,166			
#Shares		2,496,406	2,496,406			
USD/NOK		9.62	10.39			
Implied Share Price	NOK	17.59	**NOK 19.57**			
Trading Price		29.57	25.52			
Change		-40.51%	**-23.31%**			

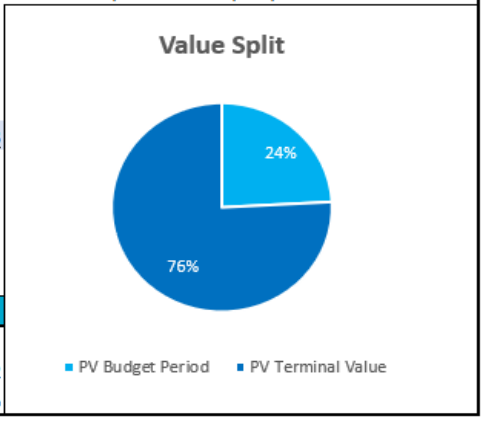

Table 29: Own Creation.

Based on the same inputs as Vår Energi's base case scenario, except for the updated revenue estimate from the renewable energy model, the discounted cash flow model produces a fair value of NOK 19.57 for Vår Energi's share. This value reflects a significant decrease of 3.20 NOK compared to the base case scenario, indicating a substantial downside of 23.31% in the share. Given this significant downside and the lack of future renewable energy projects by Vår Energi, it is recommend selling or shorting the company's share in this scenario. The rapid growth of renewable energy is negatively impacting Vår Energi's revenue from the sale of fossil fuels. Its lack of plans to enter the renewable energy sector will result in significant revenue loss, leading to decreased share value.

8.7 Sensitivity Analysis

The process of valuing a stock is based on assumptions and estimates. However, these estimates may contain potential inaccuracies that could affect the estimated stock price. A sensitivity analysis will be conducted to determine how changes in specific estimates could impact the stock's value. The analysis will focus on the discount rate and perpetual growth rate, as these estimates have the most significant impact on the result. Although a sensitivity analysis could be performed on all estimates, it is unnecessary in this case. When estimating the discount rate, there are various values that one could argue for beta and the risk-free rate. Different values would lead to different stock prices. The terminal period is where most of the price comes from, as indicated in table 21. Therefore, changes in the perpetual growth rate would significantly impact the valuation. The impact of different estimations of these values on the final stock price can be seen in table 30.

Sensitivity Analysis		WACC						
		8.00%	8.50%	9.00%	9.32%	9.50%	10.00%	10.50%
Terminal Growth	1.00%	28.82	24.14	20.03	17.62	16.40	13.15	10.24
	1.50%	32.95	27.66	23.06	20.38	19.02	15.45	12.26
	1.89%	36.64	30.77	25.71	**22.77**	21.31	17.43	14.00
	2.00%	37.76	31.71	26.52	23.51	22.00	18.03	14.52
	2.50%	43.45	36.45	30.50	27.10	25.39	20.95	17.05
	3.00%	50.28	42.04	35.16	31.26	29.32	24.30	19.93
	3.50%	58.62	48.75	40.66	36.13	33.89	28.15	23.22

Table 30: Own Creation.

Small changes in the discount rate and terminal growth rate can significantly impact the estimated stock price. This demonstrates the sensitivity of the DCF model to the underlying assumptions and the analysts' opinions. Additionally, since Vår Energi's value relies heavily on the terminal value,

which is far in the future, changes in the risk-free rate would also significantly affect the valuation. According to table 30, Vår Energi's terminal growth rate must be nearly 2.5% to achieve an implied share price of NOK 25.52, which is currently the trading price of the share. However, such a high terminal growth rate is unrealistic, given the finite nature of fossil fuels and the net zero scenario. Vår Energi's low WACC compared to industry and peers' standards, as mentioned in the "WACC" section, makes it unlikely that its cost of capital would decrease even more. Table 30 shows that the WACC must drop to 9% for Vår Energi to achieve an implied share price of NOK 25.71. These low probability scenarios reinforce the sell recommendation for Vår Energi's shares, as too many unlikely factors would need to occur for a buy recommendation to be warranted.

8.8 Relative Valuation Approach

Relative valuation is a method of valuing a company by comparing its valuation multiples with similar companies in the same industry or sector. This approach helps to determine whether a company is undervalued or overvalued relative to its peers. It is essential to use relevant industry multiples when conducting a relative valuation because different industries can have vastly different operating characteristics, growth prospects, and risk profiles. For example, a high-growth Oil & Gas company may have much higher valuation multiples than a mature utility company. Therefore, comparing the valuation multiples of these two companies directly would not provide a fair comparison.

To valuate Vår Energi, six different industry-specific multiples will be used. Using industry-specific multiples, it can better compare companies with similar operating characteristics and risk profiles. This allows us to gain insights into the relative value of a company and make more informed investment decisions. The valuation method used to determine Vår Energi's relative value is based on Stephen Penman's book, "Financial Statement Analysis and Security Valuation" (Penman, 2013). All data were obtained from the Bloomberg Terminal and the company's annual reports (Bloomberg , 2023).

8.8.1 Price-to-Earnings

The first ratio used in the relative valuation is the P/E (Price-to-Earnings) ratio (Appendix 9). The P/E ratio is a useful metric for comparing companies within the same industry because it provides a relative measure of how much investors are willing to pay for each dollar of earnings a company

generates. A higher P/E ratio indicates that investors are willing to pay more for each dollar of earnings, which may suggest that the company is expected to have strong growth prospects in the future (CFI, 2023). In the Oil & Gas industry specifically, the P/E ratio can be influenced by factors such as the price of Oil & Gas, production growth rates, and exploration and production costs. For example, a company with a high P/E ratio may have strong growth prospects if it expands production in a high-demand market (BCG, 2023). However, a company with a low P/E ratio may be undervalued if it has a solid asset base and is positioned to benefit from improving market conditions.

8.8.2 Price-to-Book

The second ratio that will be used is the P/B (Price-to-Book), which is a commonly used valuation metric that compares a company's market capitalisation (total market value of all outstanding shares) to its book value (total assets minus total liabilities) (Appendix 10). It is calculated by dividing the current stock price by the book value per share (Penman, 2013). The P/B ratio is a useful valuation metric when comparing Oil & Gas companies because it provides a relative measure of how much investors are willing to pay for each dollar of assets on a company's balance sheet. However, it is important to keep in mind that the P/B ratio can be impacted by several factors, such as the company's reserves, exploration and production costs, and overall market conditions.

8.8.3 Price-to-Sales

The P/S ratio is a useful metric for comparing companies within the same industry because it provides a relative measure of how much investors are willing to pay for each dollar of revenue a company generates (Appendix 11). A higher P/S ratio indicates that investors are willing to pay more for each dollar of revenue, which may indicate that the company has strong growth prospects and a strong market position (Penman, 2013). A higher P/S ratio indicates that investors are willing to pay more for each dollar of revenue, which may indicate that the company has strong growth prospects and a strong market position. However, it's important to keep in mind that the P/S ratio can be impacted by several factors, such as the company's production volume, commodity prices, and overall market conditions.

8.8.4 EV/EBITDA

The EV/EBITDA ratio is a valuation metric that compares a company's enterprise value (market capitalisation plus debt minus cash) to its EBITDA, which is a measure of a company's earnings before accounting for interest, taxes, depreciation, and amortisation expenses (CFI, 2023) (Appendix 12). In the Oil & Gas industry, the EV/EBITDA ratio is often used as a valuation metric because it allows investors to compare companies of different sizes and levels of debt on a level playing field. This is important because many Oil & Gas companies carry significant debt and have substantial capital expenditures. The EV/EBITDA ratio also considers a company's operating expenses, which can be significant in the Oil & Gas industry. This makes the EV/EBITDA ratio a useful metric for investors who are interested in a company's ability to generate cash flow and manage its expenses.

8.8.5 EV/Sales

The EV/Sales (Enterprise Value to Sales) ratio is a valuation metric that compares a company's enterprise value (market capitalisation plus debt minus cash) to its annual revenue (Appendix 13). It is calculated by dividing the enterprise value by the annual revenue (Penman, 2013). In the Oil & Gas industry specifically, the EV/Sales ratio is a useful metric for investors to consider because it provides a quick and easy way to compare companies of different sizes and levels of debt on a level playing field. It also takes into account a company's production volume and commodity prices, which can have a significant impact on a company's revenue. Additionally, the EV/Sales ratio can be beneficial for investors who are interested in a company's growth prospects. A company with a low EV/Sales ratio may be seen as undervalued if it has the potential for growth through acquisitions, exploration activities, or the development of new projects (BCG, 2023).

8.8.6 EV/BOE

The EV/BOE (Enterprise Value per barrel of oil equivalent) multiple is a commonly used valuation metric for Oil & Gas companies (Appendix 14). This multiple compares the enterprise value (EV) of a company to the number of barrels of oil equivalent (BOE) it produces, which is a measure of the company's production output. The reason why the EV/BOE multiple is useful when valuing Oil & Gas companies is that it accounts for the company's entire asset base. The EV/BOE multiple considers the company’s equity, debt, and any cash on the balance sheet. This provides a more comprehensive view of the company's overall value. It is also industry-specific, where the Oil &

Gas industry is unique in that companies are primarily valued based on its production output. The EV/BOE multiple directly incorporates this production output into the valuation metric, making it more relevant for Oil & Gas companies (CFI, 2023). This allows for easy comparison, since the EV/BOE multiple is a standardised metric, it is easy to compare across different companies in the same industry (Appendix 15). This makes it easier for investors to identify undervalued or overvalued companies in the sector.

An overview of the latest (2022) competitor's multiples can be found in table 31 below:

2022 Peers Multiples						
Company	Price/Earnings	Price/Book	Price/Sales	EV/EBITDA	EV/SALES	EV/BOE
Equinor	3.96	2.11	0.76	0.80	0.47	77.50
Aker BP	9.59	1.24	1.18	1.60	1.32	89.05
DNO	3.09	0.89	0.86	1.06	0.49	28.80
Shell	4.89	1.03	0.54	2.85	0.61	83.13
BP PCL	6.31	1.09	1.08	5.12	0.61	200.04
Exxon Mobile	7.85	2.31	1.16	4.82	1.08	95.71
Chevron	9.36	2.12	1.47	5.13	1.28	83.13
Marathon Petroleum	4.40	1.91	0.34	3.19	0.44	0.00
Total Energies	7.87	1.47	0.61	2.75	0.62	76.41
Vår Energi	6.09	1.03	0.87	2.40	1.01	76.41

Table 31: Own Creation. Source: (Vår Energi, 2023) & (Bloomberg , 2023)

In the relative valuation approach, Vår Energi's closest peers will be used to calculate an implied share price. However, this valuation method has a drawback since the value estimated in this model may differ from the value estimated in the DCF model due to different market expectations. This method also assumes that Vår Energi's multiples are comparable to its peers, which may not always be the case in practice. Although Vår Energi's tax and depreciation laws may result in slight variations in multiples such as P/E and P/B, these multiples are still considered essential measures when pricing Oil & Gas production stocks.

8.8.7 Weightings

In order to value a company accurately, it is necessary to evaluate multiple ratios that have their own advantages and disadvantages. Vår Energi, a company operating in Norway, faces a significantly higher effective tax rate for Oil & Gas companies compared to its peers, which is almost 80%. Therefore, ratios considering taxes, such as P/E and P/B, will likely result in lower

multiples for Vår Energi. Additionally, Vår Energi has a unique market value capital structure with an interest-bearing debt-equity ratio of approximately 5% debt and 95% equity. As a result, it is crucial to use multiples that consider this unique feature, such as Enterprise value multiples.

The EV/EBITDA multiple is a suitable ratio that captures both Vår Energi's distinctive characteristics. This ratio incorporates the company's high tax payments and unique capital structure. As a result, it is given the highest weighting in the relative valuation of Vår Energi. The high tax rate in Norway also affects the P/E ratio, which is calculated using earnings per share that consist of net income. Therefore, it may not be as accurate when comparing Vår Energi to Total Energies, which pays lower taxes as it is based in France. Therefore, there will be a greater emphasis placed on the Enterprise multiples. This is because Vår Energi has a distinctive tax situation and capital structure, which necessitates the use of a ratio that incorporates these features. In particular, the EV/EBITDA ratio is deemed the most suitable ratio for valuing Vår Energi, as it considers both the company's unique attributes. Consequently, it will be given the highest weighting in the relative valuation analysis.

8.8.8 Partial Conclusion Relative Valuation

Table 32 below shows the results from the relative valuation, which is based on Vår Energi's nine most robust valuation peers (Bloomberg, 2022). All multiples are calculated on a 5-year average basis, and a historical premium or discount against Vår Energi's 5-year average multiples is estimated. Vår Energi's estimated earnings are then used against these multiples to calculate the implied share price by assuming that the total number of shares will remain the same for the following year.

Relative Valuation Vår Energi			
Multiple	Historical Premium/Discount	Implied Share price	Weights
5-year Average P/E	-0.04	5.21	10%
5-year Average P/Book	-0.35	0.64	10%
5-year Average P/Sales	-0.02	2.22	10%
5-year Average EV/EBITDA	-0.19	3.20	30%
5-year Average EV/Sales	-0.04	0.46	20%
5-year Average EV/BOE	0.01	2.02	20%
Final Implied Share Price $		2.26	
USD/NOK (1/4/2022)		10.39	
Final Implied Share price NOK		**23.52**	

Table 32: Own Creation. Source: (Vår Energi, 2023) & (Bloomberg , 2023).

The relative valuation implies a fair value of NOK 23.52 for Vår Energi's share. As of 01.04.23, the share is traded at a value of NOK 25.52, indicating a downside of 6.85% according to the relative valuation model. This share price is slightly above the base case scenario in the DCF model, which provides evidence supporting a sell recommendation based on these calculations.

9.0 Conclusion

The principal aim of this thesis was to estimate Vår Energi's appropriate enterprise value, the market value of equity, and share price using various methods. The thesis also aims to provide an overview of the rise in renewable energy and conclude if it is still worth buying shares in a company that operates exclusively in Oil & Gas production. The strategic analysis conducted in Chapter 4 highlighted the significant risks the Oil & Gas industry faced in the short, medium, and long term. Future developments concerning Oil & Gas demand and supply can substantially impact the industry's financial viability. However, the strategic analysis also revealed that Vår Energi possesses significant challenges by not investing in renewable energy technology and production.

As a result, of not investing in renewable energy, this thesis presents a model that captures the effect on Oil & Gas prices, which will decrease due to increased renewable energy production. The model is built upon several estimation from different sources, where the final outputs of the model estimate a percentage decrease in the demand for Oil & Gas for the next four years. The results from this model indicate a decrease in the demand for Oil & Gas in electricity production as renewable energy is expected to increase by over 4300TWh annually. This 2.2% average yearly increase in renewable electricity in total electricity produced will also boost electricity demand in total energy consumption worldwide. The model also suggests that electricity will increase its market share in total energy produced worldwide by 4.283%. As a result of this, Oil & Gas are expected to experience a decrease in demand for energy production by 1.403% and 0.567%. Applying this demand decrease to 1 of April 2023 Oil & Gas prices would result in a yearly reduction of approximately $1.12 in the oil price and $0.48 in the gas price.

The profitability analysis conducted in this thesis suggests that Vår Energi is in line with its competitors, as it is gaining the same amount of return on its equity. However, in the last two years, it has been outperformed by its competitors, who are receiving higher returns on their assets. The liquidity analysis indicated a short-term liquidity similar to their main competitor

AkerBP, but generally worse than Equinor. In the long term, the liquidity was, on average, calculated to be slightly worse than the two competitors. Using a discounted cash flow model and applying all the inputs discussed throughout the thesis, a fair implied value of Vår Energi's shares are estimated to be NOK 22.17 as of 1 of April 2023. This implied share price indicates a downside of 10.76% from 1 of April 2023's share price of NOK 25.52. The relative valuation approach implies a similar share price, where a fair value of the share is estimated to be NOK 23.52. This implied share price indicates a downside of 6.85% from 1 of April 2023's share price.

The discounted cash flow model and the relative valuation approach imply that the fair value of Vår Energi's share is approximate 10% below where it is trading as of 1 of April 2023. The recommendation is, therefore, to sell or short the share. This recommendation is built upon the case that Vår Energi is not invested enough in renewable energy, resulting in a decrease in future Oil & Gas prices. The future Oil & Gas price will decrease too fast for Vår Energi, as renewables are replacing Oil & Gas in the world's energy demand. If Vår Energi could dramatically increase its production, and renewable energy installations were not growing as much as forecasted, Vår Energi's share could be worth buying. Still, as of 1 of April 2023, Vår Energi is not expected to achieve this according to this valuation.

10.0 Thesis in Perspective

During the course of this thesis, a comprehensive understanding of the Oil & Gas industry has been attained, along with the significant threats it poses to the environment. Of particular concern is the expected dramatic increase in the use of renewable energy until 2050, where it is projected that all energy generated will be from renewable sources. Through an analysis of the strategic and financial factors surrounding a pure Oil & Gas company, such as Vår Energi, it has become evident that these companies cannot sustain its current strategy and must develop a renewable energy plan in order to ensure long-term viability.

This thesis conducted a fundamental valuation of Vår Energi using a discounted cash flow (DCF) model. While the components employed in the DCF method were found to be robust, limitations were observed in the terminal growth rate and terminal Oil & Gas price. Given that fossil fuels are a finite resource on earth, applying a terminal growth rate to a company that solely produces Oil & Gas is not entirely accurate. This is because a terminal growth rate or terminal assumes that the company will continue to grow infinitely into the future at a given rate. As a result, scenario analysis for different Oil & Gas prices and sensitivity analysis for terminal growth rates were conducted.

In researching how other analysts have valued Exploration and Production (E&P) companies using a DCF model, it was observed that there is no particular style or component used to determine the terminal growth rate or Oil & Gas price. However, the Net Asset Value (NAV) valuation method, primarily used for valuing investment funds, frequently appeared in the valuation of E&P companies. By applying this method, a different implied share price of Vår Energi could have been calculated, and the sell recommendation may have been changed to a buy or hold recommendation.

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11.0 Appendix

Appendix 1: ***Electricity Forecasting****. Source: (IEA, 2021), (Ember, 2022), (Irena, 2021), (Mordorintellegence, 2023), (Global Wind Energy Council, 2022).*

Solar:	Hourly Instaled GW	Yearly Instaled GW	Yearly Instaled TW	Yearly Estimated Effect
2017A	480	4204800	4205	519
2018A	520	4555200	4555	580
2019A	650	5694000	5694	733
2020A	780	6832800	6833	868
2021A	940	8234400	8234	1071
2022A	1208	10582080	10582	1371
2023E	1486	13015958	13016	1721
2024E	1813	15879427	15879	2128
2025E	2193	19214184	19214	2593
2026E	2632	23057021	23057	3154

Nuclear	Hourly Instaled GW	Yearly Instaled GW	Yearly Instaled TW	Yearly Estimated Effect
2012A	2403	21052120	21052	19368
2013A	2418	21185534	21186	19491
2014A	2473	21660852	21661	19928
2015A	2502	21921462	21921	20168
2016A	2540	22254605	22255	20474
2017A	2566	22480087	22480	20682
2018A	2620	22947433	22947	21112
2019A	2724	23862941	23863	21954
2020A	2635	23079884	23080	21233
2021A	2739	23996443	23996	22077
2022E	2814	24651516	24652	22679
2023E	2833	24815240	24815	22830
2024E	2851	24975636	24976	22978
2025E	2869	25132790	25133	23122
2026E	2887	25286879	25287	23264

Wind:	Hourly Instaled GW	Yearly Instaled GW	Yearly Instaled TW	Yearly Estimated Effect
2021A	825	7227000	7227	1857
2022E	925	8103000	8103	2147
2023E	1028	9005280	9005	2408
2024E	1133	9925080	9925	2680
2025E	1253	10976280	10976	2992
2026E	1382	12106320	12106	3344

Hydro:	Hourly Instaled GW	Yearly Instaled GW	Yearly Instaled TW	Yearly Estimated Effect
2017A	1272	11142720	11143	4077
2018A	1296	11352960	11353	4208
2019A	1313	11501880	11502	4239
2020A	1334	11685840	11686	4350
2021A	1360	11913600	11914	4209
2022E	1384	12123840	12124	4321
2023E	1408	12334080	12334	4563
2024E	1437	12588120	12588	4615
2025E	1465	12833400	12833	4688
2026E	1494	13087440	13087	4771

Bioenergy	GWh	Total Yearly Instaled capasity GWh	Total Yearly Instaled capasity TWh	Yearly Estimated Effect
2015	106	925932	926	340
2016	115	1003896	1004	371
2017	121	1059960	1060	388
2018	130	1135296	1135	421
2019	137	1200996	1201	443
2020	146	1279836	1280	476
2021	158	1382328	1382	488
2022	169	1476936	1477	526
2023	177	1553148	1553	575
2024	188	1642500	1643	602
2025	199	1744992	1745	637
2026	208	1821204	1821	664
2027	217	1900920	1901	692

Appendix 2: ***Oil & Gas Price Calculation.*** *Source: Own Model*

Inputs for Price Calculations :

Average 5-year Growth from Total Energy Consumption	
Oil	-1.403%
Gas	-0.567%
Electrisity	4.283%

Average growth in energy consumption last 5 years	
Oil	-0.3211%
Gas	0.5486%
Electrisity	5.4204%

Renewables Energy Growth Electrisity	
2022E	9.73%
2023E	10.77%
2024E	8.18%
2025E	8.83%
2026E	9.37%

Renewables Growth from Total Electrisity Consumption	
2022E	2.33%
2023E	2.34%
2024E	1.68%
2025E	1.98%
2026E	2.29%

Oil decrease in total electrisity consumption	
2022E	-0.07%
2023E	-0.06%
2024E	-0.04%
2025E	-0.05%
2026E	-0.06%

Gas decrease in total electrisity consumption	
2022E	-0.59%
2023E	-0.50%
2024E	-0.33%
2025E	-0.41%
2026E	-0.52%

Total decrease in Energy Oil Demand	
2022E	-1.4751%
2023E	-1.4634%
2024E	-1.4437%
2025E	-1.4532%
2026E	-1.4662%

Total decrease in Energy Gas Demand	
2022E	-1.161%
2023E	-1.064%
2024E	-0.901%
2025E	-0.980%
2026E	-1.087%

Appendix 3: ***Production Split.*** *Source: (Vår Energi, 2023)*

Production split		
Yearly Production in 2022	80319000	
Daily Productuon in 2022	220052.0548	Barrels/day
Crude Oil	56%	
Gas	37%	
NGL	7%	

Acuall Production, Revenue and Oil Price 2022								
Oil			**Gas**			**NGL**		
Daily Production	123229.1507		Production	81419.26027		Production	15403.64384	
Acuall Revenue 2022	4669095		Acuall Revenue 2022	4,732,282		Acuall Revenue 2022	379166	
Average Oil Price 2022	104	$	Average Gas Price 2022	159.24	$	Average NGL Price 2022	67.44	$
Daily revenue	12792041.10		Daily revenue	12965156.16		Daily revenue	1038810.959	
Yearly Revenue	4669095000		Yearly Revenue	4732282000		Yearly Revenue	379166000	
In 1000USD	4669095		In 1000USD	4732282		In 1000USD	379166	
Objective for solver	0.00	- Solver	Objective for solver	0.00	- Solver	Objective for solver	0.00	- Solver

Appendix 4: ***Credit ratings****: Source: (Trading Economics , 2022)*

Agency	Rating	Outlook	Date
DBRS	**AAA**	stable	Mar 21 2012
Fitch	**AAA**	stable	Sep 21 2000
Moody's	**Aaa**	stable	Sep 30 1997
Fitch	**AAA**	n/a	Mar 13 1995
S&P	**AAA**	stable	Nov 08 1990
S&P	**AAA**	negative	Jun 26 1989
Moody's	**Aa1**	stable	Jul 13 1987
Moody's	**Aaa**	stable	Jan 12 1978
S&P	**AAA**	n/a	Jul 09 1975

*Appendix 5:****Beta Regression****, Vår Energi against Oslo Børs. Source: (Yahoo Finance , 2023)*

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.557837438							
R Square	0.311182607							
Adjusted R Square	0.308713727							
Standard Error	0.023773042							
Observations	281							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	0.071234	0.071234	126.042	2.21E-24			
Residual	279	0.157679	0.000565					
Total	280	0.228913						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95,0%*	*Upper 95,0%*
Intercept	9.17434E-05	0.001418	0.06469	0.948467	-0.0027	0.002883	-0.0027	0.00288347
X Variable 1	1.335242018	0.118933	11.22684	2.21E-24	1.101122	1.569362	1.101122	1.56936195

Appendix 6: ***Cost of Equity Calculation.*** *Source: (World Government Bonds, 2023), (Damodoran, 2022), (Yahoo Finance , 2023)*

10-year government yield	3.17%
Market risk premium	4.82%
Beta	1.32
Cost of Equity	9.5324%

*Appendix 7:****Cost of Debt Calculation.*** *Source: (Vår Energi, 2023)*

Year	Interest paid on debt and borrowings	non-Current Interest Bearing Debt and Borrowings	Current Interest bearing debt and borrowings
2021	143462	4493426	333149
2022	129782	2452589	500000
Pre - Tax Cost of Debt			
2021	2.9723%		
2022	4.3955%		

Appendix 8: ***WACC Calculation.****: Source: (Vår Energi, 2023) (Yahoo Finance , 2023) (Regjeringen, 2022)*

	31/12/2022
Equity	83879249.87
Debt	2952589
We	0.9660
WD	0.0340
re	0.095324
rd	0.043955322
Tax	22.00%
WACC	9.3248%

Appendix 9: ***Price Earnings.*** *Source: (Vår Energi, 2023) & (Bloomberg , 2023)*

Price/Earnings	2018	2019	2020	2021	2022
Equinor	9.27	36.26	25.32	10.15	3.96
Aker BP	18.92	83.92	210.64	13.01	9.59
DNO	4.23	18.78	14.05	5.65	3.09
Shell	10.43	15.05	19.14	8.48	4.89
BP PCL	12	5.44	6.04	5.46	6.31
Exxon Mobile	13.84	27.89	21.82	11.49	7.85
Chevron	12.49	20.1	17.33	13.62	9.36
Marathon Petroleum	10.27	10.72	10.87	27.01	4.4
Total Energies	12.05	12.76	9.8	8.34	7.87
Mean each year	11.50	25.66	37.22	11.47	6.37
Median each year	12	18.78	17.33	10.15	6.31
Vår Energi					6.09
Historical Premium/Discount					-4%
Mean	-4%				
Median	-4.38%				

2023E	
P/E Peers Mean	18.44
Premium/discount	-4%
Target P/E	17.63592603
EPS	0.38
Price from P/E	**5.21**
Weight	20%

Appendix 10: ***Price/Book.*** *Source: (Vår Energi, 2023) & (Bloomberg , 2023)*

Price/Book	2018	2019	2020	2021	2022
Equinor	1.63	1.61	1.63	2.23	2.11
Aker BP	3.02	4.98	4.58	4.74	1.24
DNO	1.24	1.01	0.93	1.14	0.89
Shell	1.21	1.25	0.89	0.98	1.03
BP PCL	1.55	1.33	1.02	2.11	1.09
Exxon Mobile	1.51	1.54	1.11	1.54	2.31
Chevron	1.32	1.57	1.23	1.63	2.12
Marathon Petroleum	1.14	1.16	1.21	1.41	1.91
Total Energies	1.33	1.35	0.9	1.2	1.47
Mean each year	1.55	1.76	1.50	1.89	1.57
Median each year	1.33	1.35	1.11	1.54	1.47
Vår Energi					1.03
Historical Premium/Discount					-35%
Mean	-35%				
Median	-34.58%				

2023E	
P/B Peers Mean	1.65
Premium/discount	-35%
Target P/B	1.081609033
Book Value per share	0.59
Price from P/B	**0.64**
Weight	10%

Appendix 11: ***Price/Sales****: Source: (Vår Energi, 2023) & (Bloomberg , 2023)*

Price/Sales	2018	2019	2020	2021	2022
Equinor	0.89	1.05	1.21	0.98	0.76
Aker BP	2.4	3.52	3.05	1.96	1.18
DNO	1.82	1.4	1.27	1.15	0.86
Shell	0.63	0.69	0.76	0.65	0.54
BP PCL	1.38	1.4	1.13	1.19	1.08
Exxon Mobile	1.04	1.17	0.99	0.95	1.16
Chevron	1.3	1.61	1.67	1.44	1.47
Marathon Petroleum	0.32	0.36	0.38	0.34	0.34
Total Energies	0.75	0.82	0.77	0.72	0.61
Mean each year	1.17	1.34	1.25	1.04	0.89
Median each year	1.04	1.17	1.13	0.98	0.86
Vår Energi					0.87
Historical Premium/Discount					-2%
Mean	-2%				
Median	-2.13%				

2023E	
P/S Peers Mean	1.14
Premium/discount	-2%
Target P/S	1.11273
Revenue per share	1.994740781
Price from P/S	**2.22**
Weight	10%

Appendix 12: ***EV/EBITDA****: Source: (Vår Energi, 2023) & (Bloomberg , 2023)*

EV/EBITDA	2018	2019	2020	2021	2022
Equinor	4.25	12.01	1.92	1.12	0.8
Aker BP	7.14	8.2	3	1.68	1.6
DNO	4.57	27.11	2.54	1.34	1.06
Shell	6.1	8.07	4.54	2.96	2.85
BP PCL	7.2	7.01	4.99	5.02	5.12
Exxon Mobile	11.02	14.78	6.89	5.31	4.82
Chevron	7.92	12.92	7.07	6.04	5.13
Marathon Petroleum	9.32	8.12	7.34	3.11	3.19
Total Energies	5.65	7.75	4.32	3.12	2.75
Mean each year	7.02	11.77	4.73	3.30	3.04
Median each year	7.14	8.2	4.54	3.11	2.85
Vår Energi	4.2	4.7	4.1	4.6	2.4
Historical Premium/Discount	-40%	-60%	-13%	39%	-21%
Mean	-19%				
Median	-20.94%				

2023E	
EV/EBITDAPeers Mean	5.97
Premium/discount	-19%
Target EV/EBITDA	4.835611594
EBITDA	3,833,079
Implied EV	18535281.58
Implied NIBL	10421373
Implied Equity value	8113908.577
Shares Outstanding	2496406.246
Price from EV/EBITD	**3.20**
Weight	30%

Appendix 13: ***EV/Sales****: Source: (Vår Energi, 2023) & (Bloomberg , 2023)*

EV/Sales	2018	2019	2020	2021	2022
Equinor	1.28	1.58	0.97	0.66	0.47
Aker BP	4.56	4.28	2.27	1.39	1.32
DNO	1.82	2.07	1.33	0.63	0.49
Shell	0.91	1.2	0.86	0.63	0.61
BP PCL	0.66	1.27	0.9	0.6	0.61
Exxon Mobile	1.38	1.4	1.13	1.19	1.08
Chevron	1.81	2.18	1.65	1.5	1.28
Marathon Petroleum	0.7	0.97	0.5	0.43	0.44
Total Energies	1.05	1.12	0.9	0.71	0.62
Mean each year	1.57	1.79	1.17	0.86	0.77
Median each year	1.28	1.4	0.97	0.66	0.61
Vår Energi	1.4	1.15	0.88	1.02	1.01
Historical Premium/Discount	-11%	-36%	-25%	19%	31%
Mean	-4%				
Median	-11.08%				

2023E	
EV/Sales Peers Mean	1.23
Premium/discount	-4%
Target EV/Sales	1.178745093
Implied EV	11571444.71
Implied NIBL	10421373
Implied Equity value	1150071.713
Shares Outstanding	2496406.246
Price from EV/Sales	**0.46**
Weight	20%

Appendix 14: ***EV/BOE.*** *Source: (Vår Energi, 2023) & (Bloomberg , 2023)*

EV/BOE	2018	2019	2020	2021	2022
Equinor	54.50968992	56.92526519	58.9236715	70.7647908	77.499264
Aker BP	68.64433121	78.37683333	59.1432905	79.7899952	89.051162
DNO	24.52883297	31.31993835	28.4823503	31.2012447	28.80485
Shell	74.12908162	60.75352912	59.1532249	65.7627345	83.131427
Total Energies	163.9604087	163.4533493	172.476993	195.638667	200.04213
Mean each year	77.15	78.17	75.64	88.63	95.71
Median each year	68.64433121	60.75352912	59.1432905	70.7647908	83.131427
Vår Energi	79.17	84.21	86.02	89.9957091	76.41174
Historical Premium/Discount	3%	8%	14%	2%	-20%
Mean	1%				
Median	2.61%				

2023E	
EV/Sales Peers Mean	69.50
Premium/discount	1%
Target EV/Sales	70.25802557
Daily production	220052
Implied EV	15460419.04
Implied NIBL	10421373
Implied Equity value	5039046.042
Shares Outstanding	2496406.246
Price from EV/Sales	**2.02**
Weight	20%

Appendix 15: ***EV/BOE Calculation****: Source: (Vår Energi, 2023) & (Bloomberg , 2023)*

Production Peers					
Vår	Production mboepd	Equity + Liabilities	EV	BOE	EV/BOE
2018A	169	82,179,122	8217912200	169000000	48.62669941
2019A	300	133502825	13350282500	300000000	44.50094167
2020A	265	131966748	13196674800	265000000	49.79877283
2021A	220	19799056	19799056000	220000000	89.99570909
2022A	246	18797288	18797288000	246000000	76.41173984
Equinor	Production mboepd	Equity + Liabilities	EV	BOE	EV/BOE
2018A	2064	112,508	1.12508E+11	2064000000	54.50968992
2019A	2074	118,063	1.18063E+11	2074000000	56.92526519
2020A	2070	121,972	1.21972E+11	2070000000	58.9236715
2021A	2079	147,120	1.4712E+11	2079000000	70.76479076
2022A	2039	158,021	1.58021E+11	2039000000	77.49926435
Aker BP	Production mboepd	Equity + Liabilities	EV	BOE	EV/BOE
2018A	157	10777160	10777160000	157000000	68.64433121
2019A	156	12226786	12226786000	156000000	78.37683333
2020A	210	12420091	12420091000	210000000	59.14329048
2021A	209.4	16708025	16708025000	209400000	79.78999522
2022A	421.8	37561780	37561780000	421800000	89.05116169
DNO	Production mboepd	Equity + Liabilities	EV	BOE	EV/BOE
2018A	81.712	2,004.30	2004300000	81712000	24.52883297
2019A	104.467	3,271.90	3271900000	104467000	31.31993835
2020A	95.101	2,708.70	2708700000	95101000	28.48235034
2021A	94.477	2,947.80	2947800000	94477000	31.20124475
2022A	97.31	2,803.00	2803000000	97310000	28.80485048
Total Energies	Production mboepd	Equity + Liabilities	EV	BOE	EV/BOE
2018A	1566	256,762	2.56762E+11	1566000000	163.9604087
2019A	1672	273,294	2.73294E+11	1672000000	163.4533493
2020A	1543	266,132	2.66132E+11	1543000000	172.4769929
2021A	1500	293,458	2.93458E+11	1500000000	195.6386667
2022A	1519	303,864	3.03864E+11	1519000000	200.042133
Shell	Production in Millions daily	EV	EV	BOE	EV/BOE
2018A	538.512	399,194	39919400000	538512000	74.12908162
2019A	665.535	404,336	40433600000	665535000	60.75352912
2020A	641.162	379,268	37926800000	641162000	59.15322493
2021A	614.906	404,379	40437900000	614906000	65.76273447
2022A	532.92	443,024	44302400000	532920000	83.13142686