Handelshøyskolen BI

GRA 19204 Masteroppgave i regnskap og revisjon

Thesis Master of Science 100% - W

Predefinert informasjon

Startdato:	11-01-2021 09:00 CET	**Termin:**	202120
Sluttdato:	01-12-2021 12:00 CET	**Vurderingsform:**	Norsk 6-trinns skala (A-F)
Eksamensform:	T		
Flowkode:	202120||22666||IN17||W||T		
Intern sensor:	(Anonymisert)		

Deltaker

Navn:	Arijana Horic

Informasjon fra deltaker

Engelsk tittel *:	Valuation of the Statkraft Group
Navn på veileder *:	Ignacio Garcia de Olalla Lopez

Inneholder besvarelsen konfidensielt materiale?:	Nei	**Kan besvarelsen offentliggjøres?:**	Ja

Valuation of the Statkraft Group

Master Thesis in Auditing and Accounting

BI Norwegian Business School

Arijana Horic

Acknowledgements

I want to express gratitude to my supervisor, Ph.D. Ignacio Garcia de Olalla Lopez. Thank you for your guidance, and support. I would also like to thank my family. Thank you for your patience and constant support throughout this process, I would not have been able to do it without you.

Contents

Executive summary

The purpose of thesis is to do a valuation of the Statkraft Group. Statkraft is Norwegians largest energy producer, generating its power mainly from hydropower. In 2020 the Group generated 65,4 TWh energy. (Statkraft, 2021) Statkrafts main market is in Norway, but the Group is planning to expand internationally. Increasing interest in clean energy throughout the last decades have led to growth opportunities in the clean energy sector. We see existing companies redefining their strategies to become more sustainable, and new established companies competing to take advantage of the increased demand.

The energy industry is dynamic and with the growth opportunities, Statkraft plans to position them self as one of the world's leading clean energy providers (Statkraft, 2021). Entering new markets may yield higher returns but also expose the Group to new risks. Analysis of the industry shows that profitability is highly volatile and achieving strong and stable returns will require high quality risk management and smart investments.

Valuation of the Statkraft Group is done by forecasting future income, and discount future cash flows with the cost of capital. The present value of the cash flows yields the market value of equity. The forecasted future returns are based on historical figures and analysis of the company, industry, and the growth potentials.

The profitability analysis shows that the Statkraft Group yields positive returns to the equity owners, in line with the market average. The Groups financial leverage is below the market average indicating lower risk for the equity holders. The Groups financial position appears solid and the fundament for further growth is strong.

The Dividend-model is the main model used to estimate the market value of the equity. The model yields a market value of NOK 174 billion. The estimated value of the Groups equity is based on several assumptions regarding future growth, cost of capital and future power prices. The market value is compared to other firms in the energy sector listed on the stock exchange, using the Multiple P/E.

1.0 Introduction

1.1 Research question and purpose of the thesis

Energy is essential in our day-to day services and business. Just think about how much electricity you use in one day, showering, cooking, traveling to work or working on your computer. According to the Norwegian Water Resources and Energy Directorate (NVE), energy consumption has increased by 40% in Norway since the 1970`s.

New climate goals and political incentives like the Paris Agreement, UN Sustainable Development Goals and the European 2030 Climate Target plan increase the demand for renewable energy and sustainable power sources.

The purpose of this thesis is to finalize my master`s degree in auditing and accounting. I have chosen this topic because the research process will allow me to use knowledge acquired in several courses that I have found interesting.

The Norwegian government have considered the possibility of a partial privatization of Statkraft and a potential initial public offering of Statkraft has been discussed for several years (Bøhren & Hovland, 2020) and (Rikke, J, 2016 s. 90-96). This debate has been my motivation for doing a valuation of the Statkraft Group.

Norway`s hydropower resources are protected by legislation. The government wants to make sure that the resources are used for the benefit of the society. The Waterfalls Right Act § 5 (The Waterfalls Right Act, 2018) requires that minimum two thirds of the capital and votes are under public ownership, meaning that up to 33% of the company could potentially be owned by private investors.

Recently, Christian Rynning-Tønnesen, the CEO of Statkraft AS, said in an interview with E24 that “the growth potential of the company is only limited by capital” (Bøhren & Hovland, 2020). The CEO is optimistic to a potential initial public offering, while there are more divided opinions among the politicians and the Norwegian people. In this thesis, I will do a financial analysis and valuation of Statkraft Group with the purpose of estimating the market value of the company.

My research question will therefore be:

- What is the market value of the Statkraft Group?

1.2 Methodology

In this thesis I will use both archival and quantitative research methods.

I will start my research with collection of financial data and information about the Statkraft Group. Information will be collected from publicly available information only. Furthermore, I will do an external and internal analysis of the industry and the company. This first part will give me better understanding of the company and growth opportunities and will be taken into consideration in the valuation process. There are several valuation methods, in this thesis I will use both discounted cash flow models and relative valuation models. Estimation of future cash flows will be based on financial information from the annual reports in the period 2015-2020.

The thesis will be based on publicly available information from both primary and secondary sources. Secondary data information will be used as a supplement. Collection of data will include a critical evaluation of the reliability of the data and the source.

2.0 Presentation of company

2.1 About the company

Statkraft AS is a Norwegian company within the energy sector. Statkraft AS is wholly owned by the Norwegian state through the state enterprise Statkraft SF. The only purpose of Statkraft SF is to investment in Statkraft AS, the parent company of the Statkraft Group. The objective of Statkraft is to engineer, construct and operate energy facilities, in addition to physical and financial energy trading.

The headquarter is in Oslo, Norway and the CEO is Christian Rynning-Tønnesen.

The Statkraft Group has become a global provider of pure energy, with over 100 years of history and 4 600 employees in countries across the world. They are Europe`s largest renewable energy producer, producing electricity from hydropower, wind power, solar power, gas-fired power, and biomass. Statkraft also supply`s distinct heating within Norway and buy and sell electricity. Approximately 90% of the Statkraft`s power is generated from hydropower. The Group owns and operate 346 hydropower plants, majority of them in Norway and Sweden. They also have power plants in Germany, Albania, Turkey, India, Brazil, and Chile (Statkraft, 2021).

Remaining 10% of the energy production comes from wind and other energy sources. The group owns 29 windfarms, most of them located in the Nordic countries and Great Britain.

Statkraft owns three solar parks/plants. One floating solar plant in Albania and two solar parks in Germany. The floating solar plant is a new investment in 2020-2021.

In addition, the group operates two biomass power plants and four gass-fired power plants in Germany.

Statkraft owns approximately 35% of Norwegians production capacity in the energy sector (Energifaktanorge, 2021). In 2020, over 90 per cent of Statkraft`s power generation was based on renewable energy sources (Statkraft, 2021).

Statkraft plans to become one of the world's leading clean energy providers by being competent, responsible, and innovative, which are their values. The Group has long experience with clean energy production and the experience will be important when looking forward.

2.2 Governance and structure

2.2.1 Structure

The Statkraft Group consist of four business areas, Production, Markets and IT, European Wind and Solar, and International power. All four business areas have an Executive Vice President who deals with daily operations and risks, the Executive Vice Presidents are all reporting to the CEO. In addition to the business areas` they have two staff areas, The CFO organisation and Corporate staff.

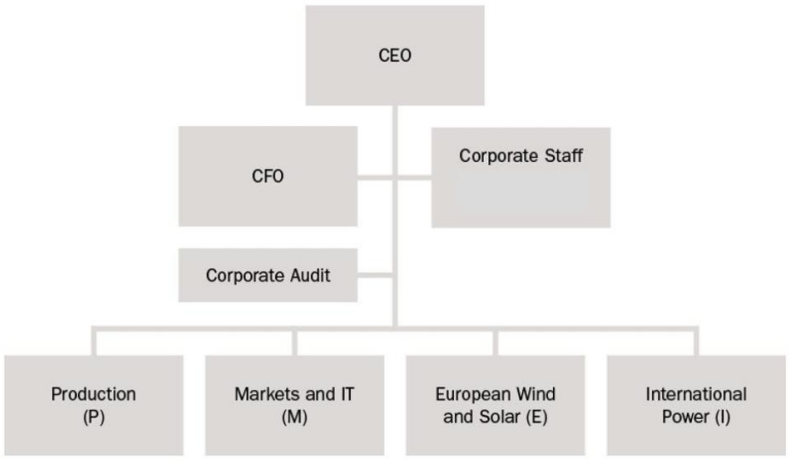

Figure 1: Organisation Statkraft Group. Source: Annual report 2020

The reportable segments are defined as European flexible generation, Market operations, International power, European wind and solar, District heating and Industrial ownership.

European flexible generation is the largest segment in the group, consisting of the hydropower business in Europe, gas-power plants in Germany and Baltic Cable and biomass power plants in Germany.

Market operations main activities include providing a market access for trading renewable energy and trading of standard financial contracts and structured products.

International power is responsible for development, ownership, and operations of renewable assets outside Western Europe, focusing on growth markets.

European wind and solar segment constructs and develop wind and solar power plants with the purpose to sell.

District heating segment delivers electricity heating within Norway and Sweden. Waste-to-energy plants and biomass plants are used to produce electricity.

Industrial ownership is responsible for shareholdings within the Group`s core business.

Most of the revenues in all the segments, come from sales of energy.

2.2.2 Governance

The CFO organisation is responsible for financial management such as monitoring financial performance and allocation of resources.

Corporate staff consists of supporting functions such as HR and Governance. Risk management is an integrated part of the governance.

In addition, the group has a separate/independent audit function.

Being a global company, Statkraft is exposed to higher risk and complexity. An effective organisational structure and good governance is essential to be able to reach their objectives, ensure value-creation, and stay competitive.

The Groups corporate governance complies with the Norwegian Code of Practice for Corporate Governance and Norwegian state`s ten principles for efficient governance (Norwegian Corporate Governance Board, 2020).

The Institute for Internal Auditors (IIA) provides guidance for governance and risk management to enhance performance.

According to the IIAs a company has a higher probability of being effectively managed if they structure their organization according to the three lines of defense model (The Institute of Internal Auditors, 2020).

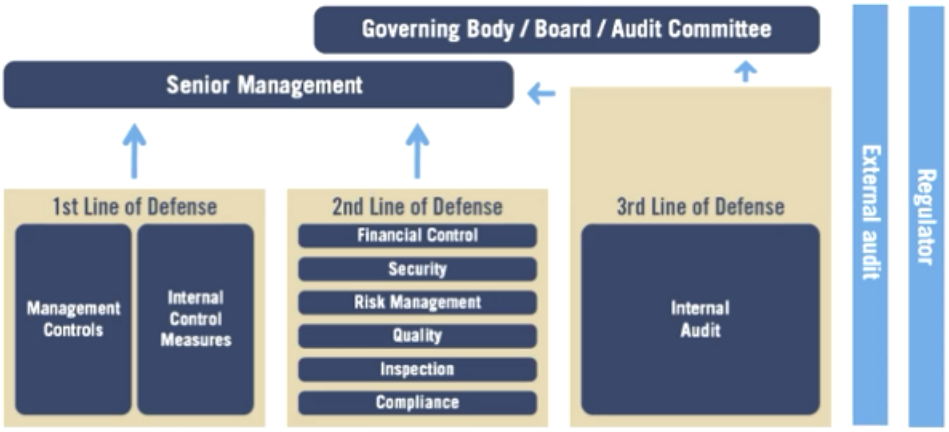

Figure 2: Three lines of defense-model. Source: The Institute of Internal Auditors

It appears like the Statkraft Group has implemented all three lines of defense and has a good fundament for enchasing performance, assuming good information flow between the different functions. The board have between eight and ten annually meetings, including a meeting where the strategi is discussed and there are established guidelines for the board- members and the managements responsibilities and duties.

According to the Annual report 2020 page 62, the processes of risk assessment is reviewed regularly both at business level and for the whole group. In 2020 the focus was on strengthening their internal controls.

The Board of Directors, consisting of nine members, is responsible for the management and supervision of the company. All the members have experience from leading positions, mainly within the energy sector. Thorhild Widvey, the chair, has long experience from enterprises within the oil and energy sector. Between 2013 and 2015 she was the prime minister of Petroleum and Energy. Peter Mellby, the deputy chair has 20 years of experience from corporate management in Equinor. The performance and competence of the board-members is considered at least once a year.

The group management consists of the Chief Executive Officer, the Chief Financial Officer, and the Executive Vice Presidents of the different segments.

2.3 Industry

The energy sector is complex and dynamic. Profitability in the energy sector is determined by the price of electricity/power, cost of input resources and how effective a company uses its resources. A competent board and management will increase the possibility of using the resources effectively. Cost of input sources are low and predictable for Statkraft, owning 346 hydropower plants.

Price on power/electricity on the other hand, is more volatile and unpredictable. The price highly depends on the reservoir lever determined by the weather conditions, the prices in the international market and the possibility of transferring power. Weather and international prices are outside the company`s control. Historical numbers from Nordpool shows that the average price per kwh in Norway is at NOK 1,18 in September 2021 (Nordpool, 2021). The price has increased in 2021 due to dry weather and high-power prices in Europe. Prices in Europe has increased as a consequence of higher coal and gas prices in addition to CO2 prices.

Power spot prices									
	2012	2013	2014	2015	2016	2017	2018	2019	2020
Power spot price	24,6	30,0	24,5	19,1	24,5	27,3	42,3	40,7	11,4

Figure 3: Historical power spot prices. Source: Norwegian Statistics Bureau

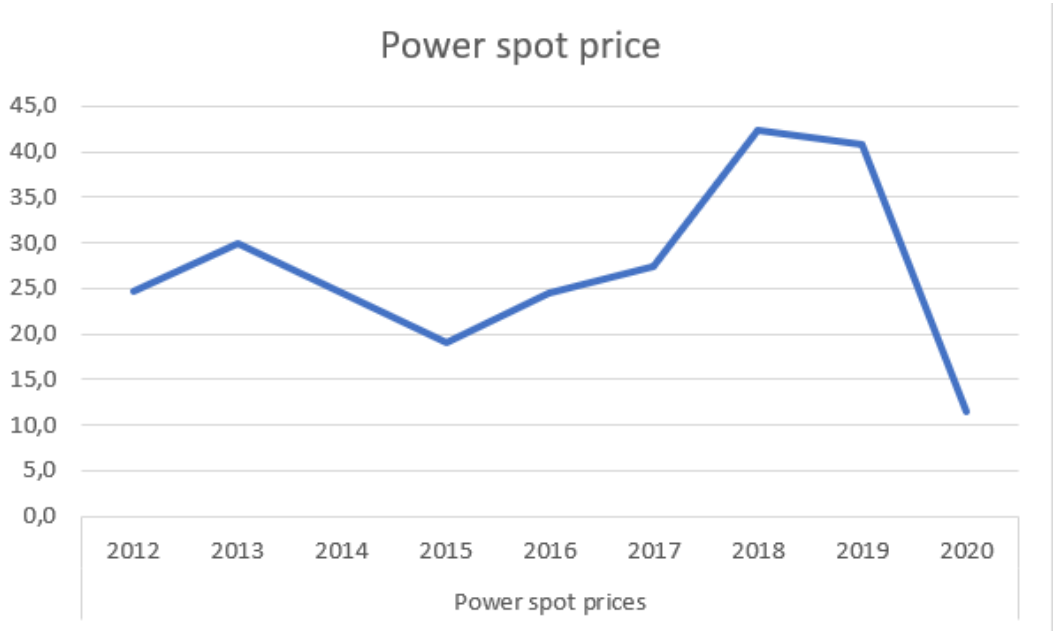

Figure 4: Historical spot prices. Source: Norwegian Statistics Bureau

Norwegian power prices have been relatively stable in the period 2012-2017, after 2017 we see an increase in power prices to about NOK 0,40 per KWh followed by a huge decrease in price in 2019-2020.

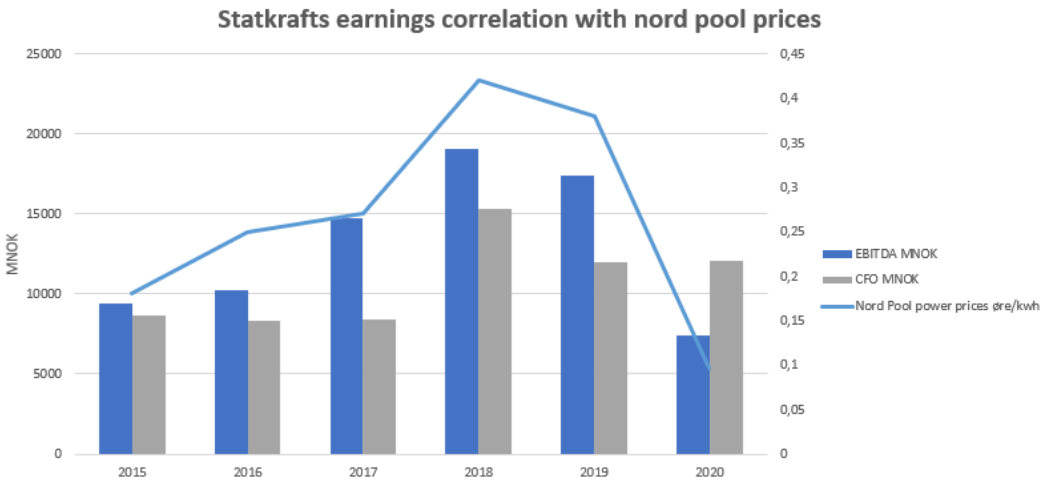

Figure 5: Earnings correlation with power prices

A we can see from figure 5, EBITDA is affected by the power prices and returns are highly exposed to changes in power prices. This becomes more evident in year 2020, when the prices were abnormally low.

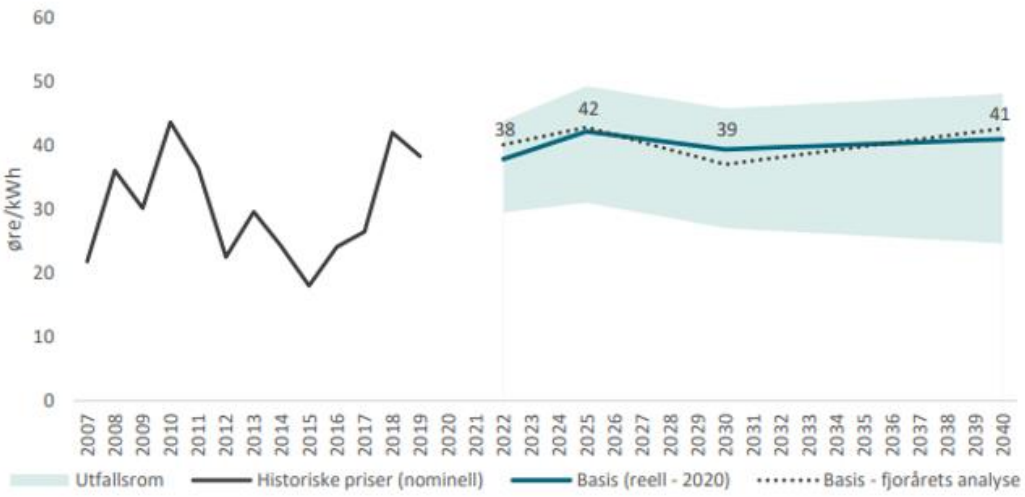

Figure 6: Prognosis for future power prices 2020-2040. Source: Norwegian Water Resources and Energy Directorate (NVE).

The Norwegian Water Resources and Energy Directorate (NVE) monitors power prices and estimates future power prices. According to their estimates, the power price per KWh will be NOK 0,38 in 2022, NOK 0,42 in 2025 and an average of NOK 0,40 after 2025. I will use NVE`s estimations in my forecast, to estimate future revenue.

The power industry in Norway is dominated by one big actor, Statkraft AS, producing over 40% of the energy in Norway. Other energy producers and suppliers are a lot smaller (Energifaktanorge, 2021).

Approximately 90 % of the produced power in Norway is from hydropower, remaining10 % from wind power and solar energy (Norwegian Water Resources and Energy Directorate, 2021).

There are 1682 hydropower plants, and 1000 reservoirs, with a production capacity of over 33 000 MW and a storage capacity of 87 TWh (Norwegian Water Resources and Energy Directorate, 2021).

According to NVE, Norway owns almost 50% of Europe’s total storage capacity. Because of the storage possibilities, energy production from hydropower is more flexible than energy production from other energy sources like wind and solar.

The hydropower plants and the reservoirs owned by Statkraft provides them with unique competitive advantage.

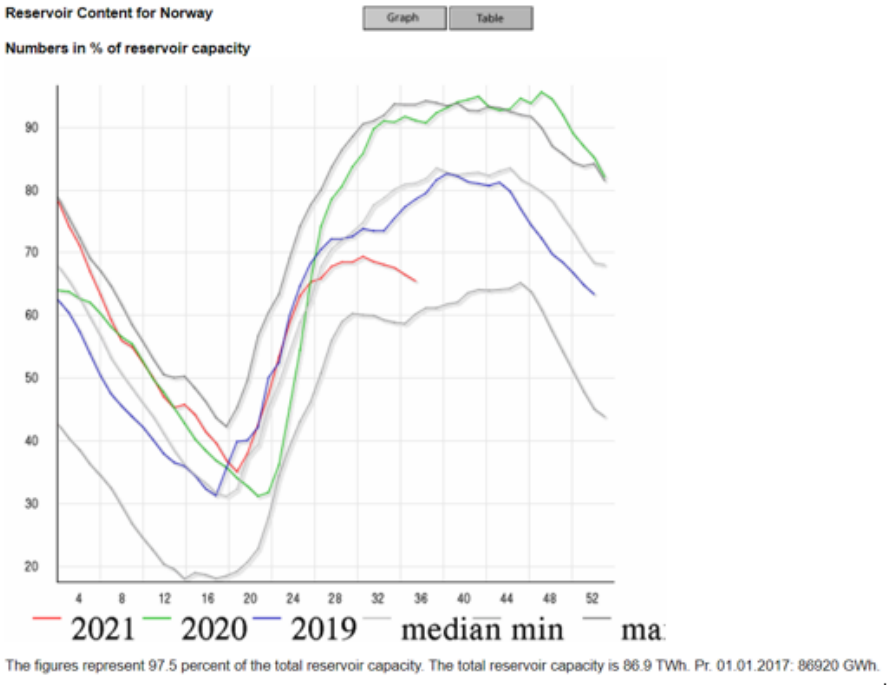

Figure 7: Reservoir content for Norway. Source: Norwegian Water Resources and Energy Directorate (NVE)

Figure 7 shows how reservoir content impacts power prices. As we can see in figure 7, water storage is not constant thorough out the year, there are normally lower levels in the spring and higher levels in the autumn when it rains mores. In 2020 the water levels were close to the maximum and the power prices were also low. In 2021 however water levels are under median, and the power prices are high.

2.4 Energy market

Fossil fuels like coal, oil and gas play a dominant role in the global energy sector.

Producing energy with fossil fuels creates carbon dioxide and have negative impacts on the environment and the climate. The energy sector is preparing for a transformation from fossil fuels to renewable energy. Statkraft has an opportunity to contribute to achieving the climate goals and the transformation to pure energy. The growth opportunity is driven by environmental and political ambitions. In

2019, the EU produced around 39 % of its own energy, while 61 % was imported (European Commission, 2021).

European Union “2030 climate and energy framework” includes targets for reducing greenhouse gas emission and increasing the portion of renewable energy. The goal is to increase renewable energy share to 32% by 2030, from today’s share of approximately 19% (European Commission, 2021).

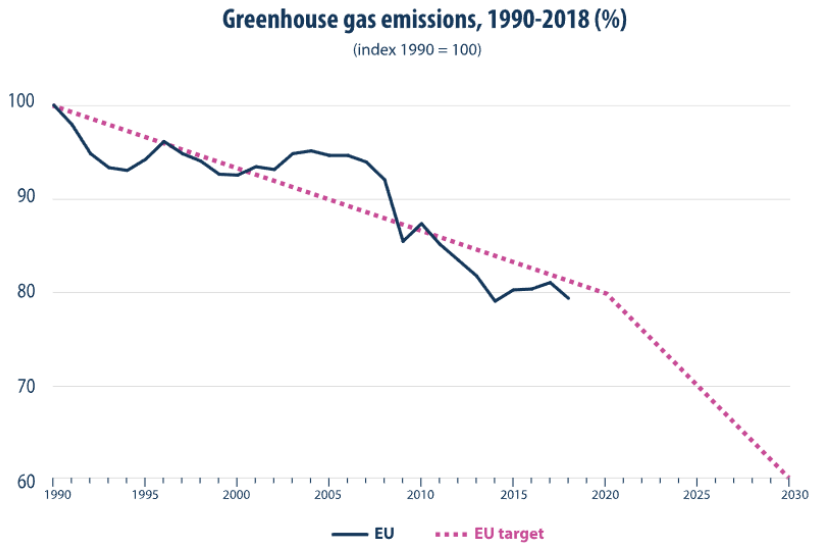

Figure 8: Greenhouse gas emissions. Source: European Commission

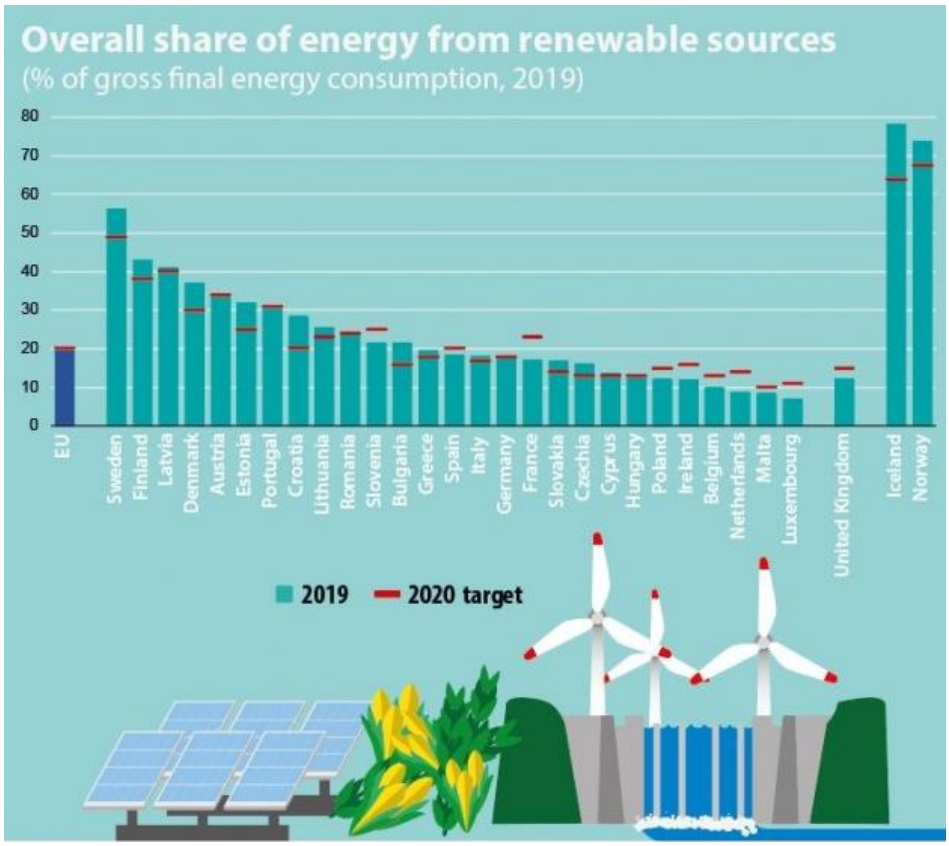

Figure 9: Overall share of energy from renewable sources. Source: European Commissi

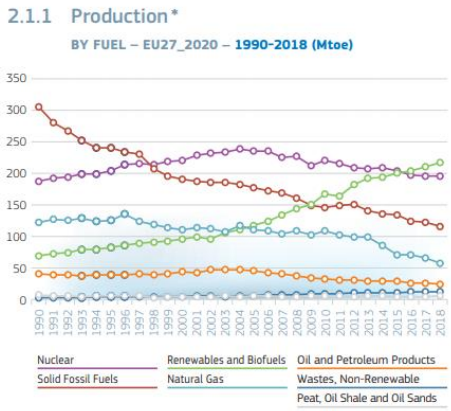

Figure 10: Energy production by fuel in the European Union. Source: European Commission.

As we can see in figure 10, the share of renewable energy has increased in the period 1990-2018. In figure 9, we can see that the share of renewable energy is just below 20% in the European Union by 2019. We also see that the Nordic countries have the largest shares of renewable energy.

Statkraft already has a large market share in the Norwegian energy market, but there is a potential for further growth internationally. The Group has a growing presence in international markets and according to their annual report 2020, they are planning international investments of NOK 10 billion annually.

Statkraft generation by geography in 2020, TWh	
Norway	47,5
Sweden	7,4
Rest of Europe	6,4
Outside Europe	4,1
Total generation	**65,4**

Figure 10: Statkrafts generation by geography.

As shown in table 10, Statkraft generates most of its power. 47,5 TWh, in Norway but they are also producing power in Europe as well as outside Europe.

Produksjon (TWh)	2020	2019
Norge	154,2	134,9
Sverige	157,8	162,4
Danmark	27,2	27,9
Finland	63,7	63,8
Sum Norden	403,0	389,0
Forbruk (TWh)		
Norge	133,7	134,9
Sverige	132,9	136,4
Danmark	34,1	33,5
Finland	78,4	83,4
Sum Norden	379,1	388,3
Nettoeksport (TWh)		
Norge	20,5	0,0
Sverige	24,9	26,0
Danmark	-6,9	-5,6
Finland	-14,6	-19,6
Sum Norden	23,8	0,7

Figure 11: Energy production in Norway. Source: Norwegian Statistics Bureau

As we can see in figure 11, Norway produced 154,2 TWh energy and consumed 133,7 TWh energy in 2020. As mentioned, Statkraft is responsible for over 40% of the total production.

Companies around the world are investing in renewable energy and according to the International Renewable Energy Agency, 261 GW renewable energy was installed globally in 2020 (International Renewable Energy Agency, 2021).

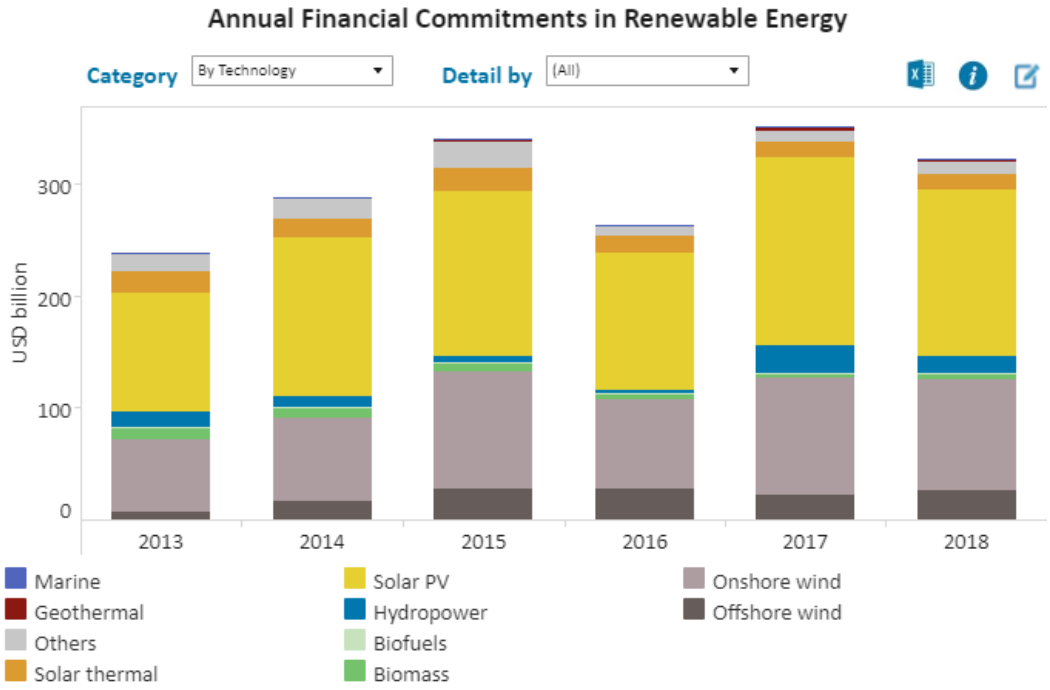

Figure 12. Annual financial commitments in renewable energy. Source: International Renewable Energy Agency

In the period 2013-2018 solar power and wind power are dominating when it comes to new investments, representing respectively 46% and 29% of global renewable energy investments.

Solar and wind power have lower production costs and large growth is expected also in the coming years.

Generation by technology in 2020, TWh	
Hydropower	55,7
Wind power	4,3
Gas power	5,1
Other (biomass and solar)	0,3
Total generation	**65,4**

Figure 13: Statkrafts power generation by technology

In 2020 and previous years, Statkrafts power was generated mainly from hydropower, but according to their annual report 2020, they are planning large investments in other energy sources like wind and solar power.

The biggest competitor in Norway is the Hafslund Eco Group. Hafslund Eco Group is the second largest energy producer in Norway, after Statkraft. The group owns 80 power plants, all of them in Norway, with a production capacity of 5 200 MW.

3.0 Financial analysis

3.1 Financial position

3.1.1 Income statement

Statkraft Group presents their financial statements in accordance with International Financial Reporting Standards (IFRS).

Revenue is recognized over time according to IFRS 15. Revenue recognition takes place when their performance obligation, delivering power, is satisfied and Statkraft have the right to send an invoice to the customer. Sales of power occur at spot-prices, regulated prices, or contract prices.

Sales revenues amount for 90% of the total revenues and consists of sales of power form the Group´s own power generation, customers sales revenues, and grid activities and other income. Customer sales revenue comes from buying and selling energy from other producers. In 2020 the Group generated 65,4 TWh power and the average growth in production is 3,34 % in the period 2015-2020.

Gains/losses from market activities are income related to risk reducing activities and trading activities according to IFRS 9 Financial instruments.

Other operating income is income from rental of power plants to third parties, gains from divestments of subsidiaries and miscellaneous other operating income.

In 2020 the Statkraft Groups operating income was MNOK 38 518, a decrease of 19,6% from 2019. The decrease in income was mainly due to extremely low Nordic power prices, because of mild climate and an unusually wet winter. The decrease in power prices is partly offset by successful price hedging and solid performance from market operations.

Energy purchase includes costs from trading with energy products. The gross margin varies from 38% in 2015 to 61% in 2019. In 2020 the margin product was 56%

Operating expenses amounted to MNOK 15 669, an increase of 25,9% from 2019.

The operating expenses consists of salaries, depreciation and amortization, impairments, property tax and license fees (for owning hydropower plants in Norway) and other operating expenses related to operation of power plants.

The increase in operating expenses is explained by a higher number of employees, new wind farms, acquisitions of businesses and increased business development costs.

In 2020 the Group has recognised impairment costs of MNOK 3 203 for property, plant and equipment related to wind power in the Nordics, and hydropower in Chile. The impairment is due to expected lower power-prices in the coming years. Expected improved market conditions for gass-fired prower plants and bio-mass power on the other hand, resulted in reversal of previous years impairments of MNOK 1 824 with net impairment costs of MNOK 1 379.

Large impairment costs may normally indicate to low depreciation costs or management earnings. However, in this industry impairments and reversal of impairments are driven by volatile power-prices and complexity of estimating future income.

Statkraft is a knowledge-based company and investing in research and development (R&D) is important for further technological development and growth.

According to the applied accounting policy, research expenditures are expensed as incurred and development costs are capitalised if the future economic benefit can be identified from the development. In 2020 the Groups` R&D expenses were MNOK 54, an increase from MNOK 40 in 2019. Capitalised development costs were MNOK 2 in 2020, compared to MNOK 5 in 2019.

The operating profit (EBIT) was MNOK 6 670 compared to MNOK 16 744 in 2019. A decrease of 60%. Net profit amounted to MNOK 3 532 in 2020 compared to MNOK 11 327 in 2019. The decrease in EBIT is mainly due to lower power prices.

The segment with the highest EBIT is European flexible generation, this segment also has the largest installed capacity. The segment with the lowest EBIT is European wind and solar segment and other activities.

Net currency effects include currency gains and losses on financial instruments.

Interest and other financial items include items like interest income, interest expenses, and interest expenses from lease. The interest expenses amount to MNOK 465 in 2020 compared to MNOK 669 in 2019.

Most of the Groups tax expense is related to Norway. In 2020, Norwegian corporate income tax in is 22%. Companies that are engaged in hydropower generation in Norway are subject to natural resource tax (NRT) and resource rent tax (RRT). The NRT is calculated based on power plants` average output over the past seven years, and the tax rate is NOK 13/MWh. The RRT tax on the other hand, is a profit-dependent tax calculated by power plants` production hour by hour, multiplied by the spot price for the corresponding hour. Operating expenses, depreciation and a tax-free allowance are then deducted from the resource rent revenue.

The tax expense of MNOK 1 421, mainly consists of nominal Norwegian tax rate MNOK 1 090 (interest rate 22%) and resource rent tax payable MNOK 1 282 (interest rate 37%). The effective tax rate for the company in Norway is 48,4%. The effective tax rate for the Group is 28,7% in 2020.

Other comprehensive income amounted to MNOK 456, consisting mainly of estimate deviation related to pension and currency translation effects.

The disclosure quality is overall good, the notes are informative and detailed.

The internal audit function is expected to improve accounting quality. I do not find any signs of cosmetic earnings or reg flags. The ratios do not differ from the industry, they are not growing faster than their competitors and there are no large, capitalized expenditures.

3.1.2 Balance sheet

Statkraft AS' share capital is 33 600 000 000, divided among 200 000 000 shares with a nominal share price of NOK 168 per share.

The Groups Intangible assets decreased with MNOK 520 to MNOK 4 113 in 2020. The Group have reclassified development projects of MNOK 1 290 from intangible assets to inventories. Intangible assets consist of Goodwill MNOK 1 993 and MNOK 2 120 is related to power sales agreements. New additions mainly consist of intangible assets related to the acquisition of Solarcentury.

Property, plant and equipment (PPE) increased with MNOK 2 205 to MNOK 112 057 in 2020 and mainly comprise powerplants and heat producing facilities, buildings and machines, waterfall rights and right-of use assets. Plants, turbines, and waterfall rights stands for 75% of total PPE. The increase in PPE in 2020 is due to additions in plants, turbines, buildings, and plants under construction in addition to reversal of impairments and positive currency translation effects. Work in progress of MNOK 897 was reclassified to inventories.

Equity accounted investments are investments in other energy companies like BKK AS, Agder Energi AS, Hidroelectrica La Confluencia and Wind UK.

The Group have net deferred tax liabilities, arising from different tax rules for depreciation of PPE.

At the end of 2020, the equity amounted to MNOK 98 028 (including minorities), corresponding to 54% of total assets.

Liabilities consist of deferred tax, pension liabilities, taxes payable, derivatives, interest bearing debt and other liabilities. Derivatives assets and liabilities are fair value energy derivates related to energy trading and hedging of future revenues.

Lease liabilities for office buildings is a part of the interest-bearing liabilities along with bonds and debt issued in the market.

The current ratio, current assets relative to current liabilities is 1,4. The current ratio measures the companies' ability to pay short term obligations and a ratio of 1,4 means Statkraft has more current assets than current liabilities which is positive.

Statkraft has a credit rating of A- (stable outlook) from Standard & Poor's and BBB+ (stable outlook) from Fitch Ratings. (Statkraft, 2021)
The credit rating means that the capacity to repay debt is strong.

3.1.3 Cash flows

In 2020 the Group has invested NOK 9,9 billion in investments, of which 50% was in Norway, 26% in Europe and 24% outside Europe. Approximately 46% of the investments was new capacity, the remaining 54% was maintenance and acquisitions of shares (Statkraft, 2021).

Total installed renewable capacity increased by 433 MW to 16 488 MW. There has been an increase within hydropower in Norway, Sweden and Albania in addition to ongoing constructions in India and Chile. A new wind farm has been constructed in Norway and two more wind-projects have started in Scotland and in Brazil. The windfarm in Brazil is the biggest wind power project developed by Statkraft, with capacity of 519 MW. There has also been investments in solar energy production with the acquisition of Solarcentury. The acquisition of Solarcentury positions the Group as a leading developer in the European solar market.

Historcal cash flows						
Numbers in MNOK	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Cash flow from operating activities	8639	8371	8415	15286	11961	12045
Cash flow from investing activities	-9834	-6817	4309	5301	-4821	-7639
Cash flow from financing activities inkl. dividends	-2603	-3217	-5780	-11689	-15039	-8280
Net change in cash	**-3797**	**-1663**	**6945**	**8898**	**-7900**	**-3874**

Figure 14: Historical cash flows

In 2020, cash flow from operating activities was MNOK 12 045, MNOK -7 639 from investing activities, and MNOK -8 280 from financing activities. Net change in cash and cash equivalents was MNOK -3 874. Cash flow from operating activities is solid and increased from 2019 to 2020. The increase was primarily due to prepayments received from customers related to power sales agreements, cash inflow from cash collaterals and positive changes in the working capital. Cash flow from investing activities was related to investments in property, plant and equipment and acquisition of shares. Cash flow from financing activities was related to repayments of interest-bearing debt and dividend payments.

As shown in table 14, cash flows from operating activities are positive for all years in the period 2015-2020. The positive cash flow indicates solid core business activities.

3.2 Profitability analysis

Historical profitability is a measurement of economic strength and therefor important when estimating future expectations (Petersen et al., 2017). Profitability can provide introductory evidence to differentiate good businesses from mediocre ones. I will do a preliminary analysis of Statkrafts profitability using profitability ratios like net profit margin and return on equity. The profitability ratios will be compared to rations in comparable firms.

Net margin	2017	2018	2019	2020
Statkraft Group	17 %	24 %	24 %	9 %
Hafslund Eco Group	58 %	15 %	62 %	33 %
Scatec ASA Group	29 %	19 %	9 %	-13 %
Fortum Group	19 %	16 %	27 %	3 %
Vattenfall AB	7 %	8 %	9 %	5 %
Average	*26 %*	*16 %*	*26 %*	*7 %*

Figure 15: Net margin comparable firms

Net margin measures how much net profit a company makes per NOK revenue. As we can see from figure 15, net margins for Statkraft are close to average of comparable firms. Statkraft`s net margin has increased from 2017 to 2019 and is above average in 2020. We can see that the low power prices in 2020 affected net margins negatively for all comparable firms. Net margin is calculated as followed:

$$Net\ margin = \frac{Net\ income}{Net\ sales} * 100$$

ROE	2017	2018	2019	2020
Statkraft Group	13 %	14 %	11 %	4 %
Hafslund Eco Group	31 %	10 %	26 %	4 %
Scatec ASA Group	23 %	9 %	4 %	-4 %
Fortum Group	7 %	7 %	11 %	12 %
Vattenfall AB	10 %	12 %	14 %	7 %
Average	*17 %*	*10 %*	*13 %*	*5 %*

Figure 16: Return on equity for comparable firms

Return on equity (ROE) measures owners accounting return on their investments. ROE measures profitability of both operating and financing activities.
As we can see from figure 16, Statkrafts ROE is close to average of comparable firms. Hafslund Eco Group is the company that yields the highest returns overall in the period 2017-2020. Increases in return on equity alone does not necessarily mean increasing return, the financial leverage also needs to be considered.
Return on equity is calculated as followed:

$$ROE = \frac{Net\ profit\ after\ tax}{Average\ book\ value\ of\ equity} * 100$$

Financial leverage	2017	2018	2019	2020
Statkraft Group	83 %	86 %	76 %	85 %
Hafslund Eco Group	167 %	198 %	125 %	124 %
Scatec ASA Group	443 %	500 %	493 %	182 %
Fortum Group	64 %	86 %	77 %	271 %
Vattenfall AB	343 %	347 %	315 %	317 %
Average	*220 %*	*243 %*	*217 %*	*196 %*

Figure 17: Financial leverage for comparable firms

As showed in figure 17, Statkrats financial leverage is well below the average. High financial leverage is associated with higher risk and suggests that the company is being aggressive in financing its growth with debt. Revenues belongs to both owners and lenders. Other things equal, higher debt means less return to equity owners. The high financial leverage in Hafslund Eco Group, Scatec Group and Vattenfall Group suggests the required rate of return may be higher than Statkrafts required rate of return and ROE of those firms needs to be higher as well.

To find out if return on equity is larger than the expected return on equity, we can calculate the Residual income (RI). RI is the excess return a firm generates and is calculated as followed:

$$Residual\ income = (Net\ income) - (Re * Book\ value\ of\ equity\ n-1)$$

Numbers in MNOK	2017	2018	2019	2020
Residual income	6 184	7 082	4 900	-1 961

Figure 18: Residual income for comparable firms

Residual income generated by the Statkraft Group is positive in all years except for in 2020. The negative RI in 2020 is explained by abnormal low power prices. Overall, it appears like Statkraft under normal conditions is creating value for its owners with higher returns than the expected.

3.3 Growth analysis

The purpose of growth analysis is to estimate future growth potential. Growth potential is affected by both external and internal factors.

Analysis of historical numbers in good times and recessions may give us valuable information about future growth potential. On the other hand, historical numbers do not reflect growth opportunities from market changes in the future. It is intuitive to associate growth with increase in revenues, but increased revenues do not necessarily mean positive growth. It is therefore important to consider the source to the growth and the sustainability of the growth.

When there are profitability opportunities, as shown in the previous section, the sector attracts new entrance which in time decreases the profitability. To be able to stay above the market average in the long run the company must have competitive advantage. It is also necessary to consider how long a company can be above market average.

As shown in precious chapters the clean energy industry is in rapid change with increasing suppliers all over the world. The political focus on climate changes and sustainability attracts high number of new entrances bringing the supply-demand relationship in balance and pushing growth rates towards the long-term sustainable growth in the economy.

Looking into the financial statements of the Statkraft AS Group, it seems like revenues have decreased over the past three years. Even though the revenues have

decreased from 2015 to 2020, there has been an increase in power generation. Power generation have increased from 56,3 TWh in 2015 to 65,4 TWh in 2020, with an average increase of 3,34%. The increase is primarily related to hydropower and wind power.

The Group grows both through acquisitions and organic development. In 2020 the Group expanded in solar power with the acquirement of Solarcentury. Solarcentury is a global solar developer in addition to acquirement of several wind-projects in Europe. In addition, several internal projects have been finalized in 2020, also contributing to increased production capacity.

As mentioned, the management is planning annual investments of about NOK 10 billion in renewable energy towards 2025. (Statkraft, 2021)

According to their annual report 2020, the new investments will be financed through retained earnings, external financing, and divestments of completed solar and wind projects. The ambition is to grow production capacity with 9 GW by 2025 primarily in wind and solar power.

The Group has a solid capital structure, competence, and the human resources to achieve their goals. Taking the external factors into consideration, there definitively is an excess demand for clean energy in the market, providing good opportunities for growth.

4.0 Strategic analysis

4.1 PESTEL

4.1.1 Political

There are high political incentives for clean energy worldwide.

Nations all over the world commits to climate goals and increasing the shares of renewable energy, by implementing frameworks to achieve the goals. Agreements like the Paris Agreement, UN Sustainable Development Goals and the European 2030 Climate Target plan increased the attractiveness of the renewable energy sector.

4.1.2 Economical

The profitability of the energy sector is affected by availability of resources, prices on raw materials and input resources, as well as power prices in the market.

4.1.3 Social

Consumption, behavioral patterns, and the attitude towards sustainability have changed the last decades, pushing politicians and governments to act. People have become more aware of how human consumption is affecting the environment.

4.1.4 Technological

Renewable energy sources need to be cost-effective in order to compete with existing fossil energy sources. The storage possibilities for renewable energy are limited and there is an increased need to develop energy production that can be regulated and is more predictable. Because of the storage limitation the development of transporting possibilities is important.

To prevent damage, Hydropower turbines should not run below certain power production capacity (if there is too little water). The turbines will be turned off, reducing effectiveness. Statkraft participates in technology development projects with the purpose to increase efficiency and flexibility of the turbines. More efficient production will increase competitiveness of clean energy sources.

4.1.5 Environmental

Primary energy sources are transformed into energy products available for consumption. When water, wind and sun are the main sources for energy production, production is highly dependent on the weather conditions and the climate. Climate researchers predict that climate changes will lead to more extreme weather like extreme heat or storms making it more difficult to predict stabile supply. Storage possibilities for water is currently more flexible than other renewable resources.

4.1.6 Legal

The energy market is affected by legislation and regulatory policy related to industry specific policy like taxation. Changes in policies may impact the profitability in the sector. When entering new markets, companies have to follow national legislation and being present in several markets may increase internal costs, because more resources is used to understand different policies and ensure compliance.

4.2 Porters five forces

Porters five forces model is used in industry analysis to understand the level of competition and the potential of long-term profitability. The model indicates that the competition in an industry depends on five basic forces. The forces are analysed in this section.

4.2.1 Threat of new entrance

The energy industry is characterized with increasing competition.

Countries and governments around the world are planning for the green-shift.

As mentioned, clean energy is promoted by politicians and governments. Members of the United Nations have agreed to protect people and the planet through 17 sustainable development goals, one of the goals is to provide affordable and clean energy. The goal is to increase substantially the share of renewable energy in the global energy supply by 2030. The Paris Agreement on Climate Change commits to reducing greenhouse gas emissions by at least 40% by 2030.

These goals and the increased focus on the environment, sustainable consumption and production, forces companies in the energy sector to rethink their strategies and produce green energy.

It also rises opportunity for new businesses and new entrance and competitors for example the new established companies under Aker Horizon ASA.

On the other hand, the energy industry is very capital intensive and requires new entrances to invest large financial resources.

Overall, the political incentives towards renewable energy and changing demands among customers is increasing the threat of new entrance.

4.2.2 Suppliers bargaining power

Suppliers bargaining power is determined by factors like the number of suppliers and availability of raw materials used in the energy industry. Energy companies are dependent on raw materials supplied by limited number of suppliers. Raw materials used in the energy industry is also used in other industries and the suppliers do not depend on the energy industry alone. Powerful suppliers may decrease profitability if the industry is unable to recover cost increases in its own prices. Differential in power generation sources may reduce the effect of price increases for certain raw materials.

Suppliers bargaining power is considered high.

4.2.3 Customers bargaining power

Price in the market is determined by the level of supply and demand.

Energy consumption is essential to households and industries, customers will not stop using energy if the prices increase.

The bargaining power of the consumers is considered low.

4.2.4 Threat of substituting products

There are many substitutes for different forms or renewable energy. Customers can choose between many suppliers, and the energy consumed is the same. However, cost efficiency of the different substitutes may affect the price and the threat of substitutes. Statkraft is in a special position, owning large power plants who generate power at a low cost. Overall threat of substitution products is considered high.

4.2.5 Rivalry among existing competitors

Competition in the energy industry is generally high due to subsidies to promote renewable energy. As discussed in earlier chapters, the energy industry is growing rapidly. Technology development and taking advantage of the high demand for renewable energy will be extremely important. Competition is considered increasing.

4.3 SWOT- analysis

Strengths • Long experience • Europe`s largest reservoir capacity • Low cost and flexible production • Solid capital structure	**Weaknesses** • Highly exposed to hydropower • Dependency on raw materials
Opportunities • Increased demand for renewable energy • Political incentives	**Threats** • Increasing competition • Increase in raw material prices • Extreme weather conditions

Figure 19: SWOT analysis

Strengths

The Group has competitive advantage from the long experience in the industry. They have developed industrial competence and an understanding of the market and power generating assets.

Statkrafts hydropower portfolio in the Nordics constitutes Europe`s largest reservoir capacity with opportunity to regulate the power supply. Ownership of powerplants and large reservoirs secure the Group long-term revenues.

About 90 % of the power generation comes from hydropower with a low cost and reservoirs provide flexible production.

The Group has low levels of debt and good credit-rating, A- on Standard and Poor's long-term rating and BBB + on Fitch Rating` long term.

Weaknesses

The Groups heavy exposure to hydropower makes them more vulnerable to low hydrological levels from dry weather conditions. Competitors who generate power from several sources are less vulnerable for certain weather conditions. The Groups strategy includes growing their production capacity and diversify the power generation.

In the future they plan to generate power from hydropower, wind power and solar power. The different energy sources all have different risks and advantages, and combined they reduce the overall risk.

Opportunities

There is a higher demand for clean energy in the entire world with possibilities for expansion in Europe and outside Europe. The increased demand is driven by social factors, environmental changes, and political incentives.

Threats

Porters five forces analysis revealed increasing competition among clean energy providers. The Groups management needs to be prepared for the green shift and be able to take advantage of the possibilities. The PESTEL analysis implies that prices on raw material and other input sources may affect the profitability in the energy sectors. Possibly more frequent extreme weather conditions is a threat for the stability of the power generation affecting the output prices and the returns.

5.0 Risk analysis

5.1 Market risk

Statkraft Group is exposed to market risk related to changes in energy prices, climate changes and commodity prices. As we have seen in 2020, the earnings are highly affected by changes in power prices. Climate changes may change the water levels in the reservoirs affecting the output from hydropower plants.

Statkraft manages market risk by trading physical and financial instruments. Looking at the income statement in the historical period, it appears like market activities have contributed positively to earnings in 2019 and 2020.

A significant share of the generation from Nordic hydropower plants is hedged with long term power purchase agreements (PPAs) with customers (Statkraft, 2021). In 2020, there are long -term commercial contract of 19,9 TWh of total 65,4 power generation. The hedging activities are supplemented with financial power contracts, normally forwards and futures. These contracts have a stabilizing effect on revenues. Approximately 70 % of the power generation is not hedged and the Group is still highly exposed to volatile power prices.

The Group is growing internationally, revenues and costs are in different currencies making the company vulnerable to changes in exchange rates. Part of the power sales contracts are settled in other currencies to reduce currency risks (Statkraft, 2021).

The interest rate risk is controlled by having duration as measure. Statkraft policy is to always keep the average duration of its debt portfolio within the range of two to five years (Statkraft, 2021).

Other market risk such as the Covid-19 pandemic have had limited effect on the Groups financials so far. Energy consumption is less sensitive to general economic crises than many other products and services.

Overall, the Group has a unified approach to markets risks and risk management is an integrated part of the Governance. The Group is monitoring and managing risks in accordance with their risk profile.

5.2 Operational risk

The Group is especially exposed to operational risks when implementing new investments and during maintenance activities. Operational risks may result in injuries, harm to the environment, damages to their production plants or financial loss.

There have been three accidents in India in 2020. Strengthening safety is the top priority and has high attention throughout the organization. In 2015 and 2016 there were 40 and respectively 39 serious accidents. It appears like the safety has improved in the past years.

When installing and operating power plants, Statkraft has high attention on executing development activities and operations in a responsible manner. The Group has insurance coverage for all significant cases of operational damages or accidents (Statkraft, 2021).

Operational risk is managed with security procedures and controls of activities and processes. There is a system for reporting risks, this information helps them implement better controls and measures, reducing future operational risk.

Furthermore, there are operational risks related to the water levels in the reservoirs. Monitoring and optimizing water levels is important to prevent damages to the power plants and being able to supply power according to demand.

5.3 Credit risk and liquidity risk

The credit risk is the risk of losses if counterparts are not able to meet its payments obligations. Credit risk is primarily relevant for transactions with financial institutions, customers, and energy trading. Credit risk is managed by collateral agreements, credit ratings and bank guarantees.

As a consequence of Covid-19, the credit risk towards customers has increased along with the risk for cancellation of contracts, but historically the Groups credit

losses have been limited. The overall counterparty exposures in the legal entities are monitored continuously and reported to the CFO.

The liquidity risk is the risk of not being able to meet their own payments obligations. Liquidity risk is managed through liquidity forecasts and ensuring the current assets, cash and cash equivalents and unused credit facilities are higher than the current liabilities.

5.4 Regulatory risk

Regulatory framework affects Statkrafts power generation, costs, and revenues. Frameworks may include concessions, grid tariffs, and energy related taxes and fees. In Norway, Staktraft follows the regulations by the Norwegian Water Resources and Energy Directorate (NVE), in addition to ordinary corporate legislation. A lot of resources are used to assure that the Group follow the required regulations.

With international presence, Statkrafts is also exposed to international laws and regulations. The Group have a common risk assessment process to ensure high quality risk management in different countries with different legislation.

6.0 Forecasting

6.1 Reformulation of the financial statements and forecasting

A firm consists of operating, investing, and financing activities. For valuation purposes we want to exclude financing activities, since financing activities does not explain a firm's ability to create value. Value is created with the underlying recurring operations. Isolating operating from financing activities enables us to forecast future profits based on our core business activities, regardless how the business has been financed. All items in the financial statement and the balance sheet are divided as either operating items or financing items. The valuation proses continues with forecasting the financial of the Statkraft AS Group. The forecast is based on historical numbers from their annual reports.

Historical period should be as long as possible. In my valuation I will base my forecasts on historical period 2015-2020. The forecast period is normally 3-10 years depending on where in the business cycle the company is. For the energy industry, I believe a forecast period of five years is appropriate. The industry is dynamic and forecasting longer periods may be too uncertain.

Based on the current transition of the energy sector I assume that the Statkraft Group will reach a steady state after 5-6 years, after 5-6 years I assume a growth rate above average would not be sustainable.

Long term growth fluctuates around a mean and should reflect the long-term growth rate of the industry.

The strategic analysis in previous chapters is considered when estimating the growth rate and value drivers. Reformulated income statement and balance sheet are presented below.

Statkraft Group income statement reformulated						
	Historical period					
	-5	-4	-3	-2	-1	0
Produced power TWh	56,3	66	62,6	62	61,1	65,4
Average Spot price NOK/KWh	0,19	0,25	0,27	0,42	0,41	0,11
Average Spot price NOK/TWh	191 000 000	245 000 000	273 000 000	423 000 000	407 000 000	114 000 000
NOK million	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Sales revenues	51 586	49 448	62 550	55 350	43 450	33 875
Shares of profit/loss in equity accounted inves	683	474	-73	790	1 249	835
Adj. Net revenue	**52 269**	**49 922**	**62 477**	**56 140**	**44 699**	**34 710**
Energy purchase (O)	-31 892	-29 093	-37 546	-26 808	-16 483	-16 060
Transmission costs (O)	-1 112	-1 273	-1 326	-1 840	-2 035	-1 040
Adj. Gross Profit	**19 265**	**19 556**	**23 605**	**27 492**	**26 181**	**17 610**
Salaries and payroll costs (O)	-3 545	-3 648	-3 707	-3 615	-3 971	-4 627
Property tax and licens fees (O)	-1 679	-1 733	-1 341	-1 352	-1 139	-1 264
Other operating expenses (O)	-4 651	-3 894	-3 846	-3 439	-3 638	-4 334
Adj. EBITDA	**9 390**	**10 281**	**14 711**	**19 086**	**17 433**	**7 385**
Depreciations and amortisations (O)	-6 401	-8 260	-3 662	-3 567	-3 824	-4 066
Impairments/reversal of impairments (O)	0	0	-500	-167	136	-1 379
Adj. EBIT	**2 989**	**2 021**	**10 549**	**15 352**	**13 745**	**1 940**
Tax reported	-1 548	-5 402	-3 961	-7 258	-7 632	-1 421
(-/+) tax shield from NFE net financial expenses	*-1436,13*	*534,25*	*-323,52*	*624,68*	*978,56*	*511,94*
(-/+) tax shield from other operating income	406,89	266,25	1557,6	593,4	168,74	150,7
Tax expense	**-2 577**	**-4 602**	**-2 727**	**-6 040**	**-6 485**	**-758**
Adj. NOPAT	**412**	**-2 581**	**7 822**	**9 312**	**7 260**	**1 182**
Gains/losses from market activities (F)	0	0	0	-1 696	3 716	3 958
Net currency effects (F)	-3 445	2 847	-2 079	-464	132	-1 520
Interest and other financial items (F)	-1 874	-710	731	4 876	600	-111
Net financial income	**-5 319**	**2 137**	**-1 348**	**2 716**	**4 448**	**2 327**
Tax-shield from NFE	*1436,13*	*-534,25*	*323,52*	*-624,68*	*-978,56*	*-511,94*
Adj. Net income	**-3 471**	**-978**	**6 798**	**11 403**	**10 730**	**2 997**
Other operating income net of tax (non-reccur	1 100	799	4 932	1 987	598	534
Net income	**-2 371**	**-179**	**11 730**	**13 390**	**11 328**	**3 531**

Figure 20: Reformulated income statement

Statkraft Group balance sheet reformulated NOA-format						
	Historical period					
	-5	-4	-3	-2	-1	0
NOK million	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Deferred tax assets (O) (22)	0	0	962	676	614	1 658
Intangible assets (O) (23)	5 822	4 533	3 313	3 909	4 633	4 113
Property, plant and equipment (O) (2	111 207	103 303	103 193	105 744	109 852	112 057
Equity accounted investments (O) (4	19 388	19 438	13 410	13 105	12 917	13 492
Deferred tax (O) (22)	-9 435	-9 446	-9 814	-9 826	-10 792	-10 596
Other non-current liabilities (O) (31)	-9 669	-7 502	-3 397	-3 192	-3 031	-3 209
Prepayments (32) (O)	0	0	0	0	0	-4 367
NONCA	*117 313*	*110 326*	*107 667*	*110 416*	*114 193*	*113 148*
Inventories (O) (28)	1 044	2 653	2 871	6 316	4 468	6 363
Receivables (O) (29)	10 675	10 219	15 372	12 831	13 348	13 659
Taxes payable (O) (22)	-2 825	-4 764	-4 010	-7 391	-7 109	-3 412
located to capital employed (O) (31)	0	0	-9 086	-9 742	0	0
ther interest-free liabilities (O) (33)	-10 781	-11 918	-593	-503	-10 049	-10 115
Prepayments (32) (O)	0	0	0	0	0	-316
NOWC (net operating working capital)	*-1 887*	*-3 810*	*4 554*	*1 511*	*658*	*6 179*
NOA (NONCA + NOWC) = Invested capi	**115 426**	**106 516**	**112 221**	**111 927**	**114 851**	**119 327**
Paid-in equity (E)	57 111	58 411	59 219	59 219	59 219	59 219
Other reserves (E)	0	0	0	0	3 627	4 733
Retained earnings (E)	22 787	17 360	28 966	34 815	33 537	29 888
Total equity attributable to owners of t	**79 898**	**75 771**	**88 185**	**94 034**	**96 383**	**93 840**
Non-controlling interest (M)	8 443	7 747	3 591	3 970	4 382	4 188
Equity	**88 340**	**83 519**	**91 776**	**98 004**	**100 764**	**98 028**
Pension liability (F) (17)	2 125	2 247	2 539	2 655	2 685	3 357
Derivatives (F) (10)	3 736	1 805	1 101	1 253	983	7 778
Long term Interest-bearing liabilitie	37 410	31 886	36 285	30 354	28 160	28 297
Short term Interest-bearing liabiliti	7 196	8 407	3 694	6 346	4 479	6 143
Derivatives (F) (10)	5 388	5 137	6 888	13 124	9 496	5 639
Derivatives (F) (10)	-4 675	-3 047	-4 023	-2 926	-2 694	-7 406
Other non-current assets (F) (17,27)	-7 874	-8 961	-4 367	-3 986	-3 597	-6 338
Financial investments (F) (10)	-513	-532	-918	-604	-1 470	-606
Derivatives (F) (10)	-6 651	-6 637	-6 537	-9 118	-8 752	-4 410
Cash and cash equivalents (F) (30)	-9 056	-7 308	-14 217	-23 175	-15 203	-11 155
NIBD	**27 086**	**22 997**	**20 445**	**13 923**	**14 087**	**21 299**
Total E + NIBD	**115 426**	**106 516**	**112 221**	**111 927**	**114 851**	**119 327**

Figure 21: Reformulated Balance Sheet

6.2 Forecasting the income statement

The key driver in Statkraft is the growth in power generation and sales.

As discussed in previous chapters, the Groups revenues are highly volatile due to volatile power prices. Sales revenues increased by 26% from 2016 to 2017, while it decreased by 11% from 2017 to 2018 and decreased by 21% from 2018 to 2019.

Forecasting future revenues based on historical revenues will therefore be inappropriate. Estimation of sales revenues will instead be based on forecasted

future production and future spot prices. I will use the average growth of energy production as the main value driver.

Production growth	2015	2016	2017	2018	2019	2020
Power produced TWh	56,3	66	62,6	62	61,1	65,4
Production growth		17 %	-5 %	-1 %	-1 %	7 %
Average production growth						3,34 %

Figure 22: Production growth

Considering their investment plans for the near future, I believe the average growth rate of 3,34% will be sustainable even in the explicit period. Since growth above average is not sustainable over long time, I assume a growth rate of 2% in the terminal period. Terminal growth rate is based on expected long term inflation in Norway (Norwegian Central Bank, 2021).

EBITDA-margin	2015	2016	2017	2018	2019	2020
Average power price NOK/KWh	0,19	0,25	0,27	0,42	0,41	0,11
EBITDA-margin	0,18	0,21	0,24	0,34	0,39	0,21

Figure 23: EBITDA-margin

EBITDA-margin in the historical period amounts from 0,18 % to 39%. EBITDA-margin is highly affected by power prices and looking at the historical period, EBITDA-margins are around 20% in periods with low power prices, (NOK/KWh 0,11-0,25) and around 35% in periods with high power prices (NOK/KWh 0,38-0,42). In the forecast, I assume an EBITDA-margin of 0,28 which is closer to the margins associated with the estimated future spot prices.

The estimated future spot-prices will be based on Norwegian Water Resources and Energy Directorate`s (NVE) long-term power market analysis discussed in previous chapters. Power prices are predicted to be NOK/KWh 0,38 in 2022, NOK/KWh 0,40 in 2023 and 2024, NOK/KWh 0,42 in 2025 and NOK/KWh 0,40 from 2026-2040. Prognosis for 2021 is based on Nord Pool average spot prices until October 2021.

Sales revenues are operating and consist of both sales of own generated power and trading with power produced by other producers.

For analytical purposes I tried to disaggregate the sales revenues to see if I can obtain a more accurate forecast for future revenues. Disaggregating the revenues did not give me any higher correlation with average power prices than the aggerated revenues. The sales revenues will therefore be forecasted as presented in the financial statement.

Sales revenues	2015	2016	2017	2018	2019	2020
Sales revenues	51 586	49 448	62 550	55 350	43 450	33 875
Power production TWh	56,3	66	62,6	62	61,1	65,4
Average power prices NOK/TWh	182343750	245032361	266782500	418899444	382941806	97443750
Sales revenues/Production*Spot price	0,00000502	0,00000306	0,00000375	0,00000213	0,00000186	0,00000532
Average ratio						0,00000352

Figure 24: Sales revenues

For the historical period it appears like the ratio sales/production times price is lower for higher spot prices and higher for lower spot prices. I assume that the best ratio to use is the historical ratio for approximately the same spot price as the one forecasted in the future. A ratio of 0,0000023 will therefore be used when estimating the future production.

Shares of profit/loss in equity accounted investments are related to activities with associates like Agder Energi AS, BKK AS and other companies providing electric power. In 2015 and 2018-2020 income was reported under EBIT, while in 2016 and 2017 the income was reported as part of EBIT. The income is a part of the Groups' core business and will be classified as operating included in EBIT.

Gains and losses from market activities consists of financial risk reducing activities, trading and origination activities and embedded derivatives. The risk reducing activities are financial power contracts that mitigate price risk. Trading and origination activities consists of buying and selling standardized products such as power contracts. Embedded derivatives are contracts nominated in foreign currency or the price is linked to commodity prices.

It would probably be most accurate to divide the risk reducing activities and the embedded derivatives into both operating and financing, since it is a hedge of both financial risk and operating risk. However, such a separation is not recommended in practice (Petersen at el., 2017). Hence the items will be classified as financing.

Other operating income includes income from all other operating activities which are not related to the principal activities in the Group. It includes items such as sales of services, gains/losses from disposals of property, plant and equipment, insurance settlements, etc. It also includes gains from divestments of business activities. Other operating income will be classified as non-recurring and will not be a part of Net operating profit after tax (NOPAT).

Energy purchase is related costs to revenues from trading with energy products. Operating expenses are all related to generation and sale of energy. Costs for energy purchase and other operating expenses will be forecasted based on their ratio relative to net income or power generation.

Calculation of the tax-shield from financing activities and non-recurring activities will be based on the marginal tax rate instead of the effective. The tax-regime for energy production in Norway consist of the ordinary corporation tax (marginal tax rate) and a resource tax that will not apply for financing income and expenses or other non-recurring income such as divestments of assets.

Forecasted income statement for the period 2021-2027 is presented below.

Statkraft Group income statement reformulated

	Explicit forecast period					Terminal period	
	1	2	3	4	5	6	7
Produced power TWh	67,6	69,9	72,3	74,8	77,3	77,5	77,6
Average Spot price NOK/KWh	0,5	0,38	0,4	0,4	0,42	0,4	0,4
Average Spot price NOK/TWh	500 930 000	380 000 000	400 000 000	400 000 000	420 000 000	400 000 000	400 000 000
NOK million	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Sales revenues	77 912	61 113	66 516	68 778	74 672	71 258	71 401
Shares of profit/loss in equity accounted inves	1 186	931	1 013	1 047	1 137	1 085	1 087
Adj. Net revenue	**79 098**	**62 043**	**67 529**	**69 825**	**75 809**	**72 344**	**72 488**
Energy purchase (O)	-42 851	-33 612	-36 584	-37 828	-41 070	-39 192	-39 270
Transmission costs (O)	-2 337	-1 833	-1 995	-2 063	-2 240	-2 138	-2 142
Adj. Gross Profit	**33 909**	**26 598**	**28 950**	**29 934**	**32 499**	**31 014**	**31 076**
Salaries and payroll costs (O)	-4 057	-4 195	-4 338	-4 486	-4 638	-4 647	-4 657
Property tax and licens fees (O)	-4 057	-4 195	-4 338	-4 486	-4 638	-4 647	-4 657
Other operating expenses (O)	-3 647	-835	-1 366	-1 412	-1 997	-1 463	-1 466
Adj. EBITDA	**22 148**	**17 372**	**18 908**	**19 551**	**21 227**	**20 256**	**20 297**
Depreciations and amortisations (O)	-5 809	-6 136	-6 119	-6 237	-6 348	-6 506	-6 521
Impairments/reversal of impairments (O)	0	0	0	0	0	0	0
Adj. EBIT	**16 339**	**11 236**	**12 789**	**13 314**	**14 879**	**13 751**	**13 776**
Tax reported	-6 080,44	-4 720,23	-5 353,39	-5 568,12	-6 208,24	-5 751,57	-5 760,00
(-/+) tax shield from NFE net financial expenses	*455,16*	*225,73*	*237,72*	*242,44*	*256,81*	*251,31*	*249,70*
(-/+) tax shield from other operating income	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Tax expense	**-6 536**	**-4 495**	**-5 116**	**-5 326**	**-5 951**	**-5 500**	**-5 510**
Adj. NOPAT	**9 803**	**6 742**	**7 674**	**7 989**	**8 927**	**8 250**	**8 265**
Gains/losses from market activities (F)	2 372,95	1 861,30	2 025,87	2 094,75	2 274,27	2 170,31	2 174,65
Net currency effects (F)	-1 582	-1 241	-1 351	-1 397	-1 516	-1 447	-1 450
Interest and other financial items (F)	1 278	406	405	404	409	419	410
Net financial income	**2 069**	**1 026**	**1 081**	**1 102**	**1 167**	**1 142**	**1 135**
Tax-shield from NFE	-455,16	-225,73	-237,72	-242,44	-256,81	-251,31	-249,70
Adj. Net income	**11 417**	**7 542**	**8 516**	**8 848**	**9 838**	**9 141**	**9 151**
Other operating income net of tax (non-reccur	0	0	0	0	0	0	0
Net income	**11 417**	**7 542**	**8 516**	**8 848**	**9 838**	**9 141**	**9 151**

Figure 25 Forecasted income statement

6.3 Forecasting balance sheet

Derivates, other non-current assets, financial investments and cash are considered as financial, all other assets are operating. On the debt-side of the balance sheet, pension liabilities and derivates are considered as financial. Interest bearing liabilities are divided into operating and financing since it the post includes prepayments from customers in 2020. Prepayments are payments for long-term power contracts and are part of their core operations. The related interest income from the prepayments will not be reclassified to operating since it only amounts for MNOK 12 in 2020 and 0 in previous years.

According to the annual report 2020, Statkraft plans to invest approximately MNOK 10 annually in new capacity. This will be financed with retained earnings and new debt. In the forecast, I expect capital expenditure close to 8 MNOK in the explicit period and an increase in interest bearing liabilities from NOK 28 billion in 2020 to MNOK 36 in 2026. The predictions are slightly lower than their own goals, since the historical average capital expenditure have been a lot lower at NOK 5,6 billion.

According to the Group's annual report 2020, the owners expect a dividend pay-out ratio of approximately 85% of net income. This is in line with average pay-out ratio in the historical period. Considering their expansion plans, I will expect the pay-out ratio to be 80%, slightly lower in the forecast period than the target pay-out ratio.

Invested capital, or net operating assets (NOA), is the net amount a firm has invested in its operating activities. I expect NOA to increase in the explicit period from NOK 121 billion in 2020, to NOK 128 billion in 2025.

The forecasted balance sheet for the period 2021-2027 is presented below.

Statkraft Group balance sheet reformulated NOA-format

	Explicit forecast period					Terminal period	
	1	2	3	4	5	6	7
NOK million	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Deferred tax assets (O) (22)	0	0	0	0	0	0	0
Intangible assets (O) (23)	7 119	5 584	6 078	6 284	6 823	6 511	6 524
Property, plant and equipment (O) (2	115 598	116 796	118 659	120 675	123 288	123 908	124 527
Equity accounted investments (O) (4	15 028	15 183	15 426	15 688	16 027	16 108	16 189
Deferred tax (O) (22)	-9 248	-9 344	-9 493	-9 654	-9 863	-9 913	-9 962
Other non-current liabilities (O) (31)	-9 492	-7 445	-8 103	-8 379	-9 097	-8 681	-8 699
Prepayments (32) (O)	0	0	0	0	0	0	0
NONCA	*119 005*	*120 774*	*122 566*	*124 614*	*127 178*	*127 933*	*128 579*
Inventories (O) (28)	6 327,86	4 963,45	5 402,33	5 586,01	6 064,73	5 787,48	5 799,06
Receivables (O) (29)	20 565,55	16 131,23	17 557,57	18 154,52	19 710,37	18 809,32	18 846,94
Taxes payable (O) (22)	-7 905	-6 136	-6 959	-7 239	-8 071	-7 477	-7 488
Liabilities allocated to CE (O) (31)	0	0	0	0	0	0	0
ther interest-free liabilities (O) (33)	-17 402	-13 649	-14 856	-15 362	-16 678	-15 916	-15 947
Prepayments (32) (O)	0	0	0	0	0	0	0
NOWC (net operating working capital)	*1 587*	*1 309*	*1 144*	*1 140*	*1 026*	*1 204*	*1 211*
NOA (NONCA + NOWC) = Invested capit	**120 592**	**122 083**	**123 710**	**125 755**	**128 204**	**129 137**	**129 789**
Paid-in equity (E)	59 219	59 219	59 219	59 219	59 219	59 219	59 219
Other reserves (E)	4 733	4 733	4 733	4 733	4 733	4 733	4 733
Retained earnings (E)	32 171	33 680	35 383	37 153	39 120	40 491	41 864
Total equity attributable to owners of th	**96 123**	**97 632**	**99 335**	**101 105**	**103 072**	**104 443**	**105 816**
Non-controlling interest (M)	4 188	4 188	4 188	4 188	4 188	4 188	4 188
Equity	**100 311**	**101 820**	**103 523**	**105 293**	**107 260**	**108 631**	**110 004**
Pension liability (F) (17)	4 350	3 412	3 714	3 840	4 170	3 979	3 987
Derivatives (F) (10)	3 164	2 482	2 701	2 793	3 032	2 894	2 900
Long term Interest-bearing liabilitie	34 605	34 972	35 404	35 876	36 469	37 179	37 450
Short term Interest-bearing liabiliti	5 966	6 030	6 104	6 185	6 288	6 410	6 457
Derivatives (F) (10)	11 865	9 306	10 129	10 474	11 371	10 852	10 873
Derivatives (F) (10)	-7 119	-5 584	-6 078	-6 284	-6 823	-6 511	-6 524
Other non-current assets (F) (17,27)	-9 492	-7 445	-8 103	-8 379	-9 097	-8 681	-8 699
Financial investments (F) (10)	-791	-620	-675	-698	-758	-723	-725
Derivatives (F) (10)	-11 074	-8 686	-9 454	-9 776	-10 613	-10 128	-10 148
Cash and cash equivalents (F) (30)	-11 194	-13 603	-13 556	-13 570	-13 095	-14 764	-15 785
NIBD	**20 281**	**20 263**	**20 187**	**20 462**	**20 944**	**20 506**	**19 785**
Total E + NIBD	**120 592**	**122 083**	**123 710**	**125 755**	**128 204**	**129 137**	**129 789**

Figure 26: Forecasted Balance Sheet

6.4 Forecasting cash flows

Forecasted cash flows are derived from the relating income statement and the balance sheet presented above. Forcasted cash flows are presented below.

Statement of cash flow Statkraft AS Group	Explicit forecast period					Terminal period	
	1	2	3	4	5	6	7
NOK million	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
NOPAT	9 803	6 742	7 674	7 989	8 927	8 250	8 265
+ Depreciation and impairment	5 809	6 136	6 119	6 237	6 348	6 506	6 521
(-/+) Changes in NOWC	4 592	278	165	4	114	-178	-6
(-/+) Changes in NONCA inkl. depr	-11 665	-7 905	-7 911	-8 285	-8 912	-7 261	-7 167
FCFF	**8 538**	**5 251**	**6 047**	**5 944**	**6 477**	**7 317**	**7 613**
(+/-) Change in NIBD excl. Cash	-979	2 391	-124	289	7	1 231	301
Gains/losses from market activities	2 373	1 861	2 026	2 095	2 274	2 170	2 175
Net currency effects	-1 582	-1 241	-1 351	-1 397	-1 516	-1 447	-1 450
Interest and other financial items	1 278	406	405	404	409	419	410
Tax-shield from NFE	-455,16	-225,73	-237,72	-242,44	-256,81	-251,31	-249,70
Other operating income net of tax (non-reccuring)	0	0	0	0	0	0	0
FCFE	**9 173**	**8 443**	**6 766**	**7 092**	**7 395**	**9 440**	**8 799**
Dividends	-9 134	-6 034	-6 813	-7 078	-7 870	-7 770	-7 778
Cash surplus	**39**	**2 409**	**-47**	**14**	**-475**	**1 670**	**1 021**
Cash at the beginning of peridod	11 155	11 194	13 603	13 556	13 570	13 095	14 764
Cash surplus	39	2 409	-47	14	-475	1 670	1 021
Cash at the end of the period	**11 194**	**13 603**	**13 556**	**13 570**	**13 095**	**14 764**	**15 785**

Figure 27: Forecasted cash flows

7.0 Cost of Capital

7.1 Cost of Equity

Cost of equity is the expected or the required rate of return on equity invested in the firm by owners and investors. Investing in a business almost always involves risks, firms need to take calculated risks to achieve their objectives. To compensate for this risk, owners/investors expect a return. Investors required rate of return increases when systematic risk increases.

The Statkraft Group invests billions of NOK every year, and there is no guarantee the investments will be successful and yield a positive return, the Group risks losing capital.

The Capital Asset Pricing Model (CAMP) is widely used when estimating the cost of equity (Petersen et al., 2017). According to the CAMP model, the cost of equity is a function of the risk-free interest rate, the systematic risk on equity and return on market portfolio.

Research studies for renewable energy markets provide evidence on which factors affects the cost of capital. Bjarne Steffen, 2020 summarizes these into three factors First, risk is affected by the country in which investments are made. Macroeconomic stability and political factors may differ from country to country and are taken into consideration. Second, investment risk differs for different renewable energy technologies. There are differences in resource risks as well as operational risks. Water, wind, and solar plants are based on different operating principles. Third, both country- and technological-specific factors may vary over time. The renewable energy industry is in transformation, with changes in regulatory frameworks and increasing demand for technological development.

Cost of equity is calculated as followed:

$$r_e = r_f + \beta_e \times (r_m - r_f)$$

where
r_e = Investors' required rate of return
r_f = Risk-free interest rate
β_e = Systematic risk on equity (levered beta)
r_m = Return on market portfolio

The different components in the cost of equity are explained in this chapter.

7.1.1 Risk-free rate

The risk-free rate indicates the return an investor can expect from a risk-free investment (default free). The rate reflects the time value of money. In practice government bonds is believed to be the closest to default free bonds and is used as a proxy for the risk-free rate. For valuation purposes, a zero-coupon rate based on a 10-year, or 30-year government bond is usually applied. It is preferable to use a government bond with the same currency as the cash flows to reduce inflation risk. The Groups` cashflows are measured in NOK, Norwegian long term government bonds would therefore be a propriate proxy for the risk-free rate.

In 2020 the average 10-year Norwegian government bond yield is 0,82% (Norwegian Central bank, 2021).

European 30-year government bonds yield is 0,11% (European Central Bank, 2021).

In recent years the interest rate has been abnormally low due to monetary policies with the aim to stimulate economic growth. Long term interest rates are not supposed to be this low for long periods. According to interest rates prognosis from the Norwegian Central Bank that the interest rate will increase in the coming years, indicating optimism regarding economic growth. For these reasons, I will use a normalized risk-free rate of 2,5% instead of the unnormal low interest rates we are seeing today.

The risk-free rate should not differ between investment alternatives, the variance in cost of equity is therefore mainly explained by the market premium and the beta (Bjarne. 2020, art 104783).

7.1.2 Market risk premium

The return on the market portfolio is in practice often based on stock returns from firms listed on the stock exchange. The difference between the return of the market portfolio and the risk-free rate is called the market risk premium. It is the excess return an investor expects for choosing an investment with higher risk than the risk-free investment and reflects the investment-specific risk. According to the PWC report "Risk premium 2020" the average market risk premium in Norway is 5% and this estimate will be used in this thesis (PWC, 2021).

7.1.3 Beta

Beta measures the covariance of a firm with the market portfolio.
The covariance is divided with the variance of the market portfolio.
Beta is calculated as followed:

$$\beta = \frac{Cov(r_s, r_m)}{\sigma_m^2}$$

Firms are exposed to both systematic and unsystematic risk. Systematic risk comes from macroeconomic factors such as interest risk, inflation risk and market risk. Unsystematic risk arises from microeconomic factors such as business risks and financial risks.
Beta takes into consideration only the systematic risk, assuming the unsystematic risk can be diversified with a broad portfolio (Petersen et al., 2017).

Investors are only willing to pay for the risk that cannot be diversified. The higher the systematic risk is, the higher the required return investors expect. Beta of equity is also affected by the capital structure, also referred to as the leverage of the firm (the debt/equity ratio).

The market`s beta coefficient is 1. An equity beta higher than 1 implies that the returns fluctuate more than the market portfolio, while a beta lower than 1 implies that returns fluctuate less than the market portfolio. For completely risk-free investments, the beta is 0.

For publicly traded companies, historical stock prices are normally used to estimate beta of equity. Statkraft Group is not listed on the stock exchange and therefor estimating the beta will require alternative methods such as estimation of beta from comparable firms, or estimation based on fundamental characteristics of the firm`s risk profile.

Beta is affected by both operating risk and financial risk. Debt holders are compensated for providing capital to the firm before the equity holders are compensated. The more debt a firm has, the smaller proportion of the earnings are left to the equity holders and the greater the risk is.
When estimating beta from comparable companies we want to isolate the beta for the operating risk (unlevered beta). The reason for this is that our firm and the comparable firm most probably have different financial leverage, consequently beta also will be different. The unlevered beta measures the operating risk in the industry and can be used to estimate beta for the valuated firm, by adding the firm-specific financial risk.

Since Statkraft Group is not listed on the stock exchange, beta estimate will be based on comparable firms with same risk profile, an efficient capital market and liquidity in the comparable shares is assumed. Four different comparable firms in the clean energy industry are considered, all of them in Europe. Statkraft Group is currently producing main of its power from hydropower, while the comparative firms are mainly producing power from other source like wind and solar. Because of the different technologies used in production, the comparable firms may have a different risk profile than Statkraft Group today. According to the Groups investments- and growth plans, they will expand power generation from other sources, and I expect the risk in the future to be similar to the comparable firms. Finding truly comparable firms may be impossible.

To find the covariance of the comparable firms` volatility in return we need to regress the change in return against the change in return for a market index.
The changes in return are obtained from investing.com.

Market indexes considered are indexes in the respective countries the firms operate in and the S&P Europe 350 index. Market indexes are supposed to represent firms in all different industries and represent the broad market. S&P Europe 350 Index consists of 350 companies in different industries, represents approximately 70% of the market capitalization.
Fortum is regressed against OMX Helsinki 25, Scated is regressed against OSE Benchmark, Iberdrola against IBEX 35 Index and Voltalia against CAC40 Index. In addition, all the companies are regressed against the S&P Europe 350 Index presented as "unlevered beta 1".

When estimating the beta, I will use 5-years old monthly closing prices to be able to provide enough observations. The regressed betas are first unlevered, and then levered with Statkrafts Groups leverage using the formulas beneath.

$$\beta_{levered} = \beta_{unlevered} + (1 + (1 - t)) * \frac{Debt}{Equity}$$

$$\beta_{unlevered} = \frac{\beta_{levered}}{1 + (1 - Tax\ Rate) * \frac{Dept}{Equity}}$$

Comparable firms	Unlevered beta 1	Unlevered beta 2
Fortum	0,44	0,45
Scatec	0,89	0,74
Iberdrola	0,30	0,26
Volatila	0,32	0,17
Average	*0,49*	*0,41*
Levered beta Statkraft Group	**0,81**	**0,68**

Figure 28: Beta comparable firms

Beta 1 is measured covariance with S&P Europe 350 index, beta 2 is measured covariance against indexes in the respective country. Regression results are presented in figure 28 and shows an average unlevered beta of 0,49 and 0,41 (5-yr monthly).

According to Petersen page 154, table 5-4, unlevered beta for green and renewable energy industry is 0,64 and the required rate of return is 6,2%. These estimates are based on a comparison of 48 companies in the industry.
Statkraft Groups´ debt to equity ratio is 0,85 and the marginal tax rate is 22%, when adding the firm-specific financial risk we obtain a levered beta of 0,81 and 0,68. For the purpose of this thesis, I will use an equity beta of 0,7.

7.1.4 Cost of debt

Cost of debt is the compensation lenders require for providing capital to the firm. Cost of debt is a function of the risk-free rate, company-specific risk of default and the tax-shield on debt. The cost of debt is calculated as followed:

$$r_d = (r_f + r_s) \times (1 - t)$$

where
r_d = Required rate of return on net interest-bearing debt (NIBD)
r_f = Risk-free interest rate
r_s = Credit spread (risk premium on debt)
t = Corporate tax rate

To estimate the cost of debt I will use the reported interest rates on the Groups borrowings, weighted by the fraction of total debt. The result is presented below.

Interest bearing liabilities	Amount in MNOK	Average nom. interest rate	Weighted interest rate
Liabilities in NOK	3 231	4 %	0,45 %
Liabilities in EURO	23 335	1,70 %	1,38 %
Liabilities in GBP	240	1,50 %	0,01 %
Liabilities in BRL	1 043	5,20 %	0,19 %
Liabilities in INDISK INR	909	7,90 %	0,25 %
SUM	**28 758**		**2,28 %**

Figure 29: Cost of debt

The calculated cost of debt is 2,28%
We now have all the parameters to calculate Cost of equity. The estimations above are used to compute the cost of equity, or the required rate of return. Cost of equity changes over time but will be constant in this thesis for simplicity reasons.

Requried rate of return on equity (Re)		
Risk-free rate	2,5 %	
Beta equity	0,7	
Risk premium	5,0 %	
Re	**6,0 %**	

Figure 30: Estimation of cost of equity

The calculated required rate of return 6% will be used to discount the future cash flows to the equity holders.

7.2 Weighted average cost of capital (WACC)

WACC is the weighted average of the required rate of return for investors and debt providers. WACC is a function of financial leverage, time value of money and risk of investing capital and is calculated as followed:

$$\text{WACC} = \frac{\text{NIBD}}{(\text{NIBD} + \text{E})} \times r_d \times (1 - t) + \frac{\text{E}}{(\text{NIBD} + \text{E})} \times r_e$$

where
NIBD = (Market value of) net interest-bearing debt
E = (Market value of) equity
r_d = Required rate of return on NIBD
r_e = Required rate of return on equity
t = Corporate tax rate

Weighted average cost of capital will differ with changes in the capital structure. Capital structure is based on marked values. Since Statkraft is not listed on the stock exchange and I don't have the market value, I will use the book value of the equity. The calculated WACC, presented below, is 5,25%.

Weighted average cost of capital	
NIBD 31.12.2020	21 299 000 000
Equity 31.12.2020	98 028 000 000
Cost of debt (Rd)	2,28 %
Cost of equity (Re)	6 %
Marginal Tax	22 %
WACC	**5,25 %**

Figure 31: Weighted average cost of capital

8.0 Valuation

The purpose of valuation is to obtain the market value of the company. To be able to valuate a company or an asset, we need to estimate future income and a relevant discount rate, reflecting time value of money the risk associated with the investment. Valuation methods have gained popularity for different purposes, including acquisitions and mergers. There are four approaches available for valuation, present value models, relative valuation models, asset-based models, and contingent claim models. The models estimate either the market value of the equity or the enterprise value. This chapter will shortly describe relevant models, discussing the pros and cons with the purpose to choose the most appropriate model for valuation of the Statkraft Group.

8.1 Present value models

Present value models estimate the intrinsic value of the firm, based on discounting future income or future cash flows generated with the firm`s core operations. The different present value models will yield similar value estimates, assuming the same input.

8.1.1 Dividend discount model

In this model, the value of a company is determined based on future dividend. The model assumes that the dividends are the cash flows to the owners. It is the dividends that are available to the owners, other earned income retained in the firm may be reinvested in business projects that do not necessarily yield positive return to the firm or the owners. The dividend discount model is argued to be the best valuation model for owners over long time (Petersen et al., 2017).

$$Marked\ valute\ of\ equity_0 = \sum_{t=1}^{n} \frac{Div_t}{(1+r_e)^t} + \frac{1}{(1+r_e)^n} x \frac{Div_{n+1}}{r_e - g}$$

To obtain the market value of equity the dividends are discounted with cost of equity (expected return on equity).

This model is time consuming and sensitive to input and estimated rate of return. Small errors may significantly affect the enterprise value. The model yields an unbiased value estimate, but the output may not be very informative. It is opposed to the discounted cash flows models and the excess return models, not based on any assumptions.

Other present value models are based on the dividend discount model (Petersen et al., 2017).

8.1.2 Discounted cash flow models

The discounted cash flow model estimates the value of a firm based on the present value of future cash flows. It is widely adopted by practitioners.

The discounted cash flow model values the firm based on generated cash flows to the firm (FCFF) or cash flows to the equity holders (FCFE), discounted with the required return on invested capital. The equity value approach discounts cash flows with investors required rate of return, while the enterprise value approach discounts cash flows with weighted average cost of capital (WACC), including the cost of debt since FCFF yields an estimate of both equity and net interesting bearing debt. The discounted cash flow models assumes that all cash surplus is paid out as dividends or is reinvested in projects with no excess return. This model may be appropriate if the cash flows are positive.

$$EV_0 = \sum_{t=1}^{n} \frac{FCFF_t}{(1+WACC)^t} + \frac{FCFF_{n+1}}{(WACC-g)} x \frac{1}{(1+WACC)^n}$$

$$MVE_0 = \sum_{t=1}^{n} \frac{FCFE_t}{(1+Re)^t} + \frac{FCFE_{n+1}}{(Re-g)} x \frac{1}{(1+Re)^n}$$

8.1.3 Excess return models

Excess return models estimate the enterprise value or the equity value, based on the value creation from invested capital. The value creation is reflected in the income statement; therefore, these models rely on accrual accounting data.

The Economic Value-Added model estimates the enterprise value based on the invested capital and the future economic value added (EVA). Economic value added is measured as NOPAT minus the WACC times invested capital in the previous period.

The market value of the equity based on the future value added can be measured with residual income (RI). Residual income consists of net earnings minus the required rate of return for the equity times book value of equity in the previous period.

A firm is creating value if the earnings are higher than the expected cost of the invested capital, and the market value of the firm/equity will be higher than the book value of invested capital and investors are willing to pay a premium relative to the book value of invested capital. If EVA or RI is negative the firm is destroying value and the market value of the firm/equity will be lower than the book value.

The excess return models assume that all revenues, expenses, gains and losses in the forecast period are recognized in the income statement. However, the clean-surplus assumption can be violated in the historical period without any effect on the value estimates.

8.2 Relative valuation models

Relative valuation models, also called multiples, assume that substitutes should sell for the same price and rely therefor on relative pricing of peer`s earnings (Petersen et al., 2017).

When using relative models, the comparing company needs to be a perfect substitute. There are a wide range of multiples available, estimating the enterprise value or the value of the equity.

Multiples are characterized with low level of complexity and are not time consuming.

The assumption that the comparing companies share the same economic characteristics and that the income statement is based on same accounting policies makes relative valuation models less reliable.

8.3 Asset based valuation models

Asset based valuation models estimate the enterprise value by measuring value of the net assets and the equity. Net assets are obtained by subtracting liabilities. There are different approaches, including fair value measurement of the assets or valuation of the different segments in the company. The disadvantage of asset-based models is that they disregard prospective earnings. Not considering potential earnings may result in lower values than other methods obtain.

8.4 Choosing an appropriate valuation model for this thesis

When choosing a valuation model I will take into consideration the precision of forecasting, if it is possible to estimate assumptions, the sensitivity of the assumptions, complexity of the model, and input available.

I believe the most suitable model for valuation of the Statkraft AS Group is Dividend model. Annual reports are available on their website and include all necessary information. The Group has a consistent and clear dividend policy. The

average historical dividends are in accordance with their policy. Even if the Group is planning major investments the following years, I assume the dividends still won't derive far from the average pay out-ratio. Based on the historical information, I believe the estimated dividends are realistic. The model is not based on any assumptions (other than the input).

I choose an equity-based valuation model because the future investments may change the capital structure and the WACC. The Group has low debt-levels but according to their annular report 2020, the debt is expected to increase with the new investments.

As a supplement, the market value of the equity will also be estimated with the discounted cash flow model (FCFE). FCFE and Dividend models do not rely on accrual accounting data unlike the excess return model. In addition, the Dividend model and the FCFF model are not dependent on all revenues and costs going through the income statement.

Lastly, relative valuation models will be applied to verify the results from our main models, by comparing the estimated market value with the market value of listed comparable firms.

9.0 Valuation results

9.1 Dividend model

The Statkraft Group is valued using the Dividend model. Dividends are estimated based on the Groups dividend policy and historical dividends. Dividends are discounted with the estimated cost of equity (Re) and shows the present value of future dividends. The value depends on assumptions regarding the terminal growth, representing the average long-term growth in the economy. The results are as followed:

NOK million	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
FCFE	9 173	8 443	6 766	7 092	7 395	9 440	8 799
Dividends	9 134	6 034	6 813	7 078	7 870	7 770	7 778
Re	6 %						
WACC	5,25 %						
Terminal growth	2 %						

	1	2	3	4	5	6	7
Dividende model	**Explicit**					**Terminal**	
	2021	*2022*	*2023*	*2024*	*2025*	*2026*	*2027*
Dividends	9 134	6 034	6 813	7 078	7 870	7 770	7 778
Cost of Equity	6,00 %	6,00 %	6,00 %	6,00 %	6,00 %	6,00 %	
Discount Factor	0,94340	0,89000	0,83962	0,79209	0,74726	0,70496	
PV of Terminal per 31.12.2026						194 453	
PV of Terminal per 1.1.2021						137 082	
PV of Explicit per 1.1.2021	8 617	5 370	5 720	5 607	5 881	5 478	
MVE in MNOK as of 1.1.2021	**173 755**						

Figure 32: Dividend model

The market value of equity according to this model is NOK 174 billion.

9.2 FCFE model

The second model used to estimate the market value of Statkraft Groups equity is the FCFE model. This model estimates the future free cash flows to the equity holders and discounts the cash flows with the estimated cost of equity. The model is based on the same assumptions about cost of equity and terminal growth as the Dividend model. The results are presented below.

NOK million	2021	2022	2023	2024	2025	2026	2027
FCFE	9 173	8 443	6 766	7 092	7 395	9 440	8 799
Dividends	9 134	6 034	6 813	7 078	7 870	7 770	7 778
Re	6 %						
WACC	5,25 %						
Terminal growth	2 %						

	1	2	3	4	5	6	7
FCFE			**Explicit**			**Terminal**	
	2021	*2022*	*2023*	*2024*	*2025*	*2026*	*2027*
FCFE	9 173	8 443	6 766	7 092	7 395	9 440	8 799
Cost of Equity	6,00 %	6,00 %	6,00 %	6,00 %	6,00 %	6,00 %	
Discount Factor	0,94340	0,89000	0,83962	0,79209	0,74726	0,70496	
PV of Terminal per 31.12.26						219 980	
PV of Terminal per 1.1.2021						155 077	
PV of Explicit per 1.1.2021	8 654	7 514	5 681	5 618	5 526	6 655	
MVE IN MNOK per 1.1.2021	**194 724**						

Figure 33: Free cash flow to the equity model

The market value of the equity according to this model is NOK 195 billion.

This model obtains a higher value than the Dividend model when there is a cash surplus in the terminal period. A cash surplus means that not all available cash to the equity-holders is paid out as dividends. The cash surplus is explained by lower capital expenditure in the terminal period than in the explicit period, considering that the following years will require higher investments to reach the Groups growth ambitions.

10. Relative Valuation

Relative valuation with multiples can be used to stress test our main valuation models. We do not use multiples as our main model because of the assumption that the comparing companies share the same economic characteristics and outlook.

I will use the equity based multiple Price/Earnings to stress test my estimated market value. The P/E shows how much investors are willing to pay per NOK of earnings. The results are presented below.

Comparable firms	Price/Earnings
Fortum	81,02
Scatec ASA	46,95
Enel S.p.a	32
Iberdrola	19,21
Average	44,795
Median	39,475

Figure 34: P/E for comparable firms

Comparable firms	P/E peers	Net incme Statkraft Group 2020	Expected MVE of our firm
Mean	44,795	3 531 000 000	158 171 145 000
Median	39,475	3 531 000 000	139 386 225 000
Low	19,21	3 531 000 000	67 830 510 000
High	81,02	3 531 000 000	286 081 620 000

Figure 35: Statkrafts market value based on calculated P/E

The estimated market value from the Dividend model yields values close to the mean. Statkraft is 9,85% more valuable compared to the average market in figure 35. Part of the explanation may be that the Statkraft Group has low leverage compared to the other firms.

The P/E multiple is affected by the leverage. Companies with high leverage will have lower P/E ratios even if the value of the operations may be as good as for another firm with less leverage. In addition, multiples do not take into consideration the specific competitive advantage of the firm and may undervalue the market value.

11.0 Sensitivity analysis

The valuation of the company`s market value is based on several assumptions.

The market value can be sensitive to small changes in these assumptions and a sensitivity analysis relates financial performance changes with changes in key assumptions.

I will therefor conduct a sensitivity analysis to examine how changes in assumptions may affect the value. Important assumptions in this valuation are estimated growth rate in the terminal period, estimated power prices in the terminal period, expected return on equity and beta. Results of the sensitivity analysis are presented below.

		Dividende model				
		Cost of equity, Re				
		5,00 %	*5,50 %*	*6,00 %*	*6,50 %*	*7,00 %*
Terminal Growth	*1,00 %*	182 949	162 608	146 571	133 028	121 938
	1,50 %	203 678	178 278	158 782	142 720	129 791
	2,00 %	231 317	198 425	173 755	154 566	139 215
	2,50 %	270 012	225 287	193 338	169 373	150 732
	3,00 %	328 053	262 894	219 449	188 411	165 129

Figure 36: Sensitivity analysis Cost of equity Dividend model

		FCFE model				
		Cost of equity, Re				
		5,00 %	*5,50 %*	*6,00 %*	*6,50 %*	*7,00 %*
Terminal Growth	*1,00 %*	205 064	182 084	163 708	148 681	136 164
	1,50 %	228 514	199 811	177 493	159 645	145 048
	2,00 %	259 781	222 602	194 724	173 046	155 709
	2,50 %	303 555	252 991	216 878	189 797	168 738
	3,00 %	369 216	295 534	246 416	211 334	185 025

Figure 37: Sensitivity analysis Cost of equity FCFE model

Dividende model				
Beta				
0,60	*0,65*	*0,70*	*0,75*	*0,80*
198 425	185 267	173 755	163 596	154 566

Figure 38: Sensitivity analysis Beta Dividend model

FCFE model				
Beta				
0,60	*0,65*	*0,70*	*0,75*	*0,80*
222 602	207 733	194 724	183 247	173 046

Figure 39: Sensitivity analysis Beta FCFE model

Dividende model				
Power prices terminal period, NOK/KWh				
0,30	*0,35*	*0,40*	*0,45*	*0,50*
125 577	149 666	173 755	197 843	221 932

Figure 40: Sensitivity analysis Power prices Dividend model

FCFE model				
Power prices terminal period, NOK/KWh				
0,30	*0,35*	*0,40*	*0,45*	*0,50*
166 654	180 689	194 724	208 759	222 794

Figure 41: Sensitivity analysis Power prices FCFE model

12.0 Conclusion

The analysis of the energy market shows growth opportunities for clean energy providers.

Statkraft has long experience in the energy industry, with a competent board of directors and management. Governance and the structure of the Group provides them with a good fundament for risk assessment and achievement of objectives.

The increasing demand in clean energy has led to rapid changes in the energy market, high technology development and growth opportunities. Growth opportunities increases the competition among the suppliers and competitive advantage becomes more crucial to achieve growth and take market shares.

Statkrafts long experience, the unique ownership of power plants and solid financial position provides them with unique competitive advantage and a good possibility of further growth. The Group plans to expand internationally, entering new markets may yield higher returns but also expose the Group to new risks and risk assessment will be even more important.

Statkraft ambitious growth plans include investments in new power sources to diversify their power generation and reduce the overall risk.

The Dividend model yield a market value of the equity of NOK 174 billon. The FCFE-model yields a slightly higher market value of equity of NOK 195 billion. Since not all free cash flows are expected to be distributed to the equity holders, I believe that the Dividend-model is more reliable. The relative valuation with the Price/Earnings ratio confirms this assumption. According to the mean P/E multiple of the comparable firms the market value of Statkraft is around NOK 158 billion, a value closer to the Dividend-model value than the FCFE- model value.

The sensitivity analysis shows that the Dividend-model is most sensitive to changes in estimated terminal power prices. An increase from 0,40 NOK per KWh to 0,45 NOK per KWh increases the market value by almost 14% (an increase of NOK 24 billion).

The FCFE model is less sensitive to changes in power prices, where the same changes in power price will increase the market value by 7%, suggesting that

changes in power prices affects the earnings in the income statement more than the cash flows to equity.

Changes in the cost of equity and terminal growth affect the market value by approximately 11% for both models. The sensitivity analysis confirms that volatility in earnings caused by changes in power prices discussed in earlier chapters in this thesis.

References

Arnesen, F. (2006). EØS-retten og hjemfallsretten. *Lov og rett, 04,* 238-251. Idun.

Nr 04 - 2006 - Lov og Rett - Idunn

Bjarne, Steffen. (2020) Estimating the cost of capital for renewable energy projects. *Institute of Science, Technology and Policy, ETH Zurich, 8092 Zurich, Switzerland*. 88, Article 104783

Estimating the cost of capital for renewable energy projects - ScienceDirect

Bøhren, L.,Hovland, K. (2020, 29. oktober). Statkraft ville vært et perfekt selskap å ta på børs. *E24.*

https://e24.no/boers-og-finans/i/R996ya/statkraft-ville-vaert-et-perfekt-selskap-aa-ta-paa-boers

Energifaktanorge. (2021). Energifaktanorge.no - fakta om norsk energi og vannressurser - Energifakta Norge

European Commission, Eurostat. (2021). Home - Eurostat (europa.eu)

Fortum. *Annual report 2020.*

download (fortum.com)

Iberdrola. *Annual report 2020.*

Annual Accounts, Directors' Report, Audit Report and Liability Statement 2020 (consolidated) (iberdrola.com)

International Renewable Energy Agency. (2021) https://www.irena.org

Norwegian Central Bank. (2021). *Inflasjon*. Inflasjon (norges-bank.no)

Nordpool. (2021). *Historical market data.*

Historical Market Data | Nord Pool (nordpoolgroup.com)

Norwegian Corporate Governance Board. (2020). *The Norwegian Code of Practice for Corporate Governance*.

The Norwegian Code of Practice for Corporate Governance | NUES

Norwegian Water Resources and Energy Direcotorate. (2021). NVE - Norges vassdrags- og energidirektorat

Petersen, C. Plenborg, T. & Kinserdal, F. (2017). *Financial Statement Analysis* (1.utg). Fagbokforlaget.

PricewaterhouseCoopers. (2021). *Risikopremien 2020*

Risikopremien 2020 (pwc.no)

Rikke. J, Malden. N & Midttun. J. (2016) Børsnotering eller ikke. *Praktisk økonomi & finans,* 06.05.2016 s. 90-96.

https://www-idunn-no.ezproxy.library.bi.no/pof/2016/01/boersnotering_eller_ikke

Scatec. (2021) *Annual report 2020.* Scatec-Annual-Report_2020.pdf

Norwegian Statistics Bureau, SSB (2021). Statistisk sentralbyrå (ssb.no)

Statkraft. (2021). *Annual report 2020.* statkraft-as-annual-report-2020.pdf

Statkraft. (2020). *Annual report 2019.* statkraft-as-annual-report-2019.pdf

Statkraft. (2019). *Annual report 2018.* https://www.statkraft.com/globalassets/0/.com/investor-relations/reports-and-presentations/2018/annual-report-2018/2018-annual-report-statkraft-as.pdf

Statkraft. (2018). *Annual report 2017.*

https://www.statkraft.com/globalassets/0/.com/investor-relations/reports-and-presentations/2017/2017-statkraft-as-annual-report/statkraft-as-annual-report-2017.pdf

Statkraft (2020). *About statkraft.* https://www.statkraft.com/about-statkraft/

The Institute of Internal Auditors. (2020). *Three lines model.*

Three-Lines-Model-Updated.pdf (theiia.org)

The Waterfalls Right Act. (2018). Lov om konsesjon for rettigheter til vannfall mm. (LOV-2017-06-21-101). Lovdata.

https://lovdata.no/dokument/NL/lov/1917-12-14-16?q=hjemfall

Voltalia SA. (2021). Annual report 2020.