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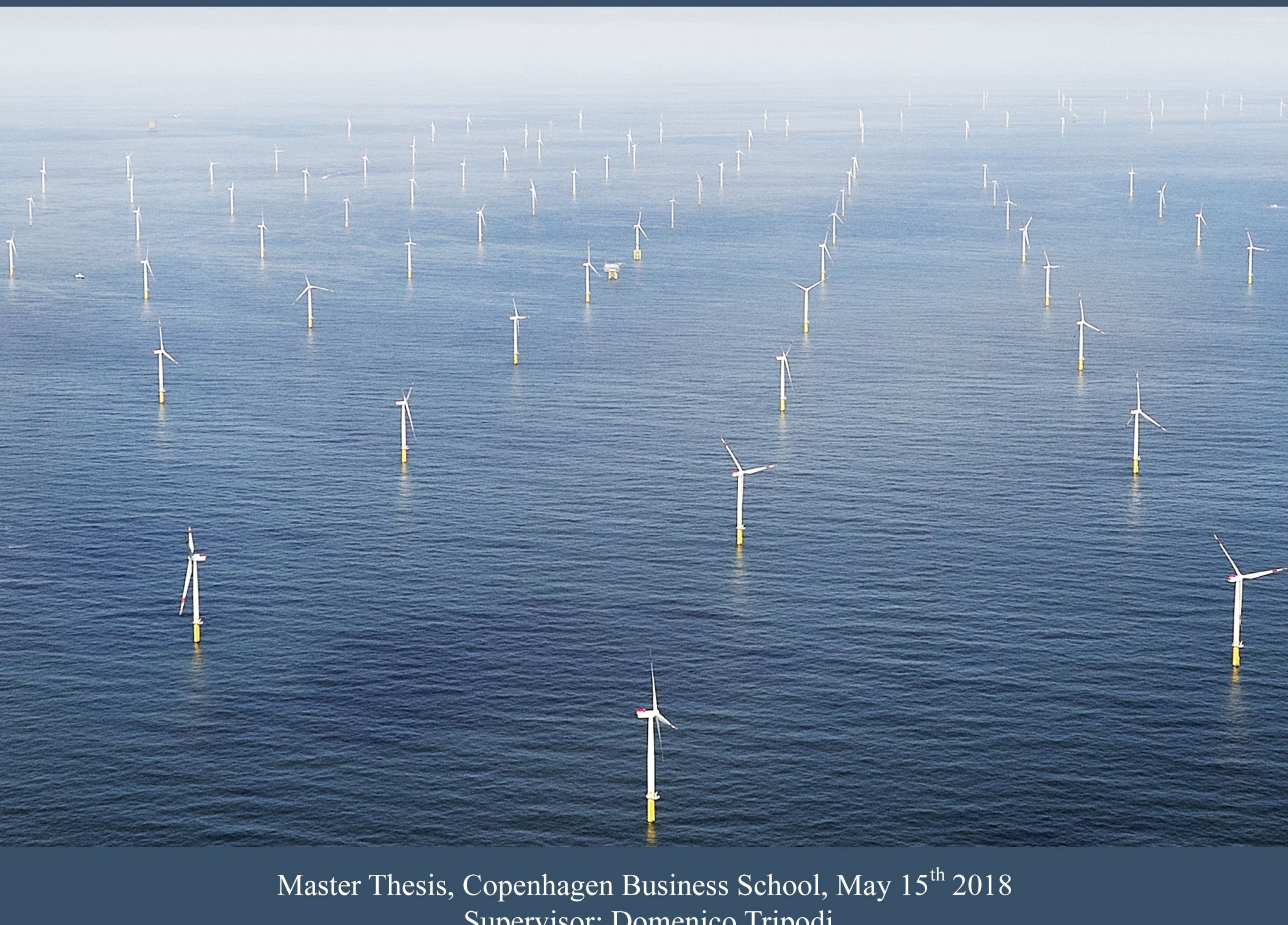
Valuation of Ørsted

Determining the fair price of Ørsted



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Executive Summary

In 2006, Ørsted was among the most coal-intensive utilities in Europe, but today it is one of the most renewable. In line with this shift, Ørsted changed its name from DONG Energy, which was an abbreviation of Danish Oil & Natural Gas, to Ørsted. Ørsted's goal is to phase out their use of coal by 2023, turning its focus to offshore wind. Because of this transformed business profile and increasing exposure to offshore wind, investors are now forced to rethink and re-evaluate their valuations of Ørsted.

The objective of this thesis has been to determine the fair value of Ørsted A/S' share price, as of March 31st, 2018.

To ensure a robust valuation of Ørsted, this thesis has incorporated a set of well-documented strategical and financial frameworks. The PESTEL framework examined the macroeconomic drivers affecting the offshore wind industry. Porter's Five Forces further investigated factors important to the competitive environment in the industry. Porter's value chain defined the activities supporting the value chain of Ørsted. Meanwhile, the VRIN framework was applied throughout in order to examine Ørsted's competitive advantages. To properly adjust the financial forecasting, a historical analysis of Ørsted's financial performance relative to its peers was conducted. The main findings were summed up with the SWOT framework. A 'triangular-valuation' approach was applied; more specifically, DCF, a relative valuation with and without machine learning, comparable transactions and market regression. To ensure a robust valuation, the DCF was thoroughly stress-tested with Monte Carlo simulations.

The strategic analysis highlighted macroeconomic factors as the key drivers of the offshore wind industry. The goal of reducing CO2 entails a shift from the conventional fossil fuels towards renewable energy sources. LCoE will determine whether offshore wind is able to compete with other renewable sources. In addition, subsidies and power prices have a major impact on the growth and profitability of the industry. However, Ørsted has a sustained competitive advantage with its know-how and technological capabilities—a product of being the first mover. The financial analysis revealed that, so far, offshore wind has been a major driver of Ørsted earning a ROIC over its WACC, creating value for its shareholders, helped by their farm-down model. However, former oil & gas companies have noticed the growth potential in offshore wind and have committed to taking market shares. The SWOT framework summarised more threats than opportunities, resulting in a negative outlook post-2025. The value per share is found to be DKK 329; consequently, the current share price of DKK 392 is OVERVALUED, initiating a SELL recommendation. According to the Monte Carlo simulations, there is an 85% probability of a loss if investors were to invest in the stock today. To forecast Ørsted's first quarter earnings April 26th, the initial idea for a wind model has been built.

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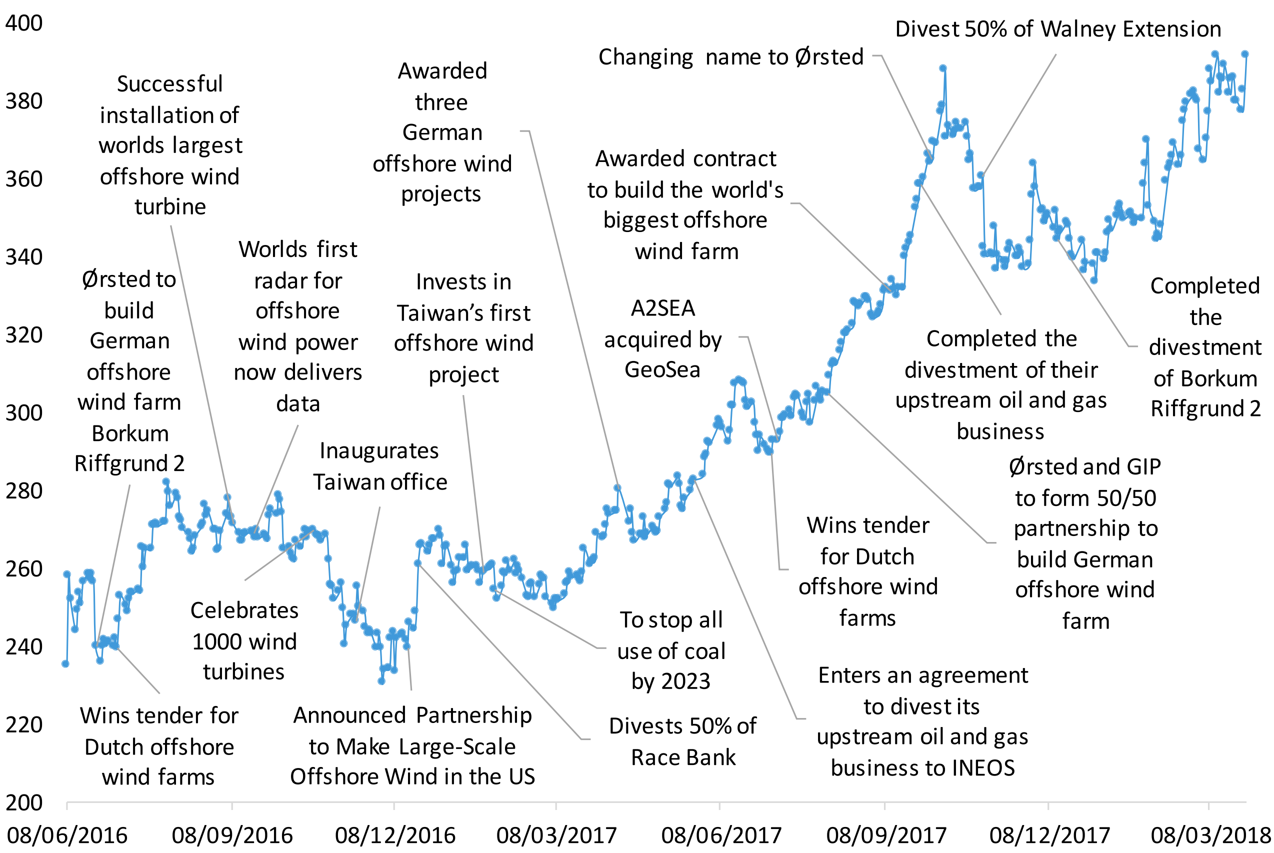
1. Introduction

Global CO2 emissions must be reduced by 2020 (UN, 2017). A dramatic increase in renewable energy deployment is needed, and Denmark is a leading producer of renewable energy (Gerdes, 2016). The offshore wind industry is growing rapidly as demand for green energy is increasing. The industry players have developed tremendously in terms of size and profitability over the last decades (Poudineh et al., 2017). This is mostly due to consolidation and technological advancement. The Danish company, Ørsted (formerly DONG Energy), is the world's largest offshore wind developer, constructor, operator and owner, with projects in Denmark, Germany, the UK and the Netherlands, as well as having small pilot projects in Taiwan and the US (Ørsted, 2016a; Ørsted, 2017a). Ørsted was a first mover in offshore wind energy and has a longer and more extensive record than its key competitors (Ørsted 2016a). In 2016, Ørsted was the first to have installed more than 1,000 offshore wind turbines (Ibid.).

Over the past 11 years, Ørsted has undergone a significant transformation towards green energy. In 2006, Ørsted was among the most coal-intensive utilities in Europe, and only 13% of their heat and power generation was based on renewable energy sources (Ørsted, 2017a). Ørsted recently reported earnings for 2017 where the company emphasised its transformation from being a Danish utility company based on coal, oil and gas to an international energy company based on green energy (Ibid). Ørsted has decided to phase out their use of coal by 2023, where more than 95% of their heat and power generation will come from renewable energy sources (Ibid.). Thune, Thomas, chairman of Ørsted commented: *"As a result, we are a completely different company today"* (Ibid, p. 5). The shifting values of the company are reflected in their name change from DONG Energy, which was an abbreviation of Danish Oil & Natural Gas, to Ørsted.

Professional investors and equity research analysts must now rethink their valuation of Ørsted. What is the fair value now when Ørsted's Wind Power division will account for the majority of the earnings going forward? If you take the recent development in the share price into account, shareholders have been predominantly positive with Ørsted trading close to its all-time high.

Figure 1 – Ørsted's share price annotated with major events



Source: Authors' own creation from (Ørsted, 2018b) and Bloomberg

The breakdown of EBITDA (highlighted in the financial analysis) shows that a total of 70% is coming from Ørsted's Wind Power division. In other words, a high double-digit percentage of Ørsted's enterprise value (EV) is coming from their Wind Power division. Going forward, the explanatory power will likely be even more significant with the divestment of oil and gas. The question now is how this will impact Ørsted's cash flows, especially in terms of volatility from quarter to quarter. The rating agency, Moody's, has earlier stated its concern regarding the volatility in Ørsted's cash flows, which resulted in a rating of Baa1, close to be a junk bond (Business, 2012). Due to the company's strong financial performance, Moody's have since updated their view on Ørsted, but Ørsted's financial dependence on wind speed is still unknown. Furthermore, the costs associated with offshore wind are still larger than those from conventional energy (Poudineh et al., 2017). Cost levels are expected to reach a more competitive level, but significant challenges lie ahead. For example, the offshore wind industry recently introduced zero subsidies (Ørsted, 2017f). In a recent competitive auction for offshore wind in Germany, 1300MW out of 1450MW were accepted without any subsidies (Poudineh et al., 2017). This presents a significant risk for Ørsted's earnings going forward as more countries may copy Germany, just like the Netherlands did (Wind Power Offshore, 2018).

Ørsted stated in their investor presentation for 2017 that over the next number of years, offshore wind will remain their primary driver of growth and constitute the vast majority of their business. They expect that more than 85% of their gross investments towards 2023 will be in offshore wind (Ørsted, 2017a, p. 6). Table 1 shows the business units' contribution.

Table 1 – Key figures 2017

Wind Power		Bioenergy & Thermal Power		Distribution & CS.	
Revenue	DKK 20.4bn	Revenue	DKK 5.9bn	Revenue	DKK 40.2bn
Gross investments	DKK 15.5bn	Gross investments	DKK 1.4bn	Gross investments	DKK 0.9bn
Capital employed	DKK 59.7bn	Capital employed	DKK 2.6bn	Capital employed	DKK 9.8bn
ROCE	28.4%	FCF	DKK -0.8bn	ROCE	13.1%
#Employees	2,253	#Employees	749	#Employees	1,263

Source: Authors' own creation from (Ørsted, 2017a)

In their IPO prospect, Ørsted states the following: *"Our strongest and most differentiated competitive positions are within offshore wind power and this is where we see the biggest potential for long-term growth and value creation"* (Ørsted, 2016a, p. 134). For these reasons, the majority of the analysis in this thesis will be done on the offshore wind industry and its outlook.

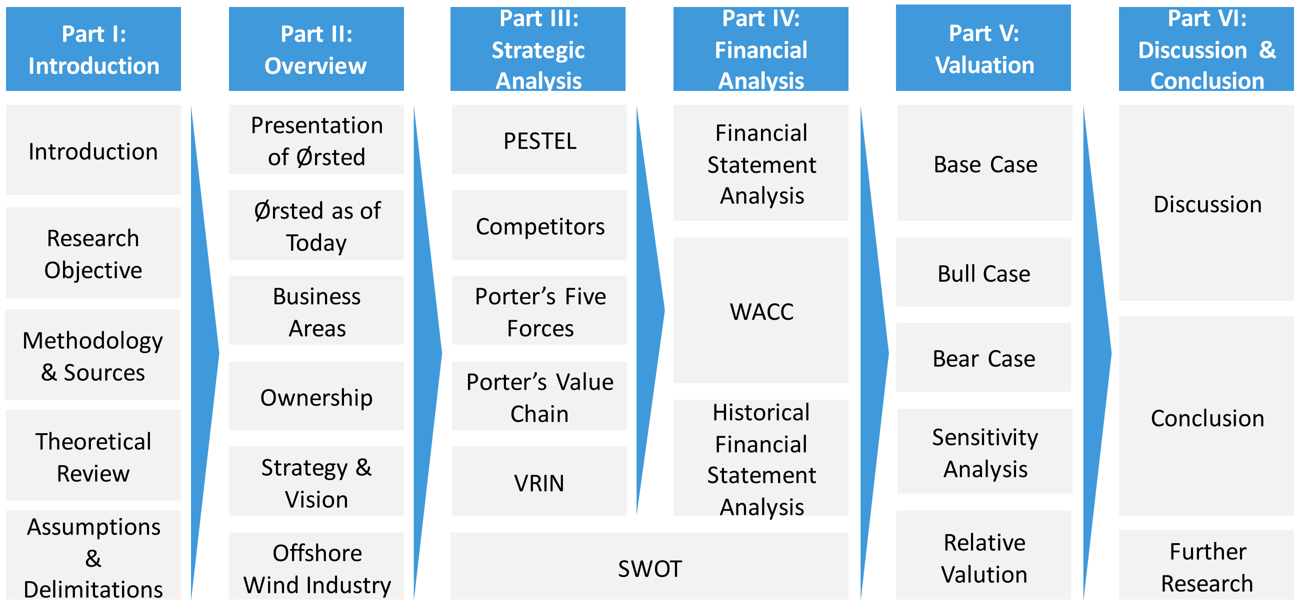
1.1. Research objective

The objective of this thesis is to determine the fair value of Ørsted's share price on a standalone basis. The thesis will rely on proven theoretical models and challenged with statistical models, in order to determine whether the share is trading around its fair price or not. Hence, the research objective is to determine:

"What is the fair share price of Ørsted A/S' as of March 31st, 2018?"

To reach a complete valuation, it is necessary to gain insight into the industry, the value drivers, the market outlook and Ørsted's competitive advantage. To ensure a thorough analysis, the following structure will be used in the thesis:

Figure 2 – Thesis Structure



Source: Authors' own creation

Part I - Introduction: This section will introduce the models, theories and frameworks used in the thesis. It will discuss which theories are considered the most suitable to get a thorough understanding of Ørsted and its fair value. It will provide a high-level discussion of best practices when performing a valuation. This section is essential for understanding the later analysis.

Part II - Overview: This section will provide an overview of the offshore wind industry and its history. Further, the section will introduce Ørsted. The history of the firm will be described briefly, starting from its foundation, up until its most recent activities. The section will provide the foundation for the strategic and financial analysis.

Part III - Strategic Analysis: The subsequent sections will provide a strategic analysis of Ørsted and is divided into three parts. First, Ørsted's macro-environment is analysed with a focus on how various macro factors impact their competitiveness. Secondly, by analysing the offshore wind industry, Ørsted's micro-environment is discussed in detail. Thirdly, an internal analysis is presented with a focus on Ørsted's internal capabilities. Following the financial analysis, the strategic analysis will be summarised in a SWOT. The overall goal of this section is to uncover the main drivers within the industry and Ørsted's potential for future value creation. The section will provide the foundation for forecasting Ørsted's growth, cash flows and risk.

Part IV - Financial Analysis: The strategic analysis is followed by a financial analysis. Ørsted's financial statements will be reformulated to separate operating items from financing items. The reformulated financial statements will be used to conduct a financial analysis of the past years. The aim is to understand Ørsted's past drivers of growth, profitability and credit risk and compare it to its peers. In order to calculate the economic value added (EVA), this section will also calculate Ørsted's cost of capital (WACC). The section will give valuable insight into Ørsted's ability to grow in the future.

Part V - Valuation: This section intends to answer the overall research question by ultimately valuing Ørsted. First, it will provide pro forma income statements, balance sheets and cash flow statements based on the results of the strategic analysis. Second, it will calculate the fair value of Ørsted with use of appropriate valuation techniques. Third, a sensitivity analysis will be used to challenge and check the sanity of the valuation.

Part VI – Discussion & Conclusion: The final section will discuss and conclude the thesis' findings and provide a final answer to the overall research question. Finally, for further research, a wind model is built with a focus on wind speed's explanatory power to Ørsted's earnings.

1.2. Methodology and sources

In this section the choice of scientific view, research approach, literature applied and source of empirical data will be elaborated upon.

1.2.1. Research Method

When conducting research, different research paths are available. No research path is better than others, but some are better at achieving different goals (Egholm, 2014). The choice of research path should always be aligned with the aim and scope of the research project.

1.2.1.1. Scientific View

Research studies are carried out within predetermined paradigms. Each paradigm presents its own view on the world, setting boundaries for what is possible. Hence it is important to establish and select a paradigm (Ibid.). Positivism and constructivism represent the most fundamental paradigms. The two paradigms take different ontological, epistemological, and methodological positions (Ibid.). The positivistic paradigm adheres to an objective ontology and emphasizes the objective analyst, who generalizes about cause-effect relations with statistical analysis. In positivism all subjectivity is rejected (Ibid.). In contrast, in constructivism the goal is to understand the subjective reality of the research subject rather than to generalize. Here the researcher is an active participant within the world being investigated (Ibid.).

The constructivist paradigm is believed to be the most suitable paradigm for the thesis due to the nature of the used frameworks. Valuation models are affected by subjective beliefs about the future. Consequently, the authors will have an impact on the outcome of the study. In addition, the goal is not to test or verify established theoretical models.

1.2.2. Research Approach

The research approach addresses the question of methodology (Ibid.). The main research approaches are induction and deduction (Ibid.). The distinction between the deductive and the inductive approach is whether to start at the empirical or theoretical level.

Deductive reasoning can informally be called a "top-down" approach (Ibid.). Here theory is the starting point, which is narrowed down to a hypothesis which can be tested. The test of the hypothesis leads to a confirmation or rejection of the original theory (Ibid.). Inductive reasoning works the other way, a "bottom up" approach (Ibid.). In inductive reasoning data is the starting point. Here patterns are detected leading to hypotheses that can be explored - the result is a new theory. In theory the two research approaches define two extremes, in practice most research involves using both inductive and deductive reasoning (Ibid.).

The thesis will use both a deductive and inductive research method. First, a deductive approach is used as the value of the share is calculated by applying general frameworks. The conclusion of the thesis is therefore sensitive to the chosen frameworks, and a thorough theoretical review is conducted to find the appropriate valuation framework. There are no general frameworks to value companies within offshore wind, so an inductive approach is also used. Combining the two research methods ensure that the thesis has the necessary flexibility to account for Ørsted's company-specific factors. In relation to research approaches, the combination of deduction and induction results in an abductive research approach. Abduction unites deduction and induction and allows for exploring an unknown phenomenon based on current knowledge (Ibid.).

1.2.3 Literature

The thesis' overall research design is like the setup used by Petersen & Plenborg (2012). The strategic analysis is based on frameworks from Grant (2015) and complemented with recommendations from Petersen & Plenborg (2012) as they focus on strategic frameworks suitable for valuation.

The valuation will primarily be conducted after the methods stated in Koller et al. (2010), Damadoran (2012), Petersen & Plenborg (2012), Penman (2009) and Rosenbaum & Pearl (2009). The reformulation of the balance sheet and income statement is primarily based on the framework produced by Petersen & Plenborg (2012) and Koller et al. (2010). The historical financial analysis is solely based on Petersen & Plenborg (2012). The cost of capital will be calculated based on the framework from Damodaran (2012) as the author uses the bottom-up beta calculation, suitable for Ørsted. The intrinsic valuation will be based on a combined framework from the listed authors with more weight on Koller et al. (2010), Damadoran (2012) and Petersen & Plenborg (2012). The relative valuation is based on Rosenbaum & Pearl (2009), as they come from an investment banking background where relative valuation is widely used. Finally, the statistical models are based on the works from Damodaran (2012) with inspiration from Vibig et al. (2008) as they focus on statistical models from leading investment banks.

It should be noted that all these authors have different beliefs regarding valuation. For example, Koller et al. (2010) is a strong advocate for focusing on economic value added (EVA) with the return on invested capital (ROIC) versus WACC as the most important metric in valuation. On the other hand, Damodaran (2012) is a strong believer in having a story to the numbers. Relying on a combined framework from these listed authors will provide a solid theoretical basis for a best practice valuation.

1.2.4 Data

The thesis is written from the perspective of an external investor. Therefore, it is entirely based on publicly available information. The thesis will involve a large amount of data; therefore, it is important to provide an overview. Data sources can be categorized into primary, secondary and tertiary sources (Booth, et al., 2008).

Primary data: The thesis relies heavily on primary data. In simple terms, primary data is data, which other research is based on. In a valuation context, primary data is data coming directly from Ørsted, i.e. annual reports, company announcements and press releases. It could be argued that this type of data can be bias and edited, however Ørsted is a listed company constrained by regulations. Hence it is assumed that public information is reflective of its facts.

Secondary data: Secondary data tries to describe or explain primary data. It summarizes or interprets the primary source. Secondary data is obtained from validated sources such as WindEurope, MarketLine, Energistyrelsen, European commission, Bloomberg, Bloomberg New Energy Finance (BNEF) and Reuters. More in depth background information about the offshore wind industry and the technical details in installation of offshore wind farms is obtained from two reputable books with more weight on Poudineh et al. (2017). In addition, articles from the Danish newspaper Børsen are used, as Ørsted is often mentioned in that paper.

Tertiary data: Tertiary data is usually not credited to an author since they compile other sources. Examples of tertiary sources are encyclopedias, fact books, chronology etc. Tertiary sources are only used in the early writing phase to obtain an overview of the offshore wind industry.

1.3. Theoretical review

The following section will review the theoretical models used to conduct a thorough valuation of Ørsted. These models will be critically assessed, and it will be shown why the models used are the most appropriate in the context of the thesis. To value a company, it is necessary to understand the economic context in which the company operates, the company's strategy, and the company's financial performance. The first subsection will focus on the strategic analysis, while the latter subsection deals with the financial analysis.

1.3.1. Strategic analysis

A strategic analysis is a pivotal factor in being able to identify key value drivers that exist in the company (Grant, 2015). The aim is to identify the non-financial value drivers that can influence Ørsted's value creation. Therefore, findings of this section will serve as the foundation for the financial forecasting.

For a strategic analysis to be all-encompassing, it needs to include both internal and external factors. For this ground to be covered using academia, a combination of theories must be used since no single theory covers internal and external factors conclusively (Grant, 2015). A strategic analysis can be conducted using a top-down perspective or a bottom-up perspective (Day, 1981). The thesis will use a top-down perspective due to its market focus, where a company's ability to generate value from its products are highlighted. Johnson et al. (2008) characterise the environment of a company as a series of layers. The outer layer is the company's macro-environment, the second layer is the micro-environment, which focuses on the sector, and the third and last layer is the company itself and its capabilities. Petersen & Plenborg (2012) present a similar framework:

- Macro factors influencing the company's cash flow potential and risks
- Industry factors influencing the company's cash flow potential and risks
- Company-specific factors influencing the company's cash flow generation and risks
- Value chain analysis
- A company's Strengths, Weaknesses, Opportunities and Threats (SWOT)

The thesis will follow the suggested strategic framework by Petersen & Plenborg (2012). Note their extensive focus on factors that influence cash flows and risks. These factors are the primary determinants of a company's share price and therefore highly relevant to uncover.

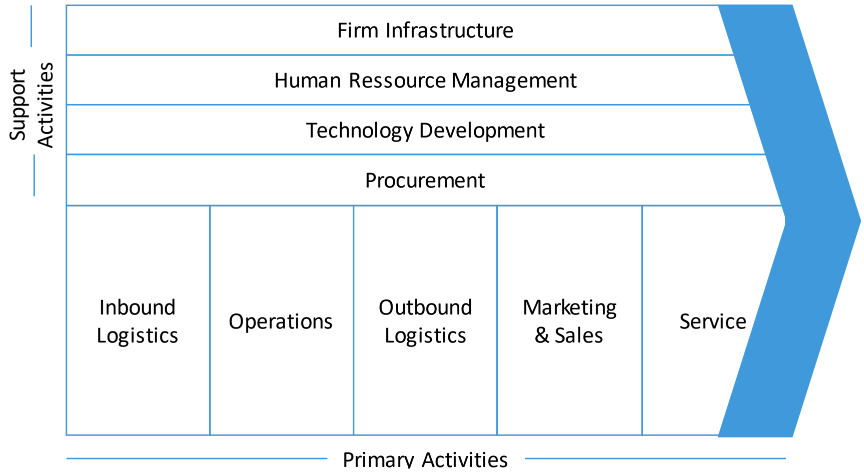
To cover the external macro-environment, the PEST framework is used (Aguilar, 1967). The model is extended to include environmental and legal factors (PESTEL) since they are important in today's society (Johnson et al., 2008). PESTEL is an abbreviation of Political, Economic, Social, Technological, Environmental, and Legal, and is one of many frameworks that structure environmental macroeconomic factors into key types

(Ibid.). The framework has been criticised for addressing highly dynamic factors that can change without a moment's notice. Another criticism is that the 'degree of impact' is not considered and up-to-date information is rarely at one's disposal (Ibid.). Furthermore, it is important to address that the PESTEL describes the past. Despite the weaknesses of the PESTEL, the model can provide a thorough overview of the surroundings and identify the key strategic factors (Ibid.)

To develop an understanding of the competitive environment and the attractiveness of the industry, Porter's Five Forces framework is used (Porter, 1979). Porter's framework is still the most widely used for thinking about strategy. According to Porter (1979) the intensity of competition in an industry is determined by five forces: threat of new entry, pressure from substitute products, bargaining power of buyers, bargaining power of suppliers and the degree of rivalry among existing competitors. Companies need to choose strategies that build competitive advantages to mitigate these forces and achieve superior profitability. Porter's framework has been criticised for being static; it considers industries in a specific moment, neglecting the dynamic relations among companies (Thurlby, 1998). Grundy (2006) also highlights that the framework tends to support the mindset of an industry as a specific entity with clear boundaries. Still, Grundy (2006) states that the model has significant potential when combining it with other tools, such as PESTEL, which is done in this thesis. Furthermore, Porter's framework does not value the company's resources and capabilities, which is a determinant of a company's profitability (Hill & Jones, 1995). For this reason, the Porter's value chain framework is introduced and merged with the VRIN model due to its internal focus (Grant, 2015). To account for some of the weaknesses related to Porter's framework, game theory could be applied. Game theory is better at capturing the industry dynamics, especially the competitor's countermoves (Johnson et al., 2008). However, according to Mahoney (2005), game theory is not better than neoclassical economic theory when trying to predict the outcome of a bargaining situation.

The internal analysis consists of a value chain analysis as proposed by Porter (1998). Porter (1998) noted that the competitive advantage of the firm cannot be understood solely by looking at the firm as a whole. Rather, the competitive advantage stems from discrete activities performed by the firm that can be divided into two activities; namely, primary and support (ibid.). Even though research by (Grant, 2015) emphasises the importance of value chain analysis, researchers have described inefficiencies with the theory. Lord (1996) and Dekker (2003) note that little empirical evidence of the use in practice is available and the concept has primarily been conceptual and anecdotal. To account for these weaknesses, the activities identified by the value chain analysis are analysed with use of the VRIN framework.

Figure 3 – Porter's value chain framework



Source: Authors' own creation from (Porter, 1998)

The VRIN-framework is used to analyse whether Ørsted's activities in its value chain, identified from the value chain analysis, have any sustainable competitive advantage. The VRIN framework, introduced by Barney (1991), integrates two existing theoretical frameworks: the positioning perspective and the resource-based view (RBV). VRIN stands for the four questions one must ask about a company's resources to determine its competitive potential:

- **Valuable:** Does the resource enable the firm to exploit an opportunity?
- **Rare:** Is the resource currently controlled by only a small number of competing firms?
- **Inimitable:** Do firms without the resource face a cost disadvantage in obtaining it?
- **Non-Substitutable:** Can other firms substitute the resource with any other resource?

If the first three questions can be answered with a "yes" and the last one with a "no", then the respective resource can be considered to be a sustainable competitive advantage (Barney, 1991). The VRIN model has been the subject of much criticism because it ignores external factors and it is a simplified version of reality (Priem & Butler, 2001). When combining the model with an external analysis, the limitations of the VRIN model are reduced (Johnson et al., 2008).

A summary of the findings from the internal, external and the later financial analysis are presented in a SWOT framework. The SWOT identifies the key issues and strategic drivers based on the external and internal analyses (Petersen & Plenborg, 2012). The SWOT analysis consists of identifying the Strengths, Weaknesses, Opportunities and Threats the company is experiencing. The first two factors, the strengths and weaknesses of a firm, are derived internally with use of the value chain analysis and the VRIN model, where the focus is placed on internal competences. The other two factors, opportunities and threats are derived from the external analysis with use of PESTEL and Porter's Five Forces. By conducting a SWOT analysis, the goal is to identify the key strategic drivers that will have direct effect on Ørsted's financial operation and thus lead to better and more thoughtful financial forecasting (Petersen & Plenborg, 2012).

1.3.2. Financial analysis

A critical assumption in valuation, as applied to publicly traded stocks, is that the market price of a stock can differ from its intrinsic value. If one assumed that the market price of a stock perfectly reflected its intrinsic value, the valuation would simply be looking at the market price. Therefore, when the thesis is performing a valuation, it subjects itself to the idea that the market can be inefficient and hence misprice a company (Damodaran, 2012).

1.3.2.1. Intrinsic valuation

To obtain a useful estimate of intrinsic value, an analyst must combine accurate forecasts with an appropriate valuation model. Among the many ways to value a company, the thesis will focus on one in particular: the discounted cash flow model (DCF). To control the assumptions in the DCF, the DCF will be inspired by the economic value-added model (EVA), more specifically the use of ROIC. Given that the DCF and EVA yield identical results, only a DCF is used. The DCF remains a favourite of practitioners and academics because it relies solely on the flow of cash in and out of the company, rather than on accounting-based earnings (Damodaran, 2012). It is premised on the principle that the value of a company can be derived from the present value of its projected free cash flow (FCF): *"We buy most assets because we expect them to generate cash flows for us in the future"* (Damodaran, 2006, p. 4). The DCF can be specified in two ways. One approach is used to estimate the enterprise value of a company (unlevered DCF) and the second approach estimates the equity value of a company (levered DCF) (Damodaran, 2012). This thesis will estimate the enterprise value and work backwards to calculate the equity value. The three major inputs into the unlevered DCF are the following:

- Cash flows
- Terminal value
- Discount rate

Choosing appropriate inputs for the DCF analysis can be difficult. A minor change in any one of these variables can significantly affect the estimated value of a company.

1.3.2.2. Cash flows

The basic idea of the DCF model is to determine the present value of free cash flows (FCF). The FCF are derived from a variety of assumptions about the firm's future financial performance, including revenue growth, profit margins and reinvestment needs. The complexity lies in estimating these inputs, which is the main problem with the DCF (Damodaran, 2012). While there are varying definitions of FCF, the most common one is the free cash flow to the firm, which is defined as follows:

$$\text{FCF} = \text{NOPLAT} + \text{Depreciation} - \text{CAPEX} - \Delta\,\text{NWC}$$

The formula represents the cash produced by the company's business operations after paying for operating expenses and capital expenditures. It is a more representative measure of cash generation than simply looking at the company's net income (Ibid.). The FCF are typically projected for five to ten years, allowing a company to reach its steady state. This period typically spans at least one business cycle and allows sufficient time for the successful realisation of in-process or planned initiatives (Koller et al., 2010).

To account for the uncertainty when forecasting FCF, sensitivity analysis, such as Monte Carlo simulations, can be used. With this method, input variables are estimated as probability distributions rather than static values (Vibig et al., 2008). The Monte Carlo process includes running many simulations, yielding a whole set of possible enterprise values. Nowak & Hnilica (2012) argue that replacing the static numbers in the DCF with distributions is a robust method for capturing possible outcomes. It provides statistical measures such as mean, minimum and maximum value as well as standard deviation. Estimating the input distributions can be challenging but relying on historical data or a strategic analysis is a reasonable starting point (Vibig et al., 2008). In theory, any type of probability distribution can be used. However, due to the nature of the DCF, only a few probability distribution types are appropriate. In practice, the uniform and triangular probability distributions are widely used (Titman & Martin, 2011). The uniform distribution assigns equal probabilities for all values within a range, meaning that no value is more likely to occur, making it suitable for highly uncertain variables. The triangular distribution is similar to the uniform distribution but, in this case, the most likely value is also defined. Hence, the triangular distribution does not assign equal probabilities for all values or impose symmetrical probabilities around the most likely value. This is useful when using a DCF with carefully selected inputs from a strategic analysis (Vibig et al., 2008). With extensive research, a realistic minimum, most likely, and maximum value can be defined, improving the reliability of the Monte Carlo simulations (Ibid.). Hence, triangular distributions are used throughout the thesis.

When performing Monte Carlo simulations in a DCF, it is important to account for correlation between the input variables (Ibid.). It cannot be assumed that any financial value can be drawn randomly from each distribution independently. For example, a company that wants to grow its revenues usually must invest in property, plant and equipment and in net working capital, such as inventory and receivables. As a result, revenues and investments are typically correlated. The later Monte Carlo analysis shows how the thesis has accounted for correlation. In summary, sensitivity and scenario analyses are of great importance when performing a valuation due to *"…the valuation approach must yield an unbiased estimate"* (Petersen & Plenborg, 2012, p. 212).

1.3.2.3. Terminal value

Given the challenges of projecting a company's FCF indefinitely, a terminal value is used to quantify the remaining value after the projection period. The terminal value typically accounts for a substantial portion of the value in a DCF (Damodaran, 2012). Therefore, it is important that the financial data in the final year of the projection period (terminal year) represents a steady state or normalised level of financial performance, as opposed to a cyclical high or low (Koller et al., 2010). The terminal value can be calculated with use of the Gordon's growth formula:

$$\text{Terminal value in year n} = \frac{\text{Cash flow in year (n + 1)}}{\text{Discount rate} - \text{Perpetual growth rate}}$$

The fact that a stable growth rate is constant in infinity sets constraints on how high it can be. Since no firm can grow forever at a rate higher than the growth rate of the economy in which it operates, the constant growth rate cannot be greater than the risk-free rate (Damodaran, 2012).

Another approach that is widely used to calculate a company's terminal value is the exit multiple method (EMM) (Rosenbaum & Pearl, 2009). The EMM calculates the remaining value of the company after the projection period based on a multiple of the terminal year's EBITDA. According to Damodaran (2012) using multiples to estimate terminal value results in a dangerous mix of relative and intrinsic valuation. A DCF should provide an estimate of intrinsic value, not a relative value. Consequently, the only consistent way of estimating terminal value in a discounted cash flow model is to use a stable growth model (Damodaran, 2012). This thesis will rely on Gordon's growth formula and use the EMM approach as a sanity check.

1.3.2.4. Discount rate

The company's FCF is discounted with an appropriate discount rate such as the weighted average cost of capital (WACC). WACC is the price charged by investors for bearing the risk that the company's FCF may differ from what they anticipate. In other words, WACC equals the minimum return that investors expect to earn from investing in the company (Damodaran, 2012). WACC is a function of cost of equity (r_e) and cost of debt (r_d) and the market values for equity (MVE) and debt (MVD).

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

Cost of equity is probably the most difficult input to estimate in the WACC formula (Damodaran, 2012). The equity holders are residual claimants of the FCF and need to be derived in contrast to cost of debt. Cost of equity is found by the widely used and criticised capital asset pricing model (CAPM) (Koller et al., 2010). According to Graham & Harvey (2001), the CAPM is used by 73.5% of U.S. managers. The CAPM has been challenged by academics and practitioners but, so far, no practical competing model has emerged (Ibid.). The CAPM uses three variables to determine a stock's expected return and assumes a linear relationship between the risk-free rate, the market risk premium (i.e., the expected return of the market over the risk-free rate), and the stock's beta.

$$\text{CAPM} = \text{Risk free rate} + \text{Beta} * (\text{Return on Market} - \text{Risk free rate})$$

The risk-free rate is the starting point for all expected return models (Damodaran, 2012). In order for an asset to be risk-free, the asset must meet two conditions: (1) there can be no risk of default associated with its cash flows and (2) there can be no reinvestment risk (Damodaran, 2012). In a valuation, this will lead towards government bond rates as risk-free rates. Since they are risk-free, they have a beta of zero. According to the duration matching strategy, the government bonds need to be long term, so the duration is matched up to the duration of the FCF (Koller, et al., 2010). Furthermore, it is important that the risk-free rate is denominated in the same currency as the cash flows so issues such as inflation are avoided (Petersen & Plenborg, 2012).

Beta measures a stock's co-movement with the market and represents the stock's ability to further diversify the market portfolio. It is the only component in the standard CAPM formula that is company-specific. Stocks with high betas must have excess returns that exceed the market risk premium; the converse is true for low-beta stocks (Petersen & Plenborg, 2012). Studies over the last few decades suggest that the beta does not explain the differences in returns across stocks (Damodaran, 2012). However, there is no disputing that risk matters and some investments are riskier than others. If a beta is not used as a measure of relative risk, then an alternative measure of relative risk must be used. When estimating a beta, analysts often do a regression of a stock's return against a market index, where the beta is the slope of the regression (Petersen & Plenborg, 2012). This is known as the top-down beta approach and it is problematic due to it always being backwards-looking, dependent on the estimation period, and if the stock is a major component of the index, it will generally have a beta of one, known as the index effect (Damodaran, 2012). The thesis will use the bottom-up beta approach, where the regression beta is replaced with a sector-average beta. The regression beta would not be appropriate due to Ørsted only started trading in 2016; hence, the data available is insufficient. The bottom-up beta is obtained by averaging across regression betas of comparable firms, which reduces the standard error (Damodaran, 2012). This is important for Ørsted as the sector-average beta reflects its current mix of businesses (divestment of oil & gas) rather than its historical mix.

The market risk premium (ERP) is an estimate of the excess returns an investor can expect to receive as compensation for bearing equity risk (i.e., investing in the market portfolio rather than a risk-free instrument). There is a direct relationship between the ERP and required return, which means that as an investment's risk increases, investors will expect a higher return on equity (Damodaran, 2016). Conversely, as risk decreases, the required return on equity will also decrease. To estimate EPR, analysts often look at the past, which according to the literature is problematic (Ibid.). Historical returns vary widely over time, which results in large estimation errors. If the actual market index used has performed well during the historical period, the estimates may be skewed. An alternative is to back out a forward-looking premium (called an implied ERP) from current stock price levels and expected FCF (Ibid.). As a valuation is based on discounting future FCF, the thesis will rely on the implied ERP. It is often seen that ERP is based on an average across different approaches, but this represents different views of the world and gives a false sense of security (Ibid.).

The cost of debt (r_d) is the rate at which the company can borrow. It will reflect not only the default risk but also the level of interest rates in the market. The most frequently used approach to estimating cost of debt is looking up the yield to maturity on a straight bond outstanding from the firm. The limitation of this approach is that very few firms have long-term straight bonds that are liquid and widely traded (Damodaran, 2012; Koller et al., 2010). Alternatively, the company's credit rating can be found from rating agencies such as Moody's (Damodaran, 2012). From here, the default spread can be estimated and added to the risk-free rate to arrive at the cost of debt While this approach is more robust, different bonds from the same firm can have different ratings. As a last resort, if the company has no rating, a synthetic rating can be calculated from its interest coverage ratio (Ibid.).

1.3.2.5. Relative valuation

The idea behind relative valuation is that similar companies (peers) provide a highly relevant reference point for valuing a given company (Rosenbaum & Pearl, 2009). The underlying assumption behind the model is the law of one price and that the assets of comparable firms should be trading at the same price (Damodaran, 2012). Therefore, a relative valuation is designed to reflect a "current" valuation based on prevailing market conditions. Unlike the DCF model, the method of relative valuation does not require multi-year forecasts about the future FCF, the market renders this challenge (Rosenbaum & Pearl, 2009).

The core of relative valuation involves selecting a universe of comparable companies that have similar key businessess, financial characteristics and performance drivers to the chosen company (Ibid.). These peers are then benchmarked against one another based on their financial ratios. This comparison can be based upon enterprise-based multiples such as EV/EBITDA or equity-based multiples such as P/E. In this comparison, it is important to make sure that the companies are using the same accounting policies (conservative vs. aggressive) and to adjust for non-recurring items (Petersen & Plenborg, 2012). In general, equity ratios are sensitive to the capital structure, accounting policies, and differences in the fiscal year; therefore, the relative valuation will primarily be focusing on enterprise-based multiples. According to Damodaran's (2012) rule of consistency, if the numerator is an enterprise value, then the denominator should be an enterprise value as well. Price/Revenue is an example of an inconsistent multiple. The numerator is an equity value and the denominator is an enterprise value, which will lead to conclusions that are not merited by the fundamentals (Damodaran, 2012). Schreiner and Spremann (2007) investigated the empirical accuracy of multiple valuations among European companies and found that forward-looking multiples outperform trailing multiples. This is in line with the findings from Koller et al. (2010), who stated that *"... forward-looking multiples are consistent with the principles of valuation ... that a company's value equals the present value of future cash flow, not sunk costs"* (Koller et al., 2010, p. 378).

It is important to state that no two companies are the same, so assigning a valuation based on the trading characteristics of similar companies may fail to accurately capture a given company's true value (Rosenbaum & Pearl, 2009). For this reason, the relative valuation will also be based on more advanced methods such as multiple regressions based on the framework of Damodaran (2012). In relation to multiple regressions, McKinsey (2012) highlighted that the standard relative valuation methodology can be significantly improved when regression analysis is used (McKinsey, 2012). According to Damodaran (2012), the simplest way of controlling for differences between companies is with a multiple regression. The regression technique gives a measure of how strong the relationship is between the dependent and independent variables. If P/E is the dependent variable, then it is important that the chosen independent variables are related to e.g., expected growth, payout, risk, etc. (Damodaran, 2012). But if the independent variables are correlated with each other, known as multicollinearity, then the regression analysis will be unreliable (Damodaran, 2012).

Baker and Ruback (1999) provide research on the relative method itself. Generally, when performing a relative valuation, practitioners take the average or median of the peers' multiple and use it as the reference point. They found that the harmonic mean is the best measure of multiples when considering the four possible methods: arithmetic mean, value-weighted mean, median and harmonic mean. According to their study, using the arithmetic mean will overestimate the value due to its sensitivity to outliers (Baker & Ruback, 1999). The harmonic mean is also preferred by Petersen & Plenborg (2012).

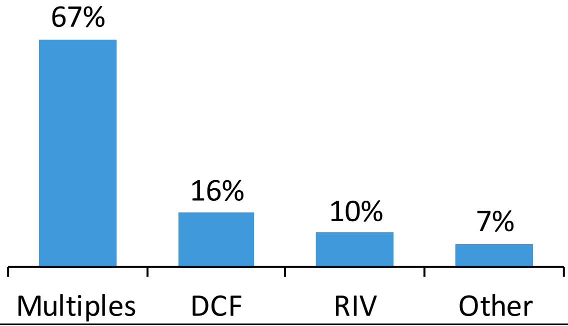
1.3.2.5.1. Comparable Transaction Analysis (CTA)

CTA is described very little in the theory, it is used more in practice. The CFA Institute (2015) and Schnoor (2006), however, have proposed simple outlines to account for precedent transactions: collect information, calculate multiples, and, lastly, estimate values. The purpose of the first step is to gather data regarding recent takeovers of comparable companies. In general, the first sample should be as wide as possible, yet limited, or related to the same industry as the company in question. This is further described by Rosenbaum & Pearl (2009) who note the different factors that may affect multiples, such as financial distress, world economy, public vs. private company and number of bidders. It is worth noting that relative valuation of multiples collected in the market and comparable transactions are the subject of past values and may be affected by the mentioned conditions. In addition, in general, all types of acquisitions are subject to control premiums (Rosenbaum & Pearl, 2009). Control premiums occur when an acquiring company tries to acquire the controlling stake of a target company. The price paid for a controlling stake of a company is usually higher as the acquiring company is then in control and makes decisions about the future. The third and last step is where the collected multiples are applied to the company. As with all multiples, the application of such does not account for the strategy of the collected multiples (Rosenbaum & Pearl, 2009). It can be argued that the multiples are derived from the strategy of the company, and the multiples thus have an implied weight of strategy. However, without carefully examining the strategy of the companies whose multiples have been collected, one cannot be sure.

1.3.2.6. Intrinsic vs. relative valuation

There are great discussions among practitioners and academics about whether relative valuation is more relevant than intrinsic valuations (Damodaran, 2012). The relative valuation is market-based, thereby reflecting the market’s growth and risk expectation. On the other hand, a valuation that is completely market-based can be skewed during periods of irrational exuberance (Rosenbaum & Pearl, 2009). The intrinsic valuation methodology is not without its problems. The DCF is often referred to as a *“garbage in, garbage out”* (Penman, 2009). The output of the valuation model is only as good as the input. Therefore, the DCF must be closely tied to the strategic and financial analysis. Baker & Ruback (1999) state that if a genuinely comparable publicly traded firm is available, and if the multiple could be estimated reliably, the method of multiples would be superior to the DCF. In the paper, “*What Valuation Models Do Analysts Use?”* by Walker et al. (2004), the relative valuation model is the preferred model among analysts.

Figure 4 – Valuation models employed in analysts' reports



Source: Authors' own creation from (Walker et al., 2004)

In summary, the DCF model yields the *absolute* value of Ørsted, while the relative valuation indicates the *relative* value of Ørsted to its peer group. This thesis will rely on both methods to reach a solid foundation of the fair share price.

1.4. Assumptions and delimitation

Answering the research objective is an extensive process and highly sensitive to newly available market information and macro events. Thus, some assumptions and limitations are necessary to only focus on the factors that influence Ørsted's share price the most.

- It is assumed that the readers of this thesis have a general understanding of financial theory and strategic concepts implying that the short review of the theory is sufficient.
- The thesis is written from the perspective of a retail investor. Hence, only publicly available information is used. In other words, no inside information from Ørsted's employees and management is used.
- As stated, the stock market is constantly changing; therefore, a cut-off date is chosen, which is set to March 31st, 2018. Information published after this date has been ignored.
- As highlighted in the introduction, Ørsted's Wind Power division accounts for the majority of the revenue and is expected to be more than 85% of their gross investments towards 2023. Therefore, offshore wind will be the main focus of this thesis.
- Ørsted operates in several continents with Europe as its core market. The outlook for Europe will be the main driver, but growth prospects outside Europe are considered as well.
- The financial valuation of a company is highly sensitive to the author's input. To overcome this problem, several valuation methodologies are used. The idea is to use the law of large numbers to get closer to the expected value.

2. Presentation of Ørsted A/S

In the following chapter, Ørsted will be presented. The following subchapters will present Ørsted's history, business areas, ownership structure, strategy and vision. This chapter is important as it provides a broader understanding of Ørsted as a company.

2.1. Ørsted's History

In 1973, Denmark had an exceptionally high dependency on oil in its energy mix (Rüdiger, 2013). More than 90% of its energy supply was based on imported oil from the Middle East. This situation led to significant economic difficulties, mostly triggered by the 1973 and 1979 oil crises (Ibid.). The Danish government wanted to be independent and therefore launched Dansk Naturgas A/S (Ørsted) in 1972. Hereafter, the Danish parliament passed a new energy policy. The goal was to have a diverse energy mix. The dependence on oil should be reduced partly by increasing the use of coal and partly by introducing a-power and natural gas. In addition, oil and natural gas in the North Sea should benefit the Danish society. The newly formed company should be a central piece in developing the new energy activities. (Ibid.).

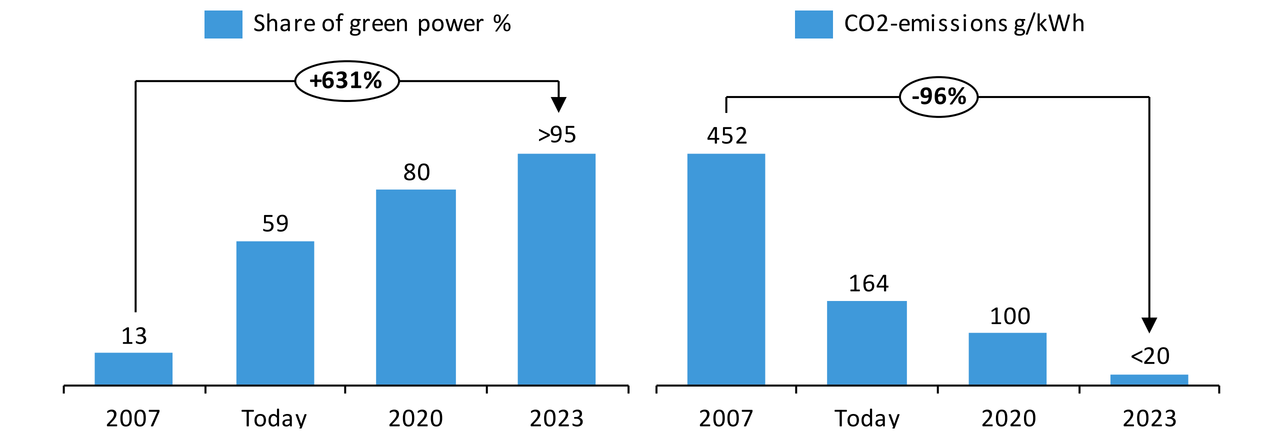
Following the establishment of The European Single Market in 1987, the EU launched a liberalisation of the energy sector in the 1990s. Ørsted was a state-owned company, a so-called natural monopoly. The liberalisation meant that, over a number of years, Ørsted lost privileges associated with state ownership. Ørsted could now also expect more intense competition (Ibid.). To prepare for this competition, Ørsted presented a strategy in the late-1990s to change the company from a gas to an energy company. Activities should cover a larger part of the energy sector. Consolidation became a keyword not only at Ørsted but throughout the sector. This meant that companies had to merge to grow (Ibid.).

The liberalisation of the Danish electricity supply meant that municipalities would no longer own a distribution company (Ibid.). Therefore, in 2006, Ørsted acquired five regional Danish energy companies (Elsam, NESA, Energi E2, part of Copenhagen Energy, and part of Frederiksberg supply). The merger was one of the largest in Denmark's history, and the company name was changed to DONG Energy A/S (Ørsted, 2016a). At the merger, it was planned that Ørsted should be listed on the OMX Nordic Exchange Copenhagen. The Ministry of Finance postponed the IPO due to the financial crisis in 2008 (Reuters, 2008). Ørsted was later successfully listed in June 2016. The IPO was the largest in Europe in the last five years and the largest ever in Denmark in terms of deal size and market cap (Reuters, 2016).

In the following years, Ørsted was involved in the exploration and production of oil and gas, construction of offshore wind farms, electricity generation, gas sales and distribution. The growing demand for renewable energy and the need to reduce coal-fired thermal generation capacity in the Nordic area led Ørsted to revise its strategy (Ørsted, 2016a).

In line with the global climate debate, Ørsted selected a green profile (Ibid.). Following significant financial challenges in 2012, an action plan was executed in 2013 and 2014 to improve Ørsted's capital structure, to avoid a downgrading of their credit rating, and to ensure a sufficient financial foundation to continue the green transformation of Ørsted (Rigrevisionen, 2016). The financial action plan included a significant divestment of non-core assets such as onshore wind, cost reductions and a capital injection of DKK 13bn., which took place in February 2014 (Ibid.). Ørsted lowered its net interest-bearing debt and stabilised credit ratings (Staal, 2018). In November 2016, Ørsted decided to put the oil and gas business up for sale as part of the transformation to green energy. A sale to INEOS for DKK 7bn was announced in May 2017 and closed in September (INEOS, 2017). To reflect the transformation, the company decided to change their name from DONG Energy to Ørsted in honour of the Danish 19th-century scientist H.C. Ørsted (Ørsted, 2017a). They launched a newer and bolder vision for the company: *"Creating a world that runs entirely on green energy"* (Ørsted, 2018a, p.1). The transformation has made Ørsted one of the greenest and fastest-growing energy companies in Europe.

Figure 5 – Transformation of Ørsted from black to green energy



Source: Authors' own creation from (Ørsted, 2017a)

2.2. Ørsted as of Today

Today, Ørsted is a focused energy company with a strong profile in renewables and with leading competences in offshore wind, bioenergy, and energy solutions. Ørsted is headquartered in Denmark and employ around 5,600 people, including over 900 in the UK (Ørsted 2018a). In financial terms, Ørsted has shifted their capital base profoundly from fossil fuels to renewables, which now account for 83% of capital employed, up from 21% in 2006 (Ørsted, 2017a). During the same span of years, they have more than doubled their operating profit (EBITDA) to DKK 22.5 bn., and more than quadrupled their return on capital employed from 6% to

25% (Ibid.). The year 2017 was a particularly strong year for Ørsted with an all-time high EBITDA and an 8% improvement in ROCE from the year before (Ibid.).

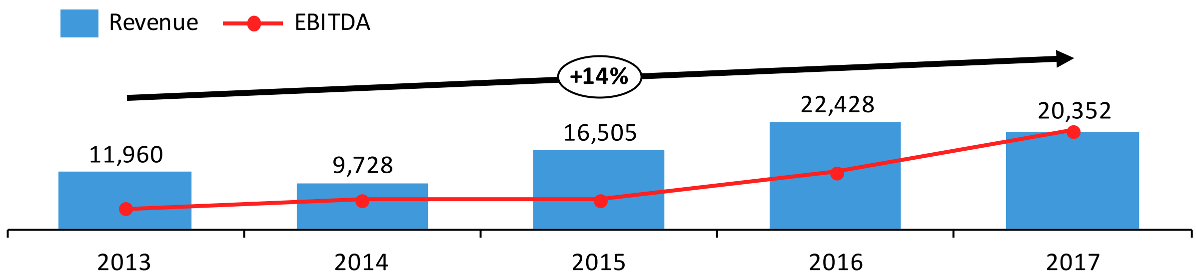
2.2.1. Business Areas

Even though Ørsted's strategic focus is on the growth story in offshore wind, the company still operates classic utility businesses. More specifically it operates through three divisions 1) Wind Power 2) Bioenergy & Thermal Power 3) Distribution & Customer Solutions (Ørsted, 2017a). Table 1 in the introduction shows the divisions' key figures from 2017.

2.2.1.1. Wind Power

Looking firstly at Wind Power, Ørsted is a global leader in offshore wind with a 25% market share (Ørsted, 2018d). The company was a first mover in offshore wind energy and today it is positioned as a clear market leader with operations in Europe, the US and Asia (Ørsted, 2017a). They have built enough offshore wind to power 9.5m. people (Ørsted, 2018c). The UK is their biggest offshore wind market with nine wind farms already operating. To date, they have invested GBP 6bn. in the development of UK offshore wind farms and plan to double that by 2020 (Ørsted. 2017b). In 2017, they built the world's largest offshore wind turbines at Burbo Bank Extension and reached an important milestone with the submission of their first bid for an offshore wind project in the US (Ørsted, 2017a). Furthermore, they were the first in the industry to achieve a levelised cost of electricity (LCoE) visibly below EUR 100 per MWh with the Dutch Borssele 1 & 2 offshore wind farms in June 2016 (Ørsted, 2018e).

Figure 6 – Wind Power financials



Source: Authors' own creation from (Ørsted, 2017a)

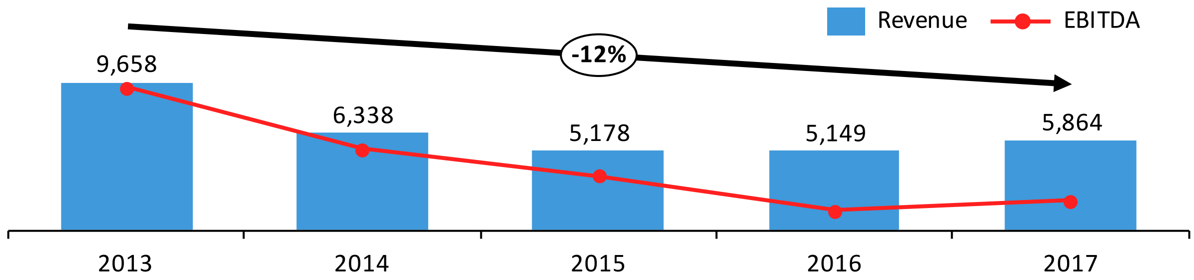
Ørsted is a pure offshore wind player, meaning it does not have any activities within onshore wind. It previously had exposure to onshore wind but was divested due to financial pressure (Ørsted. 2016a). Recently, Ørsted has shown their intention of re-entering the onshore wind market. This decision was questioned by an analyst on the earnings call in connection to the annual report for 2017 (Ørsted, 2017c). Henrik Poulsen, CEO of Ørsted, said that they are exploring the idea of taking on onshore wind projects that are under development, where the developer does not have the necessary capabilities to operate it, but it is preliminary (Ørsted, 2017c, p. 17).

The Wind Power business offers a substantial growth outlook as Ørsted plans to realise the current build-out plan of 8.9GW towards 2022 and expand to 11-12GW by 2050 (Ørsted, 2017a). Offshore wind will remain their primary driver of growth and constitutes most of their business. They expect that more than 85% of their gross investments will be within offshore wind and will yield an average return on capital employed of 13-15% in the years up to and including 2023. (Ibid.).

2.2.1.2. Bioenergy & Thermal Power

Bioenergy & Thermal power is part of Ørsted's transformation to green energy, but from a financial point of view, it is a small division (Ibid.). The division is the largest producer of heat and power from a thermal power plant in Denmark (Ørsted, 2016a). It focuses on providing stable electricity and heat production, while reducing the CO2 emissions in energy production (Ibid.). Most of its stations combine production of electricity and heat. Furthermore, the division provides ancillary services in the Danish and Northern European markets. In line with the rest of the European utility sector, Ørsted has been hit by the low electricity and gas prices, leading to operating earnings losses in its power activities (Ibid.).

Figure 7 – Bioenergy & Thermal Power financials



Source: Authors' own creation from (Ørsted, 2017a)

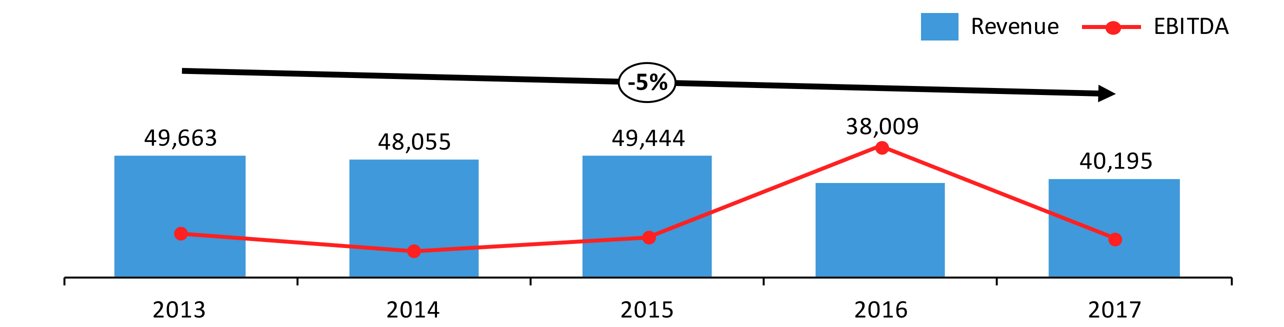
To mitigate the volatility in electricity prices and optimise the structure in the Danish energy market, Ørsted has initiated a strategic conversion plan for the existing Combined Heat and Power (CHP) plants in Denmark (Ørsted, 2016a). It is currently in the process of transforming its business to a greener profile. It is converting its thermal heat and power plants from coal and gas to bioenergy (primarily from wood pellets and chips) (Ibid.). By using biomass as fuel, emissions across the life-cycle are reduced by about 90% compared to using coal. The biggest value driver for the bio-conversions is that when fossil fuels are replaced with biomass, it implies a significant tax saving (CMD, 2017). Ørsted has already converted five of their power stations from coal and gas to sustainable biomass (Ibid.). It has eight combined heat and power (CHP) plants, a heat plant, and a peak-load power plant, which are all located in Denmark. Additionally, it has 50% ownership in a combined cycle gas turbine power plant in the Netherlands and a REnescience facility under construction in the UK (Ibid.).

2.2.1.3. Distribution & Customer Solutions

This division's core businesses are power distribution and sale of power and gas in the wholesale and retail markets in Denmark, Sweden, Germany and the UK (Ørsted, 2017a). It consists of three businesses, which are Distribution, Sales to B2C and B2B and Markets, which includes Liquefied Natural Gas (LNG) (Ibid.). The value of this division lies in the Distribution business as it is a stable business with a regulated return. The other parts of the division contribute less to earnings and have proved to be more volatile (Ørsted, 2016a).

Ørsted's distribution activities are undertaken by the subsidiary Radius Elnet (Ibid.). The distribution business is the largest electricity distributor in Denmark with around one million customers. Although the business is concentrated in a relatively limited area, the company serves nearly 30% of Denmark's population (Ørsted, 2017a).

Figure 8 – Distribution & Customer Soluations financials

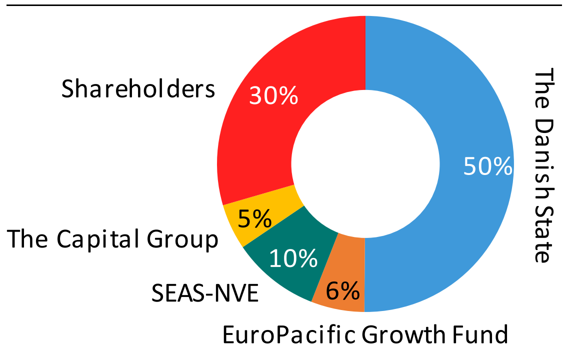


Source: Authors' own creation from Ørsted (2017a)

2.3. Ownership

Ørsted is listed on the OMX Nordic Exchange Copenhagen with 420.38m. shares outstanding (Ibid.). As of March 31st, the share price is DKK 392, which equals a market cap of DKK 164,789m (Ørsted, 2018e). The Danish State is the majority shareholder in Ørsted and currently owns 50.12% of the company. Other large shareholders include EuroPacific Growth Fund (5.83%) and SEAS-NVE A.M.B.A (9.54%) (Ørsted, 2017a).

Figure 9 – Ownership



Source: Authors' own creation from (Ørsted, 2017a)

The Danish State used to own a significantly larger share of the Ørsted. Ørsted got a capital injection of DKK 13bn. in 2014. Goldman Sachs bought shares for DKK 8bn, APT for DKK 2.2bn. and PFA for DKK 0.8bn. The rest came from existing minority shareholders (Rigsrevisionen, 2016). The investments were based on a valuation of Ørsted of DKK 31.5 bn. (Ibid.). This equity injection diluted the government's ownership stake in Ørsted from 81% to 60%

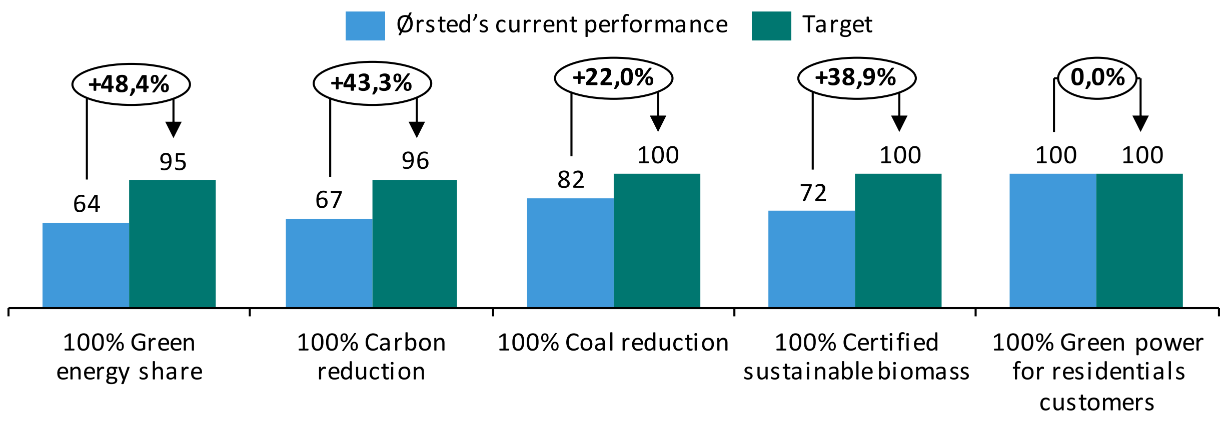
(Ibid.). Goldman Sachs' ownership share of 18% in Ørsted was a widely discussed topic in the Danish society at the beginning of 2014 (FT, 2016). In 2016, Ørsted was listed with the share price of DKK 235 per share, which was equal to DKK 98bn. in enterprise value (Reuters, 2016; Ørsted 2016a). This was a significant change in value from the capital injection in 2014. In 2017, Goldman Sachs sold its last shares in Ørsted, leaving Ørsted with the current ownership highlighted in figure 9.

2.4. Strategy and Vision

Ørsted's strategy is to remain a market leader within offshore wind power production (Ørsted, 2017a). They have an ambitious 2020 plan for the build-out of offshore wind, which will enable them to maintain and strengthen their global leadership position. They will maintain their focus on reducing the costs of offshore wind (LCoE) and on further developing innovative technical solutions (Ibid.). Over the next number of years, offshore wind will remain their primary driver of growth, key investment priority and constitute the vast majority of their business (Ibid.). They expect that more than 85% of their gross investments towards 2023 will be within offshore wind (Ibid.). As new growth initiatives, they highlight exploration within other renewable energy technologies such as Solar PV, Onshore wind and Energy storage (Ørsted, 2017c). Ørsted's vision is working towards a world that runs entirely on green energy. In their recent sustainability report, CEO, Henrik Poulsen writes:

"Our vision is a world that runs entirely on green energy. It is deeply rooted in what we do, and who we are as a company. We want to be a company that provides real, tangible solutions to one of the world's most difficult and urgent problems." (Ørsted, 2017d, p. 2).

Figure 10 – Ørsted's vision in figures



Source: Authors' own creation from Ørsted (2017d)

3. Offshore Wind Industry

The following section will provide an overview of offshore wind industry and information on recent market developments that are expected to affect the future growth of the market. When referring to the volume of the wind energy market, it is calculated as the net volume of electricity produced through wind energy in gigawatt hours (GWh) or megawatt hours (MWh).

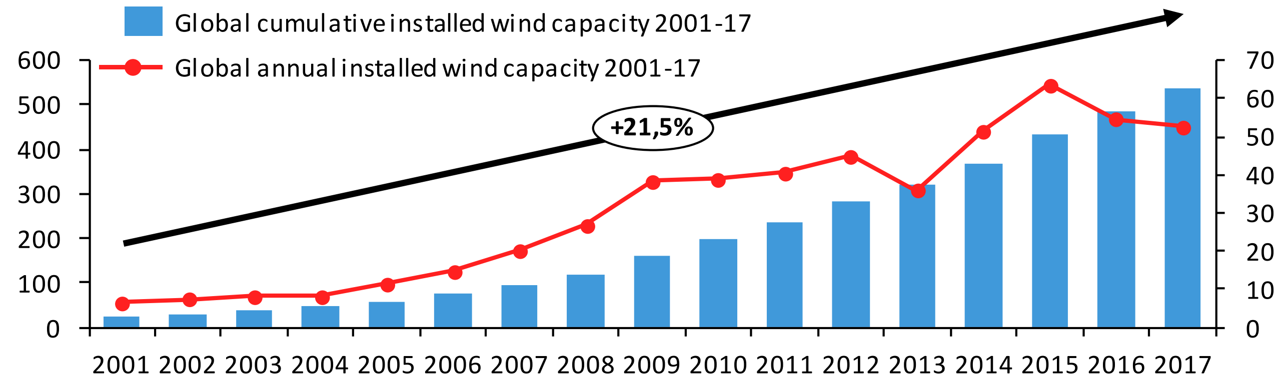
3.1. History

The offshore wind energy industry has evolved significantly over the last two decades (Poudineh et al., 2017). As seen in Figure 11 below, it was not until recent years that the offshore wind industry started to grow. The offshore wind industry primarily emerged as an incipient industry to the land-based wind industry in the early 1990s in European countries. Land scarcity and land-use issues impeded the potential for an onshore wind industry to proliferate (Ibid.). The first offshore wind farm was inaugurated in 1991 at Vindeby. It was developed by Ørsted and had a total capacity of 4.95MW (Ibid.). Until 2001, the growth of the offshore wind power sector was sporadic and depended on a handful of small near-shore projects in Danish and Dutch waters featuring wind turbines with a capacity of less than 1 MW (Ibid.). The total cumulative market size was below 100 MW and consisted of small-scale wind farms like Vindeby. In the years that followed, larger and more commercialised projects evolved in the pioneer country, Denmark (Ibid.).

The primary legacy of this handful of pioneering projects was construction cost overruns and frequent turbine equipment failures in the harsh marine environment offshore (Ibid.). The higher construction costs offshore and persistent equipment failures in the marine environment made offshore wind farms more expensive and less reliable than their onshore counterparts (Ibid.). The cost overruns and equipment failures did little to win support for the industry. In the United Kingdom, the prevailing viewpoint throughout the 1990s was that offshore wind was prohibitively expensive and that the technologies would not be economically viable until after 2020 (Ibid.). In 2011, Ørsted's CEO commented that onshore wind was able to compete, but offshore wind was too immature to compete without subsidies (Børsen, 2011). In 2013, a comprehensive review was done on the offshore wind industry and it was concluded that the offshore wind market would not develop much further due to the costs (Platt, 2013).

After a slowdown in 2013, the wind industry set a new record for annual installations in 2014 by installing 52GW of new wind power—a 108% increase from 2014 (Letcher, 2017). In 2015, however, the global wind industry smashed all previous records by installing over 63GW of new capacity (Ibid.). Three underlying factors enabled this growth: effective policy goals stemming from the Kyoto Protocol, lower development costs, and declining oil prices in the mid-2010s (Ibid.). Until recently, the development costs have always been the biggest barrier for deploying offshore wind (Poudineh et al., 2017).

Figure 11 – Global Cumulative & Annual wind capacity 2001-17



Source: Authors' own creation from (GWEC, 2017).

Last year, 2017, was a breakthrough year for offshore wind. Offshore wind witnessed the largest annual build-out of global offshore wind capacity, with more than 4GW coming online (Ørsted, 2017a). Furthermore, for the first time in history, it had become cheaper to build and operate offshore wind farms than new coal power stations (Ørsted, 2017d). In comparison with 2012, the cost of offshore wind energy has dropped by 60%. This development combined with different attractive governmental supporting schemes for renewable energy established the ground for what appeared to be solid business cases (Poudineh et al., 2017).

4. Strategic Analysis

Following the outline and the frameworks provided in the methodology section, this chapter comprises the qualitative analysis of Ørsted and its environment. Firstly, the external analysis will be conducted, consisting of the analysis of both Ørsted's macro- and micro-environment. Subsequently, the internal analysis will deal with the Ørsted's resources and capabilities. After the financial analysis of Ørsted, the result of the strategic and financial analysis will be summed up in a SWOT-model and will be of importance in the financial forecasting section.

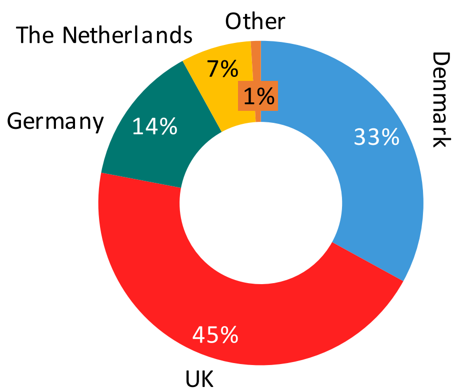
4.1. External Analysis

The external analysis is split into two parts, the first being the PESTEL framework, and the second being Porter's Five Forces. Following the PESTEL and before moving into Porter's framework, Ørsted's competitors are identified.

4.1.1. PESTEL

Ørsted, as previously mentioned, is headquartered in Denmark with the vast majority of its revenue stemming from Europe. Before moving into the subsections of the PESTEL analysis, it is important to define the most important markets for Ørsted. This is done by a performing a geographic breakdown of their revenue, presented in figure 12. Indeed, the analysis is predominantly targeted towards the European market. The revenue split thus serves as a guideline for countries where the subsections of the PESTEL analysis should be thoroughly analysed. Currently, Ørsted is awaiting a response from two auctions, namely in Taiwan and the US (Ørsted, 2017c). Ørsted has previously stated that the countries may be a natural expansion because the markets are less saturated (Ibid.). Both countries are an important part of Ørsted's build-out plan for 2025 (Ibid.). Hence, both countries are included in the PESTEL.

Figure 12 – Revenue geographic



Source: Authors' own creation from (Ørsted, 2017a)

4.1.1.1. Political & Legal

Ørsted is largely affected by the political environment of Europe as well as the countries seen in figure 12. The political dimension of PESTEL is highly tied to the legal dimension as politicians, in the case of Ørsted and the overall energy distribution industry, create and manage the 'playground' that is the markets for the energy being distributed. Thus, both dimensions will be analysed throughout this section.

CO2 emissions

Conventional utility groups across Europe are facing structural pressure as the energy markets are being re-regulated by policymakers to enforce de-carbonisation of the energy mix, which was underpinned by the agenda at COP21 in Paris in 2015 (UN, 2015).

At the international level, the Kyoto Protocol came into force in 2005, providing an international framework for regulating emissions of greenhouse gases (Poudineh et al., 2017). The Kyoto Protocol sets binding emission reduction targets for 37 countries and the European community. Over the five-year "commitment period" from 2008 to 2012, these countries targeted a 5% average reduction in GHG emissions compared to the 1990 levels. The target reduction for EU members was an average of 8% (Poudineh et al., 2017; Ørsted, 2016a).

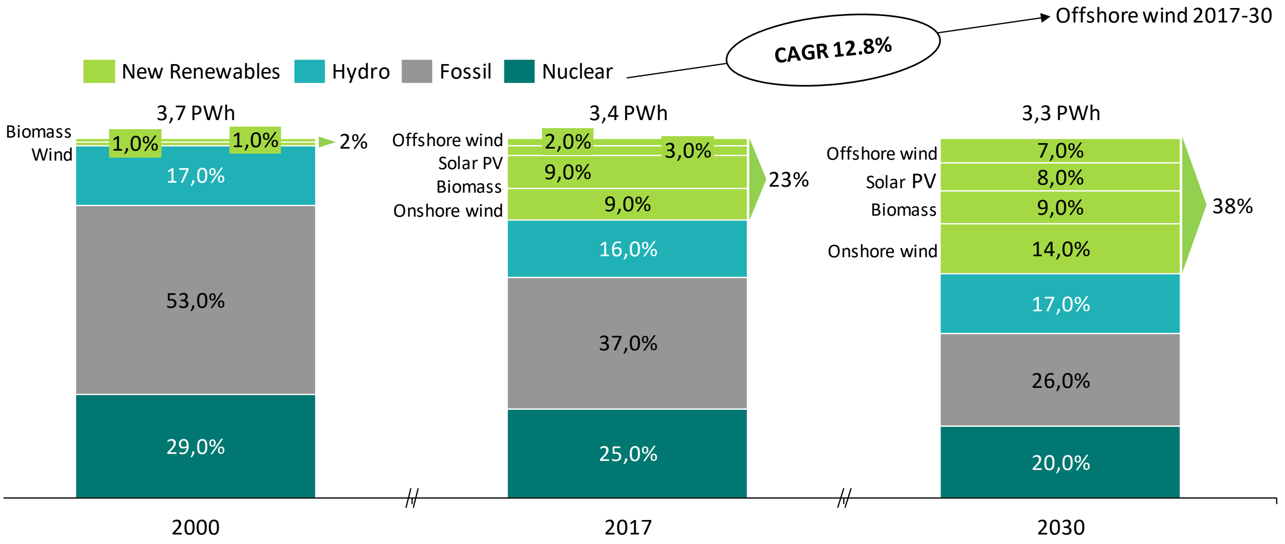
In 2015, the COP21 in Paris resulted in 195 countries adopting a global climate agreement and setting out a comprehensive action plan (UN, 2015; Ørsted, 2016a). The plan is to limit the global temperature increase to below 2 degrees Celsius between now and the year 2100, and it urges countries to limit the increase to 1.5 degrees (UN, 2015; Ørsted, 2016a). The COP21 countries have agreed to make sure that global emissions peak as soon as possible, while recognising that developing countries will need more time (UN, 2015). Developing countries, such as India and China, will be allowed to proceed more slowly because of their more recent industrialisation (Ibid.).

The targets from The European Commission (EC) are a dominating factor for the European utility companies. This is because the EC puts forth targets for the countries in the European Union. The EC has set different goals for 2020, 2030 and 2050 (EUR-Lex, 2010). The EC 2020 strategy that was defined in 2010 aims to reduce greenhouse gas emissions by at least 20%, while increasing the share of renewable energy to at least 20% and achieving energy savings of 20% or more (Ibid.). While the 2020 strategy is soon to be relieved, the EC 2030 strategy defined in 2014 focuses even more on renewable energy consumption, and targets for 2030 include a 40% decrease in greenhouse gas emissions compared to levels seen in 1990 while consuming at least 27% of renewable energy (EUR-Lex, 2014). Moreover, the strategy aims to have at least 27% energy savings compared to the "business-as-usual" scenario. Lastly, the EC 2050 strategy defines a roadmap with targets much less quantified than the two former strategies (EUR-Lex, 2011). The EC has set a goal that 55% of gross final energy consumption will come from renewable energy. Moreover, they hope that by 2050, wind power provides more electricity than any other technology (EUR-Lex, 2010).

The energy sector has an important role in mitigating climate change, given that around two-thirds of the world's greenhouse gas emissions come from energy production and use (IEA, 2015). Data from IEA, displayed in figure 13, shows the development in the different energy sources over the years, and the target for

2030. The exposure to fossil fuels has been significantly reduced since 2000 and the trend is set to accelerate further in the next two decades with COP21 and the EC targets as drivers.

Figure 13 – Structural transformation of European power generation



Source: Authors' own creation from (Ørsted, 2017e)

Offshore wind is considered one of the energy sources forecasted to be able to drive the renewable transformation in decreasing CO2 emissions, and supplying clean energy at low costs (EY, 2015). The EU has a 2020 target of over 40GW installed capacity. However, it will require at least EUR 110bn. in additional capital by the end of the decade (Poudineh et al., 2017). WindEurope has a target of 24,600MW, which is a significant reduction from the cumulative EU target of 40GW. It entails doubling the currently installed capacity in the four years between 2017 and 2020 (Ibid.). A catalogue of obstacles such as an uneven rollout of policies has hindered the progress of offshore wind developments at different points over the past half-decade. As a result, the installed capacity is cumulatively behind targets (Ibid.).

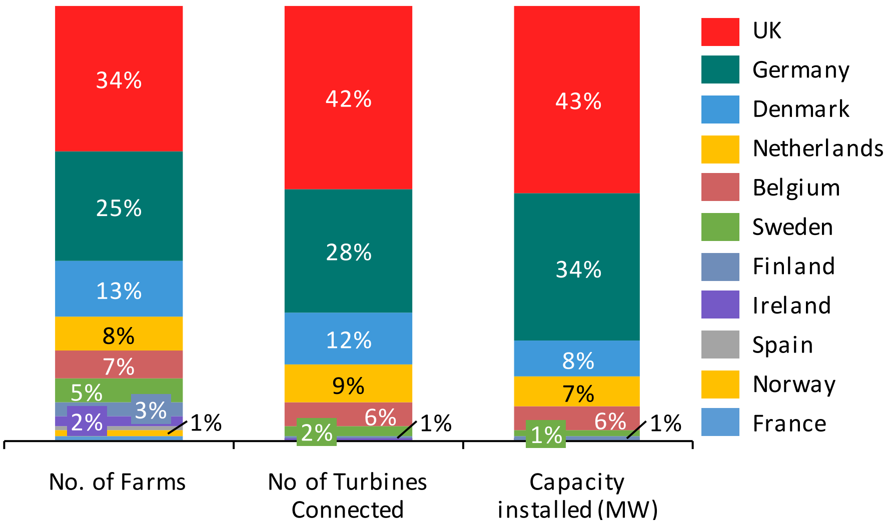
Having addressed the overall political goals of renewable energy for Europe, the following will dive deeper into the political environment for each country based on Ørsted's revenue split, including the US and Taiwan.

Country breakdown

Each EU member state has submitted a National Renewable Energy Action Plan (NREAP) to the European Commission, in which they detail projections for renewable energy development up to 2020 (NREAP, 2018). By that year, the cumulative consumption of renewable energy in all EU member states should result in an overall share of renewable energy of 20% across the EU (EUR-Lex, 2009). According to available data, some countries can be expected to surpass their targets by 2020, such as Denmark and Belgium, while other countries are unlikely to reach it by 2020, such as France and the Netherlands (NREAP, 2018).

As illustrated in figure 14, the United Kingdom is the largest offshore wind market today and accounts for 43% of all installations, followed by Germany in the second spot with 34%. Despite no new capacity in 2017, Denmark remains the third largest market and accounts for 8%. The Netherlands (7%) and Belgium (6%) remain at the fourth and fifth largest share respectively in Europe (WindEurope, 2018). As the industry has taken shape in Europe, several other countries have also started to explore the feasibility of offshore wind over the past decade, including the United States, India, China, Taiwan, and Vietnam (Poudineh et al., 2017). A more detailed breakdown of each country will follow.

Figure 14 – Offshore wind countries



Source: Authors' own creation from (WindEurope, 2018).

The United Kingdom

The UK is, like every other EU member country, affected and has been affected largely by the Pan-European policies and targets set by the EU. The post-Brexit political climate, however, seems to be less stable and surrounded by insecurity about the forthcoming UK climate policies.

Throughout its membership of the EU, the UK has always been a strong supporter of climate change policies (Froggart et al., 2016). This view is supported by the previous Prime Minister, David Cameron, who pledged to run the 'greenest government ever' (Randerson, 2010). With the current Prime Minister, Theresa May, however, the policies become more unclear. Hepburn & Teytelboym (2017) note that the British government has the option of keeping most of the EU legislation regarding climate policies, though some policies are in need of replication or replacement. Ibid. (2017), however, notes that as trade and migration will dominate the public discourse, climate change is unlikely to be a large political subject for the British public until Brexit is fully complete and climate change can once again return to the political agenda.

With political support, the UK has generally always been a pioneer in offshore wind together with Denmark. In 2017, the UK further stressed its long-time commitment by building half of Europe's offshore wind power (Vaughan, 2018). Offshore wind accounts for around 5% of the UK's annual energy demand and is expected to grow to 10% by 2020 (PwC, 2017). There is a strong pipeline of projects in development. The UK plans to increase its offshore wind capacity to help bridge a looming electricity supply gap as old nuclear plants and coal-fired power stations close (Ibid.). In November 2016, the UK government confirmed its plan to spend GBP 730m. on renewable electricity over this parliament, which is due to end in 2020 (Gov.UK, 2016). According to BNEF (2017), there are 10 GW of permitted offshore wind farms in the UK which are looking for a subsidy. This budget will be allocated to less established technologies, including offshore wind.

The British government has put forth favourable policymaking for offshore wind companies such as Ørsted to leverage on the favourable wind conditions and shallow waters. The UK has granted a high level of subsidies in order to attract offshore wind developers, currently with one scheme available (Poudineh et al., 2017). The current scheme is Contract for Difference (CFD), replacing the older Renewable Obligation Certificates (ROC) scheme (Ibid.). The ROC scheme was introduced in 2000 as the main policy measure to incentivise the shift towards renewable electricity supply by subsidising suppliers such as Ørsted for their cost of electricity in return for green energy supply (Ibid.). The ROC scheme was an extension of the Renewables Obligation (RO) that represented the UK government's commitment to meeting the target of consuming 15% of their energy from renewable sources by 2020 (Ofgem, 2014). ROCs are essentially green certificates issued by the government to developers of offshore wind farms. The developers are then able to sell the ROCs to their suppliers and receive a mark-up premium on top of the price of electricity (Baringa, n.d.) The ROC scheme was replaced by the CFD scheme after a grace period (Ibid.). The current CFD scheme aims to be another incentivising mechanism for energy developers to produce and provide renewable energy in a more certain and stable way, particularly in terms of revenue generation (Ibid.). The CFD scheme entails a company such as Ørsted being paid the difference between the strike price and the underlying market price for electricity related to the submitted bid (Ibid.). However, this also means that it is unlikely to see developers submitting bids higher than the strike prices as it would mean a loss of the difference between the strike price and the bid price on top of the strike price (Warburg Research, 2017). Hence, it is assumed that the likelihood of seeing zero-subsidy bids in the UK is slim to none.

Denmark

The governmental ownership of Ørsted of 50.12% makes the Danish political environment one of the most important in terms of targets and legislation. Generally, the political environment in Denmark is stable with a large tilt towards renewable energy, especially offshore wind (Dea, 2017). A key target for the Danish government is to ensure that 50% of the Danish power consumption is supplied by wind power by 2020

(Ørsted, 2016a). The ambitious target set by the politicians create an opportunity for Ørsted to thrive on its home turf.

Germany

Just as with Denmark, the political climate in Germany is relatively stable. Moreover, Germany has targets for offshore wind that makes the playground for Ørsted larger. Germany's 2020 goals are to have grid-connected offshore wind power of 6.5GW (PwC, 2017). However, national industry organisations argue that may already be surpassed by 1.2GW by 2020 with further 3.1GW added between 2021-25 (Offshorewind, 2017a). Clearly, the offshore market for Germany is rather restricted given its geographical shoreline. However, within recent years, it can be observed that offshore wind is making a larger impact on the installed electricity generation (PwC, 2017). Germany is in a transitional phase where it is moving away from feed-in tariffs to an auction-based system. The transitional auctions will therefore resemble the auction scheme in the UK where unique projects will compete against each other (EEG, 2016). After these transitional auctions, Germany will move to centralised auctions which resemble the auction system known from Denmark and the Netherlands (Ibid.). The experience in Denmark and the Netherlands points to increased competition once Germany moves to such centralised auctions.

The Netherlands

Just as the above, the Netherlands is defined by having a stable policy towards renewable energy, including offshore wind (PwC, 2017). The government is in the lead in terms of the transformation towards a more sustainable energy grid, and a clear roadmap has been laid out. Unlike Germany, the Netherlands has a large shoreline with shallower waters, creating perfect conditions for offshore wind projects. In 2016, the Netherlands targeted further instalments of offshore energy in order to reach its national energy agreement (NEA, 2017). The target put forth is to have 4500MW of offshore wind by 2023, with 1000MW currently installed (Ibid.). The energy targets of the Netherlands are extremely ambitious and positive towards offshore wind and create the possibility for Ørsted to derive a larger amount of revenue from the country.

United States

After several failed attempts, offshore wind finally seems to be taking off on a commercial scale in the US, particularly as the state of Massachusetts signed an energy bill in 2016 that mandates distribution companies to support 1.6 GW of offshore wind by 2024 (Offshorewind, 2016). Moreover, New York has recently released their plan towards offshore wind and are now preparing a solicitation for 800MW in total during 2018 and 2019 (Cuomo, 2018).

Policy in the United States is a bit more specialised on the state level. In addition, the United States withdrew from the Paris COP21 agreement (Zhang et al., 2017). This means that targets in the US vary from state to state (Ibid.). As the above suggests, some states—primarily those on the East Coast, such as New York—are more aggressive towards power supply through renewables. This does not mean that there are no risks associated with the overall political climate and regulations in the US on an overall level. President Trump is known to be less focused on the environment than creating jobs for the American economy. This may pose a threat to Ørsted if they manage to enter the market in the US. If Trump manages to influence state policies in a way that makes it harder for politicians to implement renewable projects, such as offshore wind perhaps through the lack of subsidies, it could prove increasingly difficult for Ørsted to create a profit.

Taiwan

The Taiwanese government—like those mentioned above—has also ramped up its targets regarding offshore wind and renewable energy in general. Recently, the targets for 2025 were raised from a build-out of 3.5GW to 5GW, and an overall target was set for the country's consumption of energy to be 20% renewable energy (Infrastructure, 2017). Perhaps most important for Ørsted are the projects where up to 3GW is guaranteed as a fixed feed-in tariff, according to the new plans, which makes the country an attractive target for offshore wind developers (Ibid.). The political climate in Taiwan is generally stable, though there are risks of it becoming unstable in the near future. Taiwan's first female president, Tsai Ing-wen, was elected in January 2016 and has a political agenda towards Taiwanese independence (Hamacher, 2017). This, in turn, creates the grounds for political instability as it may compromise the current ties between China and Taiwan, which may affect businesses and subsidies negatively.

4.1.1.2. Economical

Every industry is affected to either some degree or a large degree by the surrounding economic factors. Typically, economic factors include economic growth, interest rates and inflation rate, as these factors affect how businesses operate and make decisions over the long term (Koller et al., 2018). The energy sector, however, is somewhat non-correlated with normal economic measures because energy to a certain degree is almost always in demand. The following section will introduce the most important economic factors that influence the offshore wind industry, namely; levelized cost of electricity (LCoE), power prices, subsidies, purchase power agreements (PPA), GDP and interest rates.

LCoE

The economics of offshore wind is reliant on the significant reduction in the cost of the technology (as measured by LCoE), particularly relative to other renewable technologies (Poudineh et al., 2017; Ørsted, 2016a). Despite its limitations, the LCoE measure is often used when comparing the cost levels with competing energy sources, such as gas, coal, nuclear, solar power and wind (Poudineh et al., 2017; Letcher, 2017). It is also referenced when calculating subsidies and feed-in tariff levels (Poudineh et al., 2017). Although methodologies vary, the calculation typically incorporates the following four major inputs: 1) installed capital cost (CAPEX) 2) annual operating cost (OPEX) 3) annual energy production (AEP) 4) the fixed-charge rate (a coefficient that expresses the cost of financing over the plant's operational life):

$$\mathrm{LCoE} = \frac{\sum_{t=1}^{n} \frac{I_t + O\&M_t + F_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{E_t}{(1+r)^t}}$$

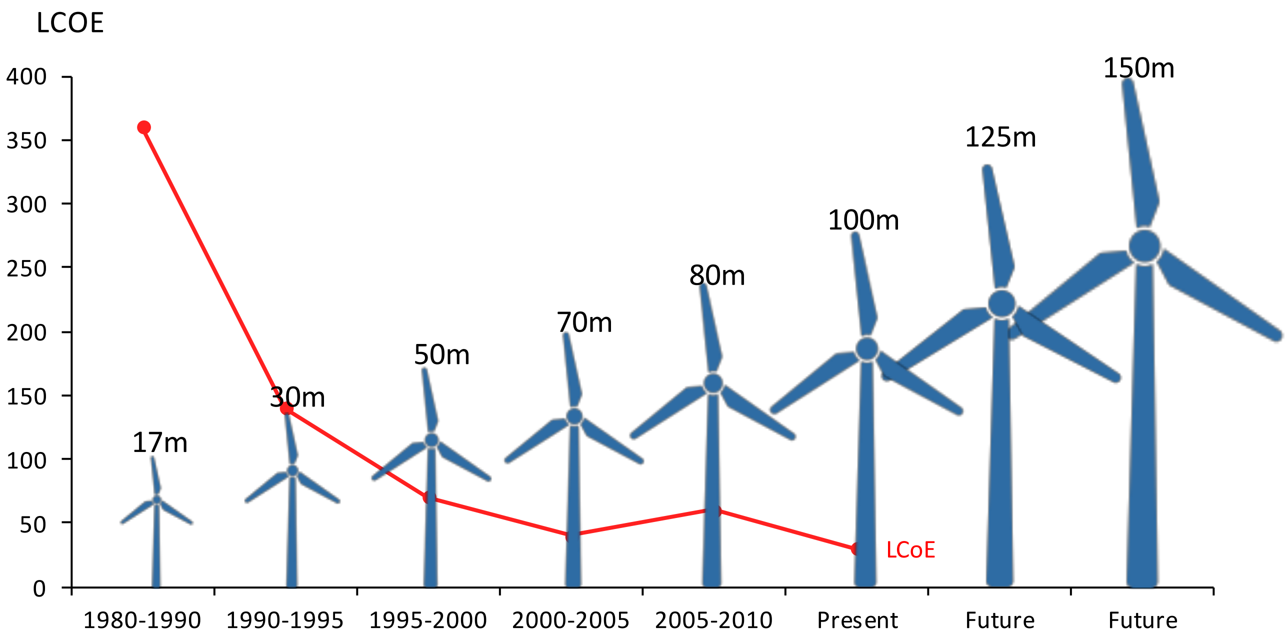
Where:

I_t = Investment in year t
$O\&M_t$ = Operations and maintenance (O&M)
F_t = Fuel cost
E = Electricity output
r = Discount rate
t = lifespan (years of the project)

In general, the formula calculates the present value of the full life-cycle costs of a power-generating technology per unit of electricity (Ibid.). It should be stated that LCoE is only a measure of cost and does not say anything about profitability and competitiveness, which are related to 'market value' rather than LCoE (Ibid.). As demand for electricity varies continuously and storage is costly, the value of electricity, reflected in price, fluctuates continuously depending on the demand and supply condition. For example, if offshore wind is generating power when and where it has the highest value, then a plant's economics may be better than that suggested by its LCoE value (Ibid.). Conversely, if generation from a wind source occurs when it has a low market value and where it imposes high transmission costs, it may be less attractive than that plant's LCoE might suggest. In some markets, periods of high wind generation coincide with very low spot market prices (Ibid.).

At the moment, both the capital costs and the operating and maintenance costs associated with offshore wind are relatively high (Ibid.). There is a continuous effort to lower LCoE and make wind a competitive source of energy without subsidies. This can be done through three channels: reducing operation and maintenance expenditure (OPEX), cutting capital expenditure (CAPEX), and/or increase in annual energy production (AEP) (Ibid.). Appendix 11 shows the various factors that influence the costs. Increased AEP offers the largest opportunity to improve LCOE (Ibid.). Hence, larger turbines play a crucial role, as a larger rotor size increases production significantly. Figure 15 shows how larger hub heights and turbines have decreased LCoE. Ørsted anticipates that offshore turbines will reach an output of 13-15MW in 2024, compared to the current output of 8MW (Ørsted, 2017c).

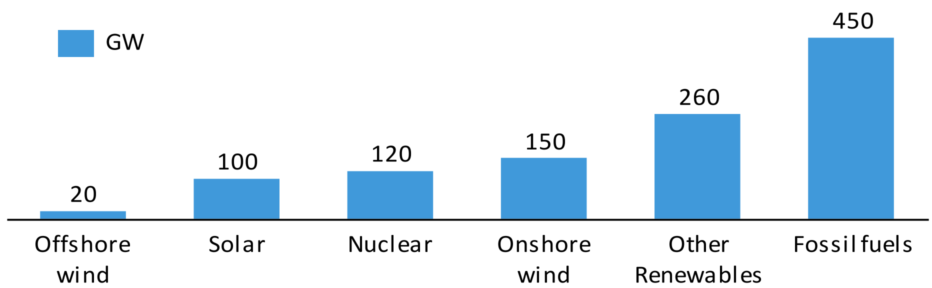
Figure 15 – LCoE and Wind Turbines



Source: Authors' own creation from (WindVision, 2015)

Offshore wind is at the start of its learning curve and should have great potential to reduce its LCoE. The industry has only existed for 25 years and is still in its infancy (Poudineh et al., 2017). The total installed offshore wind power capacity is tiny compared with what has been installed for fossil fuels. It is understandable why the accumulated experience in offshore wind industry cannot yet match the experiences gained in the coal and gas industries.

Figure 16 – EU's cumulative capacity by technology (by year-end 2015)



Source: Authors' own creation from (Poudineh et al., 2017)

The complexity of installing and operating turbines on water has historically led offshore wind to be substantially more expensive than onshore wind (Ibis.). While the LCoE for onshore wind and solar PV has been declining for years, the LCoE for offshore wind actually increased from 2009-12 (Ibis.). This reflects the immaturity of the technology compared to the two other sources. However, as seen in figure 15, LCoE for offshore wind is decreasing substantially. It has dropped 40% over the past three years, with the majority of the decline in the last three years (Ibis.). The fact is, however, that offshore wind is currently still substantially more expensive than solar PV and onshore wind, meaning that the cost reduction for offshore wind needs to continue in order to go on closing this gap. This is illustrated graphically in Appendix 17.

In general, the disadvantage of renewable energy sources compared to fossil fuels is that they do not give a continuous energy supply, as the sun does not shine continuously, and the wind does not blow all the time. Minimising the volatility in energy production therefore lowers the dependency on base load, which typically comes from fossil fuels. Furthermore, with substantial pressure to continue to reduce the LCoE for offshore wind, equipment suppliers are constantly working on improving technology and making it more efficient (Ibis.). This brings the risk that unproven technology will be used in a large-scale project and fail. Major cost overruns could potentially scare investors and politicians, leading to increasing risk premiums which would slow down the LCoE reduction.

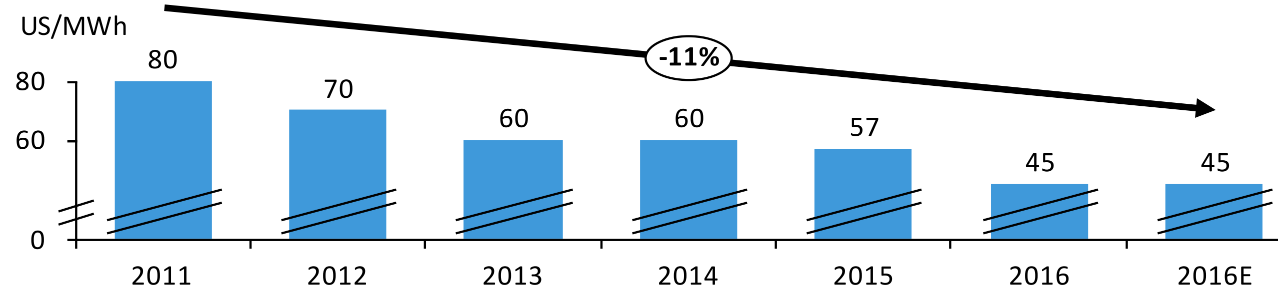
In summary, offshore wind is not currently cost competitive with other renewable technologies, including solar PV, onshore wind and hydro. Nor is it cost competitive with gas power generation, which can provide the guaranteed backup supply that offshore wind cannot. The continued success of this technology depends on a persistent decline in the LCoE, and although costs are projected to fall, this is not certain. New technology developments of other renewable energy forms might potentially render offshore wind undesirable in the future. Thus, increased political willingness to make long-term commitments to offshore wind should provide growth opportunities for companies involved in offshore wind and incentivise more companies to invest and get involved, which could potentially help drive costs down further. However, the power price environment may present challenges to the offshore wind industry and the LCoE.

Power prices

One factor that is likely to have a large impact on offshore wind's role in the future energy mix is power prices. Throughout the years, and as depicted in the figure 17, the power prices have continued to decrease (Poudineh et al., 2017). Fluctuations in the market prices of power are widely considered to be the result of changes in demand and supply, temperature, wind speeds and other weather conditions, as well as changes in commodity prices (Ørsted, 2016a). Negative power prices can occur if the supply exceeds the demand due to large outputs; however, this is normally only the case for short amounts of time (Ibis.). Should the prices continue to decrease, it would be increasingly difficult for offshore wind projects to break free of subsidies, making it hard to compete with low-cost technologies, as the LCoE of offshore projects would make the projects unprofitable (Poudineh et al., 2017). On the other hand, if power prices start to increase, offshore wind may be able to break free from subsidies. However, this should be viewed in relation to the technological changes in the industry, which may lead to either increased or stagnant outputs. Without technological improvements, LCoE would have to improve drastically for offshore wind to be profitable at a power price of, say, EUR 30/MWh (seen in 2016), without strong support from subsidies (NewEnergyUpdate, 2016; Poudineh et al., 2017).

One of the notable drivers behind the decrease of power prices and markets in the recent years has been an increase in supply by a growing use of alternative energy sources. Moreover, energy efficiency has increased, and weak economic growth has somewhat reduced demand (Poudineh et al., 2017). According to a report by the EC (2016), every percentage point increase in renewable energy share reduces the wholesale electricity price by EUR 0.4 per MWh in Europe on average, with a larger impact of EUR 0.6-0.8 per MWh in North-western Europe.

Figure 17 – Trend in wholesale electricity market prices in EU countries

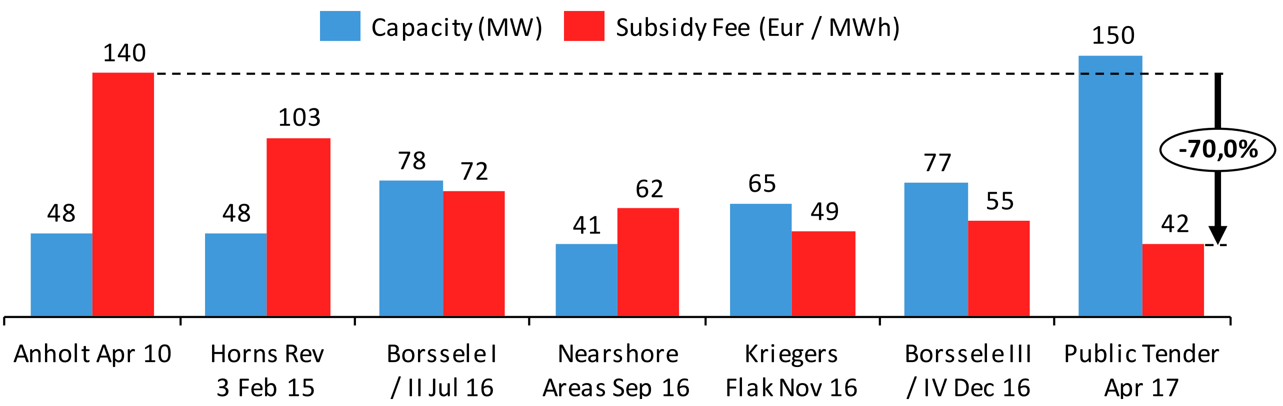


Source: Authors' own creation from (EC, 2016)

Subsidies

The declining level of subsidies creates a possible economic threat for Ørsted (Ørsted, 2016a). Figure 18 shows how the subsidies have declined the past seven years (-70%) while the capacity has increased.

Figure 18 – Development of offshore wind subsidies (in EUR/MWh) and capacity



Source: Authors' own creation from (Warburg Research, 2017)

Government policies—including subsidies, taxes, site selection, incentives for efficiency, and innovation and procurement methods—play a critical role in reducing the cost of offshore wind farms (Poudineh et al., 2017). Due to declining levels of subsidies, the realisation of offshore projects may prove to be increasingly challenging. In Ørsted's IPO prospect (2016) they state that approximately 62% of the revenue from their operational offshore wind farms in FY 2015 was derived from subsidies and other financial support (Ørsted, 2016a).

Prior to Germany running its first auction in April 2017, Denmark and the Netherlands had already tendered power purchase agreements in relation to offshore and wind auctions constructed as reverse auctions (Warburg Research, 2017). Reverse auctions imply that the government defines the capacity required, which is then put forth for tender offers. The companies then submit their bids, and the lowest bid will be chosen and awarded the contract (Ibid.). One of the main reasons for introducing auctions in line with the market mechanism is to increase competition and thus lower subsidy levels (Ibid.).

In 2003, the government of Denmark already started making smaller offshore auctions of less than 200MW, and in 2010, the first auction with a capacity almost at 400MW was completed (Poudineh et al., 2017). Back then, Ørsted won the auction and was awarded a subsidy of EUR 140 per MWh (Warburg Research, 2017). Fast forward five years and Denmark tendered a new stage of Horns Rev 3. This time, Vattenfall won the auction with a subsidy fee bid of EUR 103.1 per MWh, the lowest bid ever recorded at an offshore auction at the time (Ibid.). Auctions in Denmark and the Netherlands recorded post-2015 have continued to follow the trend of decreasing subsidies, showing that the government's strategy of using the market mechanism has been working (Ibid.). As a result of the Kriegers Flak auction in Denmark, subsidy levels for offshore energy reached new lows in November 2016, at EUR 49.9 per MWh (Ibid.). It may be questioned whether this was a one-time-only subsidy price, but just one month later, Borssele II / IV in the Netherlands won an auction at similar prices, debunking the theory (Ibid.). The development can be seen in Figure 18.

At present, prices have continued to decrease, most notably observed in the first German offshore project in April 2017 (Ibid.). The German federal networks agency tendered power purchase agreements for more than 1.5 GW in the German North Sea and Baltic Sea. Most bids came in much lower than expected, astounding the industry with three of the four winning bids coming in as "zero-bids" (Ibid.). A zero-bid implies that the project will be built free of subsidies and without any guaranteed remuneration. Thus, the average price of Germany's first offshore auction amounted to EUR 44 per MWh (Ibid.). The Netherlands later copied Germany and introduced zero subsidies (WindEurope, 2017).

It could seem that the zero-bids do not compare with the current LCoE for offshore wind farms. Thus, it would seem that strategic bidding has become a larger part of the auctioning, making it more speculative in nature. Innogy, a firm similar to Ørsted, has stated project-specific hurdle rates (IRR) for its 280MW project, Kaskasi, of no less than 5.75% (Warburg Research, 2017). In addition, BNEF (2017) estimates that new offshore projects in the 2020s will just about arrive at an LCoE of USD 50 per MWh. Thus, it may prove to be less or not at all profitable to install offshore projects unless wholesale electricity prices increase substantially in the next 10 years. Ørsted's head of Wind Power, Martin Neubert, confirms this view in an article by Børsen (2018a), commenting that the prices have now decreased to such lows that projects without subsidies make operations increasingly difficult.

Power purchase agreements (PPA)

Even though the companies in the industry face challenges like those mentioned above for Ørsted, some of them are starting to explore PPAs for corporations (Turner, 2018). PPAs are essentially contracts made to sell energy to large corporations and industrial customers rather than to the wholesale market. The PPAs through multiyear contracts typically run from ten to twenty years (Ibid.). PPAs have advantages for both the energy company as well as the potential customers as the contracts provide a guaranteed revenue stream for the independent power producing firms (IPP) while allowing corporate customers to attain the best energy prices in the market. In addition to the fixed revenue, the IPPs have the option to trade the extra produced energy in the market in times of surplus production, earning extra revenues (Ibid.). According to Manohar (Ibid.), the PPAs also have positive consequences for corporate customers to reach their sustainability goals while adding renewable energy to their consumption mix in a sustainable manner. PPAs thus offer a potential solution to the declining power prices and the lack of subsidies from governments.

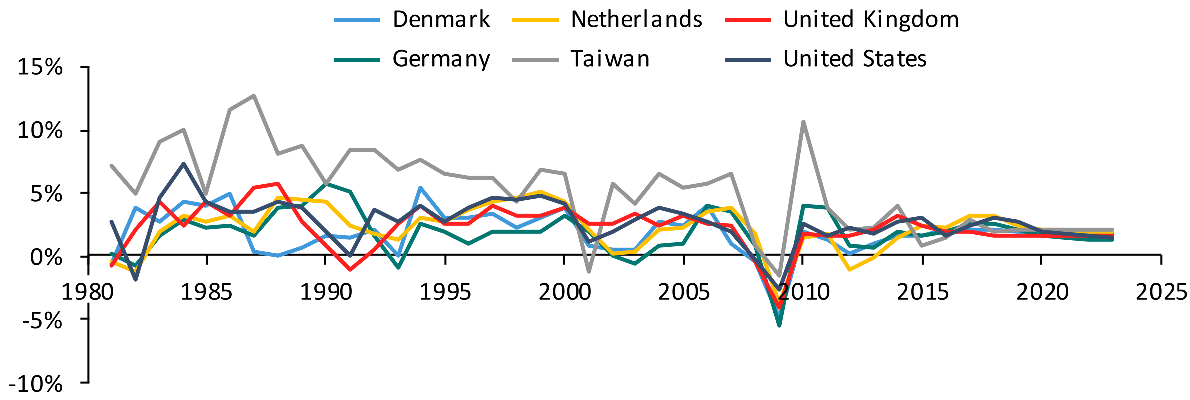
GDP & interest rates

In addition to the above mentioned economic factors, GDP growth and interest rates have the possibility to have an impact on Ørsted's business. Especially since Ørsted operates in several countries with different economic outlooks. The risks in these countries are relatively low, which is reflected in their credit ratings all being at the high end of the investment grade (Damodaran, 2018).

When analysing a global industry, such as offshore wind, it is relevant to look at the countries' GDP growth rate. GDP refers to the market value of all goods and services produced within a country in a given period. To compare the countries' GDP per annum it is adjusted for purchasing power parity (PPP) and inflation (Eurostat, 2018).

Besides the financial crisis, the annual real GDP growth rate in Ørsted's markets has been stable for the last 10 years (see figure 19). Overall, the countries are expected to show economic stability in the upcoming five years, making it safe for Ørsted to conduct heavy construction in these countries. Furthermore, the stable GDP outlook is assumed to be important for the future LCoE of offshore wind.

Figure 19 – GDP Development in Ørsted's markets



Source: Authors' own creation from (IMF, 2018)

However, interest rates can be a significant damper for the growth in offshore wind. As with most utility operations, higher interest rates are a negative driver. Interest rates are a monetary policy tool for central banks to control inflation. When interest rates decline, borrowing costs decrease and companies are more likely to expand their businesses, and vice versa when interest rates increase.

The low interest rate is best explained by the actions that the Federal Reserve (FED) took in response to the global financial crisis in 2008. The FED initially employed traditional monetary policy tools, lowering the federal fund's target rate from 5% in September 2007 to a 0-to-0.25% range in December 2008 (Federal Reserve, 2018). In November 2008 the FED initiated a program of quantitative easing (QE). QE ought to contain the financial crisis, reduce its impact on the broader economy, and encourage investment and consumption (JP Morgan, 2013). The FED is currently applying the brakes by raising rates. The yield on 10-year U.S. government bonds responded by recently rising to over 2.8% (Condon & Torres, 2017). Rising interest rates increase cost of debt, resulting in a higher WACC.

Rising interest rates pose a risk for the offshore wind industry. As described later in the financial analysis section, most of the companies in the offshore wind industry have credit ratings at the lower end of investment grade, making it expensive for them to finance their project. They rely on project finance as a financing tool. Project financing is often highly leveraged, and the debt often represents as much as 70-90% of the investment. According to WindEurope (2018), non-recourse debt remained an important instrument in offshore wind financing. In 2017, lenders extended EUR 6.2bn. of non-recourse debt across eight transactions for the financing of both new and operational wind farms (Ibid.). In addition, offshore wind ties up capital for up to four years before production. Based on the financial analysis, it can be assumed that many of the companies do not have the balance sheet capacity to retain the kind of BBB+/Baa1 credit ratings necessary to comfortably trade commodities and keep collateral requirements low and be seen as a good counterparty. Hence, rising interest rates is a major risk for companies operating within the offshore wind industry.

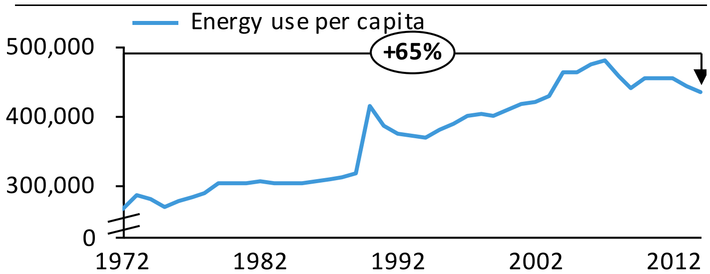
For Ørsted, the increase in interest rate causes an increase in the cost of their existing floating rate debt and potentially their maturing debt, which may have to be refinanced at higher interest rates (Ørsted, 2016a). In addition, when Ørsted divests 50% of an offshore wind farm, they typically bring in partners at a price approximately equal to their own WACC (Ibid.). When the interest starts to rise, investors are likely to look for other investments. In other words, investors are likely to weigh the risks of an offshore project with a bond or another product, posing less risk to their portfolio. In sum, the investors want a higher return while Ørsted's WACC increases. In the worst case, higher interest rates coupled with zero subsidies could make offshore wind an unprofitable business.

4.1.1.3. Social

One of the largest drivers behind Ørsted's profitability and growth is the demand for energy. As the population grows, demand for energy grows because energy is a non-substitutable resource and is considered a necessity across industries but also in the daily lives of consumers as energy is a supporting activity for almost everything in society.

Figure 20 shows the energy use per capita during the previous 30 years, illustrating a clear increase in the usage. According to Eurostat (2017) the population in the EU-28 zone is expected to grow by 1.7% from 2016 to 2080, increasing the population by a total of 8.5m. people. As the consumption per capita has been relatively stable, it would be fair to assume that the 8.5m. people are likely to consume the same amount of energy per capita, linearly correlating the population growth with energy consumption per capita.

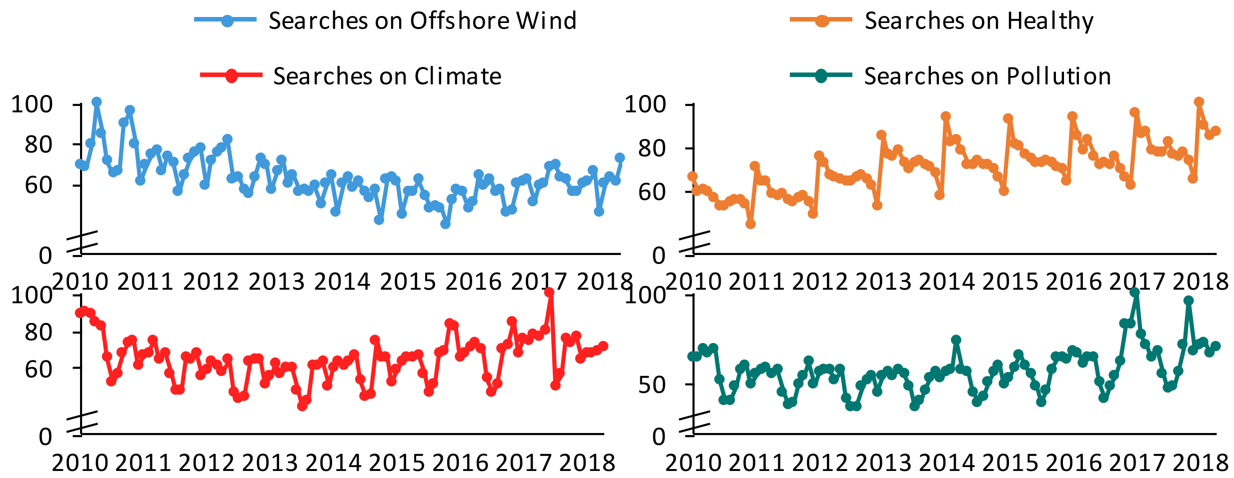
Figure 20 – Energy use per capita



Source: Authors' own creation from (EIA, 2018)

Apart from technical and economic feasibility, public acceptance constitutes a critical element for the successful implementation of renewable energy technologies and projects. The term "public acceptance" is often defined as the positive attitude towards a particular technology (Poudineh et al., 2017). Consumers have become more environmentally conscious and increasingly care about where their energy comes from (Ibid.). The energy consumers thus have an effect on policies, targeting more ambitious goals for the future. This is further backed by Google Trends, which highlights that any buzzword related to green energy has increased in popularity in recent years. Figure 21 shows that the general trend is that people are becoming more aware of the environment and sustainability.

Figure 21 – Google Trends



Source: Authors' own creation with use of Python to scrape Google Trends

Traditionally, the public perception of wind farms and other energy developments can be explained through the Not in My Backyard (NIMBY) theory (Poudineh et al., 2017). The NIMBY theory assumes that everyone agrees with the usefulness of the project but would prefer to have it in someone else's backyard rather than their own. This theory is also used to describe the situation in which there is general support for wind energy; however, there is a tendency to oppose a particular project in the vicinity of local residents (Ibid). According to Petrova (2015), the physical characteristics of turbines and aesthetic effects are among major causes of opposition. Although offshore wind farms have been given less attention compared to onshore wind with respect to visual intrusiveness, much focus has been given to the issue of actual visibility from the coast, ruining the landscape (Gee 2010).

4.1.1.4. Technological

The technological aspects of the offshore industry, with a larger emphasis on the impacts on Ørsted, will be analysed in more depth in the sections containing Porter's Five Forces, as well as in the value chain analysis. This dimension of the PESTEL analysis thus focuses on the overall technological developments.

In general, technological advances in offshore wind power have been the driver of the offshore wind industry. Throughout the past couple of years, vast technological development has been made in accordance with the technological shifts described by the EC, introducing turbines with higher outputs of power. The EC already described the importance of technology in its 2020 strategy, mentioning that the EU would simply fail to meet its 2050 goals without a technological shift (EUR-Lex, 2010). The resources required for the next decades of power generation are immense. The EC mentions major offshore wind projects affecting various member states of the union and calls for Europe-wide coordination and collaboration, which refers to the pooling of different funding sources where all stakeholders will be expected to contribute (Ibid.). The view on technological development and change thus appear to be in favour of the companies installing and managing the projects, like Ørsted. As the EC is already interested in pooling funds towards helping companies like Ørsted set up offshore wind projects, it would be fair to assume that the governments are likely to be even more prone to accept projects with zero subsidies, as mentioned for Germany and the Netherlands.

4.1.1.5. Environmental

The growing environmental awareness among governments and the general population has led to international and national policies supporting the transition towards low-carbon generation technologies. Lindgreen & Swaen (2010) describes how firms are increasingly committed to CSR as they want to be a larger part of society through social acceptance. Ørsted is thoroughly committed to the environment, which is evident in their engagement and partnerships with various climate organisations and NGOs (Ørsted, 2017d). In fact, research has shown that firms with environmentally friendly strategies outperform the opposite (Eccles et. al., 2014). With Ørsted's divestment of the oil & gas division, they prove that they care about the environment and create a greener profile. In addition to the sole financial drivers behind environmentally friendly companies, they also have a political impact. With offshore wind, the politicians are able to deliver on their targets and goals towards a higher consumption of renewable energy sources.

One thing to consider, however, is the potential environmental risk. Two recent examples of offshore wind projects running into significant issues for environmental reasons are the Navitus Bay project, as well as the Neart na Gaoithe project. The Navitus project, owned by EDF Energy and Eneco, was refused planning permissions as the authorities were concerned that the UNESCO coastline of the Jurassic Coast would lose its World Heritage status. Thus, they decided to cancel the project (Hirtenstein, 2015). Similarly, Neart na Goithe project, owned by Mainstream Renewable Power (MRP), faced issues from the Royal Society of Protection of Birds in Scotland (RSPB) over a judicial review. The review caused the project to miss its financial investment decision deadline, which in turn jeopardised the CFD contracts while holding MRP back from entering the construction site. The appeal however from RSPB however was dismissed, and the project continued (Offshorewind, 2017b).

PESTEL Summary

Summing up the PESTEL analysis, it can be concluded that political and legal powers are the key drivers behind the offshore wind industry. The goal of reducing CO2 entails a shift from the conventional fossil fuels towards renewable energy sources, such as offshore wind. Numerous economic factors specific to the offshore wind industry have been identified. With LCoE being the most referenced measure when talking about the economics of offshore wind, other factors such as the subsidies and power prices have a major impact on the growth and profitability of the industry. Conforming to the overall targets set by politicians, the social dimension supported the transformation towards renewable energy, though with implications in relation to the

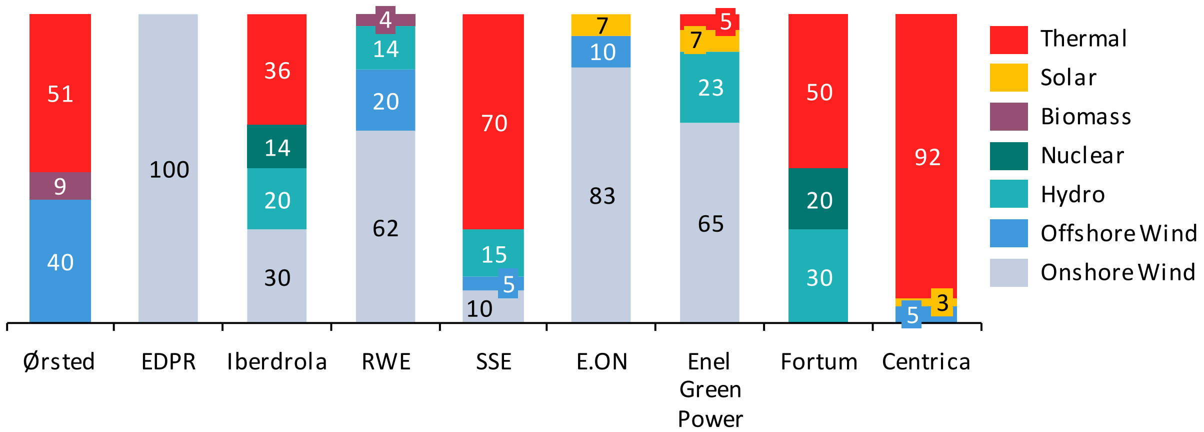
NIMBY theory. To accomplish the targets set by the EC, advances in technological development have to support the industry and scale with demand. Lastly, offshore wind is a renewable energy source making it environmentally friendly.

4.1.2. Competitors

Before analysing the micro-environment, it is necessary to identify Ørsted's competitive environment. Ørsted's first-mover advantage within offshore wind power results in a different earnings and cash-flow profile than most of the traditional utility peers who are having difficulties in transforming their business model and adapting to the new norm of renewable energy (IEA, 2017). However, while there are limited peers with exactly the same profile as Ørsted, there are a number of European energy companies with similar characteristics.

In selecting peers, their relevance through their respective capacity split per technology, operational model and geographical presence is analysed. Figure 22 summarises the findings on installed capacity by technology. It must be stated that Ørsted's business mix is unique, given its strong bias towards the offshore wind technology. The later financial analysis estimates that offshore wind explains c. 90% of Ørsted's enterprise value (EV). In contrast, in no other European utility does offshore wind contribute more than high single digit to EV. Listed companies that develop, construct and operate wind farms are mainly active within onshore wind, or they usually have broader operations, with several renewable energy technologies such as solar and hydro. With this in mind, the closest competitors to Ørsted are identified as the following: EDP Renewable (EDPR), Iberdrola, RWE, SSE, E.ON, Fortum, Centrica and Enel Green Power. As Enel Green Power is not listed separately, its parent company, Enel, is included instead. In Appendix 18, a short a description of each company and their areas of operations is provided.

Figure 22 – Competitor relevance by technology (installed capacity in %)



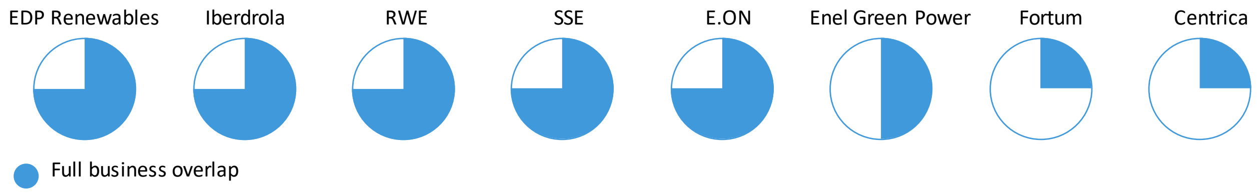
Source: Authors' own creation from (Ørsted. 2017a) & Bloomberg

While from a geographic perspective, the German utilities would be the closest peers to Ørsted. However, they have a substantially larger conventional thermal and nuclear generation fleet. In addition, they have been hit hard by Chancellor Merkel's decision to exit nuclear power by 2022, which is the main driver of their equity stories (Steitz, 2017). Therefore, Southern European vertically integrated utilities, particularly Iberdrola, EDPR and SSE in the UK are seen as more precise comparables to Ørsted. Given the mix of regulated profits and the geographical bias towards developed markets. Iberdrola and EDPR are flagged as the closest peers.

Despite its slightly different technology split on installed capacity, Iberdrola bears one of the highest resemblances to the business model of Ørsted, though it has only c15% of EV in renewables (Ibedrola, 2017). However, Iberdrola has Wikinger (350 MW) and East Anglia One (714 MW) under construction and will have more than 1 GW installed capacity by Q4 2019, positioning it as a top-five player in offshore wind development (Ibid.). Iberdrola could be carrying a discount due to its exposure to declining Spanish power prices via its traditional generation portfolio and due to the political risk in Spain (Ibid.).

EDPR is mainly exposed to onshore wind, but it does serve some relevance for valuation purposes as it is a pure-play renewables company (EDPR, 2017). In other words, EDPR can be used as a reference point when valuing Ørsted based on its Wind Power division. However, three key differences are found: 1) the bigger complexity and lower commoditisation of offshore vs. onshore wind; 2) the different geographical exposure, and 3) the bigger proportion of value concentrated in the early years of the project in offshore vs. onshore, mostly due to the higher incentives paid to the former (EDPR 2017; Ørsted 2017a; Poudineh et al., 2017). Figure 23 provides an overview of the relevance of different peers.

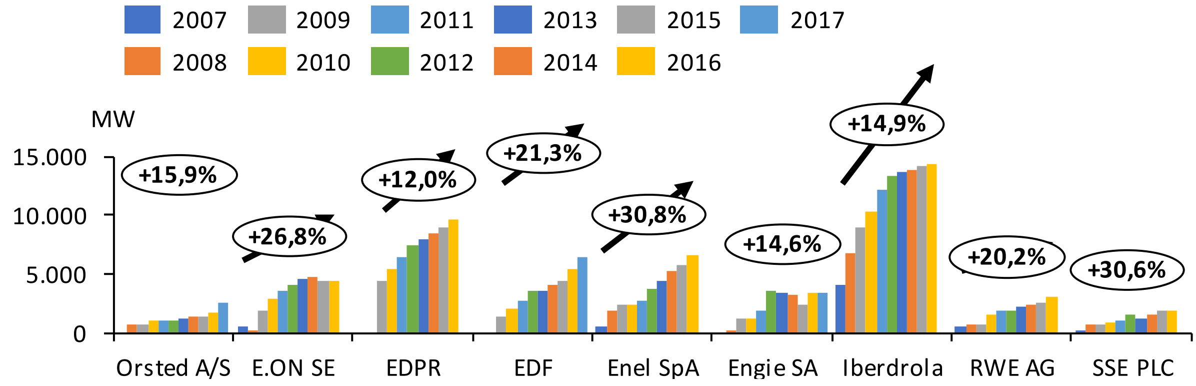
Figure 23 – Ørsted's business overlap to competitors



Source: Authors' own creation from (Ørsted. 2017a) & Bloomberg

To get an idea of how the peers rank in terms of wind power, their power capacity by wind (MW) is compared. Figure 24 includes both onshore and offshore wind, making the comparison less impressive for Ørsted. Iberdrola is the clear leader with its dominance in onshore wind. EDPR is ranked number two with a steadily increasing power capacity. These two are also highlighted as Ørsted's two closest peers. All companies have an increasing trend in wind capacity like the industry reports are reporting.

Figure 24 – Companies' Power capacity by wind

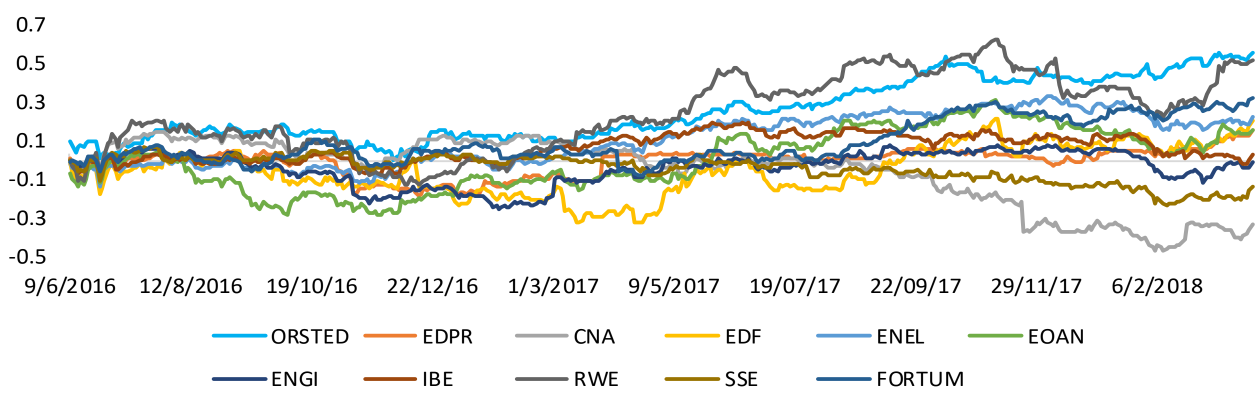


Source: Authors' own creation from Bloomberg

If looking only at installed offshore wind capacity in Europe, then Ørsted is the largest owner. Ørsted owns 17% of cumulative installations at the end of 2017, followed by E.ON with 8% of installed capacity owned, Innogy and Vattenfall with 7% each, and Northland Power with 4% (WindEurope, 2018). The top five owners represent 42% of all installed capacity in Europe, a slight decrease compared to the end of 2016, according to WindEurope (2018). When looking at which company connected the most megawatts in 2017, Ørsted is number one with 19% and Iberdrola takes the second place with 11%. However, a traditional utility company emerges in the top five; Statoil takes the fifth place with 5% (Ibis.).

By looking at the companies' stock prices, the interrelationship between the companies can be determined. Figure 25 shows how the companies have performed relative to each other in the period from Ørsted's IPO to March 2018. Ørsted is the strongest performer since its IPO, with RWE following suit. Centrica is the worst performer and is down almost 40% year-to-date.

Figure 25 – Companies' stock prices



Source: Authors' own creation from Bloomberg

The correlation matrix in figure 26 shows a positive relationship among most of the stocks. However, Ørsted is negatively correlated to Centrica and SSE. SSE was regarded as a highly comparable company to Ørsted, but this was not confirmed by the market prices. Both Iberdrola and EDPR are positively correlated to Ørsted with EDPR scoring higher at 60%. The most correlated stocks are Enel and Fortum.

Figure 26 – Correlation matrix

	ORSTED	EDPR	CNA	EDF	ENEL	EOAN	ENGI	IBE	RWE	SSE	FORTUM
ORSTED	1.0	0.6	-0.9	0.6	0.9	0.8	0.4	0.4	0.8	-0.8	0.9
EDPR	0.6	1.0	-0.4	0.5	0.5	0.5	0.7	0.3	0.7	-0.4	0.4
CNA	-0.9	-0.4	1.0	-0.5	-0.8	-0.6	-0.3	-0.3	-0.5	0.9	-0.8
EDF	0.6	0.5	-0.5	1.0	0.4	0.5	0.6	-0.1	0.5	-0.4	0.7
ENEL	0.9	0.5	-0.8	0.4	1.0	0.9	0.5	0.7	0.9	-0.7	0.7
EOAN	0.8	0.5	-0.6	0.5	0.9	1.0	0.7	0.6	0.9	-0.6	0.7
ENGI	0.4	0.7	-0.3	0.6	0.5	0.7	1.0	0.4	0.7	-0.2	0.3
IBE	0.4	0.3	-0.3	-0.1	0.7	0.6	0.4	1.0	0.7	-0.2	0.1
RWE	0.8	0.7	-0.5	0.5	0.9	0.9	0.7	0.7	1.0	-0.5	0.6
SSE	-0.8	-0.4	0.9	-0.4	-0.7	-0.6	-0.2	-0.2	-0.5	1.0	-0.7
FORTUM	0.9	0.4	-0.8	0.7	0.7	0.7	0.3	0.1	0.6	-0.7	1.0

Source: Authors' own creation with Python and Bloomberg

4.1.3. Competitive Analysis: Porter's Five Forces

The main objective of this section is to analyse the offshore wind industry through the lens of the competitive landscape.

4.1.3.1. Buyer Power

The buyer power dimension will be analysed with the assumption that the buyers of Ørsted's products, offshore wind projects, as well as power, are the governments. The current market dynamics require the governments to offer projects of varying size. Ørsted, as well as its competitors, are then able to bid for the project, and all else being equal, the government will choose the lowest bid. As such, the government auctions the sites and projects and essentially buys Ørsted's development and wind power generation.

The government's bargaining power in the renewable energy market is usually high since the output of energies like solar, wind and hydro cannot be differentiated and must be standardised when being supplied to the end users. Thus, the only competition parameter the suppliers rely on is the price, and since the end users, such as corporations and consumers, are price sensitive, they will choose the supplier who charges lower prices. This is an important aspect that enhances the bargaining power of the government. Since the governments are the buyers, they can easily drive the prices down. This is clearly illustrated in the offshore wind auctions where governments facilitate controlled competitive auctions, and where the price per unit of power produced is the only decisive criterion for the government in the selection of the winning bid (Poudineh et al., 2017). Essentially, the supply is greater than the demand, making it easy for the government to achieve an attractive price. For example, the UK government announced in March 2016 that for the upcoming auctions, the CFD prices for offshore wind would be capped at GBP 105 per MWh in 2021 and decline to GBP 85 per MWh in 2026 (Nortonrosefulbrigh, 2016). This puts pressure on the suppliers and Ørsted; they must be able to lower their costs in order to maintain a sustainable profitability level. Ørsted recently commented on this threat from the governments by saying it is an unfair distribution of risk and questioning whether it is a win-win for society (Ørsted, 2018b). In other words, the governments have distributed all the risk to the suppliers. Furthermore, Ørsted states that in a highly competitive auction, you have to ask yourself at what price you would be fine not winning the project (Ørsted, 2017f).

The question is whether Ørsted and its competitors have the power to change the terms. With Statoil's eagerness to enter the market, they will likely accept bids at low prices (Statoil, 2017; Reuters, 2017a; ICN, 2018). However, Statoil cannot be the sole supplier due to balance sheet constraints; hence, the suppliers could have a small say when determining the price levels. In addition, Ørsted received an option to not build when they won the zero-subsidy project in Germany (Ørsted, 2017f). The rationale behind this option is that if the project and power price turn out not to be at a profitable level, then Ørsted has the opportunity to abandon the project (Ibid). This indicates that the suppliers have a say in the negotiation after all.

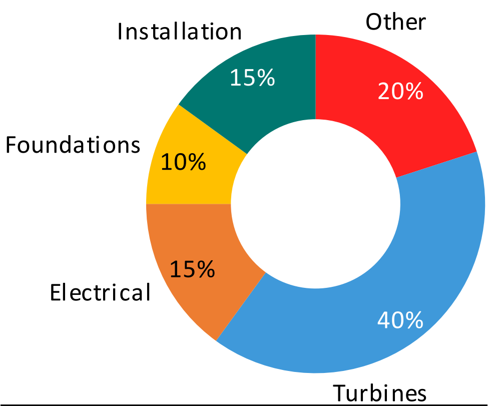
In terms of switching costs, offshore wind projects are developed and installed on a case-to-case basis, which makes switching offshore wind suppliers for the government seamless. Though, it would be fair to assume that qualitative measures, like relationships, are also part of the 'switching-equation'. Switching from a well-known supplier may entail elevated short-term costs in terms of project management regarding due diligence of the supplier. However, in general, as the buyers and projects are concentrated to a lesser amount and since the suppliers are plenty, it would be assumed that switching suppliers should be cheap and thus the bargaining power of the buyer is high.

In summary, with the overall emission targets, the governments are clearly interested in building offshore wind farms. This is also reflected in the EC being interested in pooling funds in an effort to help companies like Ørsted set up offshore wind projects. If there are no sellers, e.g., Ørsted, then the government might be forced to increase the prices so suppliers can build at a profitable rate.

4.1.3.2. Supplier Power

Ørsted has a close relationship with its suppliers. Ørsted involves the suppliers in discussions of cost improvements and closely cooperates with them on implementation (Ørsted, 2016a). Accordingly, Ørsted has improved their procurement and purchasing position by moving from a project-by-project approach to a portfolio approach (Ibid.). They are systematically broadening their supply chain by identifying, pre-qualifying and developing new suppliers. For example, Ørsted previously only had one supplier of wind turbines, making Ørsted's bargaining power low. This has, however, been optimised to currently include two suppliers of wind turbines, namely Siemens Wind Power and MHI Vestas (Ibid.). Ørsted believes that using multiple suppliers to broaden the supply chain will encourage competition within the supply chain, consequently driving costs down and performance up, leading to higher bargaining powers for Ørsted (Ibid.). The more suppliers Ørsted can choose from, the easier it is to switch to a cheaper alternative. Thus, making it difficult for the suppliers to increase their prices.

Figure 27 – Cost structure



Source: Authors' own creation from (Ørsted, 2016a)

However, in the case of wind turbines, having only two suppliers is relatively limited compared to the suppliers of foundations where there are several suppliers available (Ibid.). Ørsted's high degree of reliance on only two turbine suppliers exposes them to certain risks. Figure 27 shows that wind turbines contribute 40% to the total costs of an offshore wind farm.

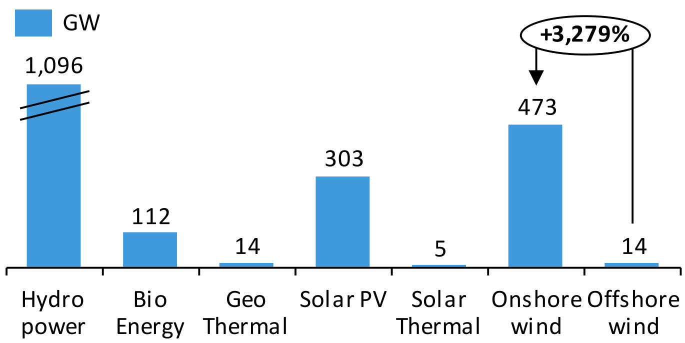
Thus, delays, increased prices for turbines, or lack of spare turbine parts due to limited supply constitute a risk for Ørsted, making the suppliers bargaining power higher for turbines compared to the bargaining power for other resources where suppliers are plentiful. It is worth noting that the relationship is likely a push-pull relationship, as the suppliers need the buyers and vice versa.

4.1.3.3. Threat of Substitution

The threat of substitution will only be analysed for the renewable energy sources, as they are exposed to the same underlying political drivers (CO2 emission targets). Renewable power can be generated from a myriad of sources, such as water, wind and solar among others, but the end product is still electricity that is then supplied to the consumers. Having a span of different renewable energies, governments can easily substitute one with another. Put differently, renewables have a common denominator—their differentiator is their LCoE.

In practice, the source that provides energy with the lowest LCoE is considered more attractive. The economic part of the PESTEL revealed that hydro provided the lowest LCoE. According to a recent report by the International Renewable Energy Agency, at USD 0.05kWh, hydroelectricity remains the lowest-cost source of electricity worldwide (IRENA, 2018). Consequently, hydro is more attractive than the other renewable energy sources. However, the installed amount of hydro is much higher than those other sources, as shown in figure 28. The implications of the large installed capacity of hydro could potentially mean a consolidated market without further possibilities for expansion, perhaps given the geographical constraints to building dams. When this is considered, there could be technological breakthroughs in hydro where developments are possible in new areas, and hydro would be considered a suitable substitute for offshore wind as the LCoE is lower.

Figure 28 –Capacity by technology



Source: Authors' own creation from (Poudineh et al., 2017)

Ørsted's business model depends mainly on LCoE from offshore wind. As such, Ørsted faces threats from other renewable sources such as hydro, which are not within the operational scope of Ørsted at the moment. However, Ørsted has shown interest in expanding into these renewable energies later on (Ørsted, 2017c). In summary, Ørsted is somewhat exposed to a threat of substitution, though with a prerequisite of lower LCoE from the substituting sources of renewable energy.

4.1.3.4. Threat of New Entry

Threat of new entry looks at how easy it is for new competitors to enter Ørsted's market. Appendix 12 shows the development risks and entry barriers in the different markets. It can be observed that both Denmark and the Netherlands have the lowest entry barriers and development risks. This is due to the fact that a significantly large number of the offshore wind projects are carried out by the governments, while the transmission system operator (TSO) essentially only leaves the installation of the foundation, array cables and turbines to the developer (ISLES, 2015). In Germany, the developer must carry out all the pre-development work, which in turn means that the developer of the project has exclusivity for a project that enters an auction, which is not the case for the two previously mentioned markets. However, the installation of transmission assets in Germany is still being carried out by the TSO, as in Denmark and the Netherlands (Ibid.). For the UK and US, the conditions are significantly different from the ones already mentioned. In these markets, the developer must carry out all the activities, including the development and installation of transmission assets (Ibid.). As such, the development risk in the UK and US is assumed to be substantially higher than it is in Denmark, the Netherlands and Germany. The development risk entails that developers are already established and have some know-how of running projects. If this was not the case, new competition could arise from new entries. Therefore, the entry barriers in these countries are assumed to be higher. This proves an important point, namely that while the market is largely focused on the low prices and risks relating to subsidies and high level of competition, the development of projects serves a risk in itself.

Accordingly, one of the large barriers to entry that is keeping new players away in the energy sector is the high and intensive capital requirements. For instance, wind turbines are not only expensive to buy but they are also costly to install (Poudineh et al., 2017). Furthermore, companies operating in the energy sector must constantly innovate since they rely on product innovation to generate their income, as described previously in the technology dimension of PESTEL. As such, these companies must dedicate a lot of resources to conducting R&D. Usually, the high costs incurred in R&D can only be meaningful to a firm if the firm is able to take advantage of the economies of scale, which may not be available for smaller companies. Therefore, the high investments in R&D coupled with high-level demands of the new technologies help to discourage new entrants to the industry. With that said, when companies such as Statoil, with its size and existing know-how in construction, are eager to assert themselves to become a permanent player in the offshore wind industry, it is easy to make an entry (Statoil, 2017). In the article, *"Oil Giants See a Future in Offshore Wind Power. Their Suppliers Are Investing, Too"* Statoil's SVP of Wind commented: *"Offshore wind developing seemed like a natural skill set for offshore oil and gas companies"* (ICN, 2018, l. 15-16).

Another important point—which was discussed earlier—is the issue of standardised outputs. Outputs in this industry are highly standardised which makes it impossible to differentiate them through branding or any other activity. It has been established that in marketing, a low level of branding in any industry helps new companies to settle as they will not be competing with other established brands. In practice, this factor has been observed to increase the threat of new entrants in the industry.

In summary, if companies within in a specific industry are able to earn a return over their WACC, new competitors will likely be attracted to enter the sector. The later financial analysis highlighted that the median return in the sector over the last 10 years has been at the lower end compared to other industries. However, with the increased demand for renewables, new companies will likely make an entry, but it will require time and financial power.

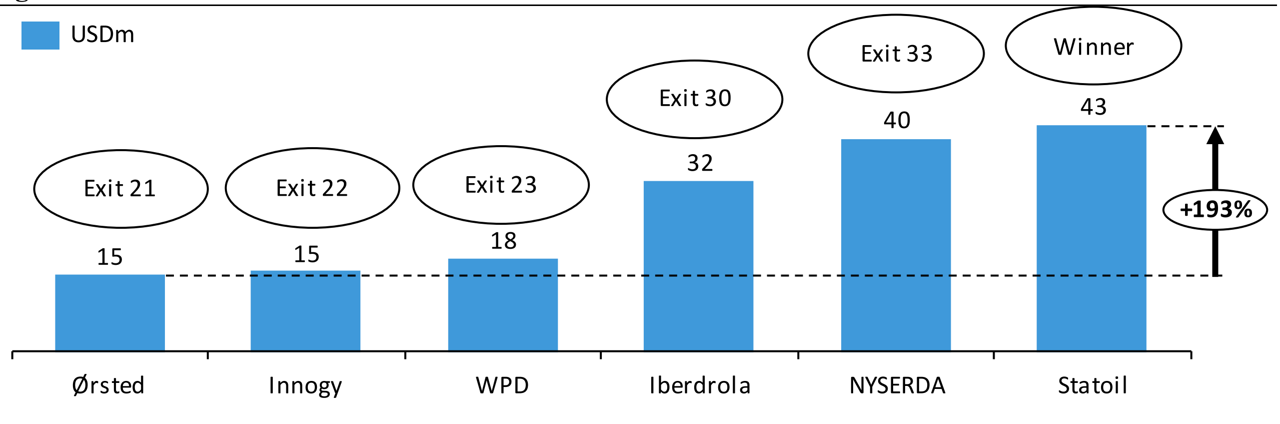
4.1.3.5. Competitive Rivalry

Competitive rivalry looks at the number and strength of the competitors within an industry. Any industry that is large enough, has high potential, and achieves higher profitability is bound to have more players, creating a strong degree of rivalry. Even though Ørsted is the leading offshore wind company, it is not the strongest financially. It can be assumed that offshore wind without subsidies is more a question of financial power and with the industry's substantial growth potential, it is introducing a new class of players.

The market in which Ørsted is operating can be considered oligopolistic, as it is dominated by a small number of large companies that deal with power generation, and as the theory of markets postulates, this helps to increase and enhance rivalry among the firms. It requires a lot of resources for entrants to establish themselves in the offshore wind industry; thus, the firms operating in this industry cannot contemplate an exit due to high costs, resulting in high exit barriers. High exit barriers have been observed to raise the degree of rivalry among the firms (Porter, 1979).

Future offshore wind projects will have to be won in tenders and auctions. The companies then submit their bids, and the lowest bid will be chosen and awarded the contract. Consequently, this puts pressure on returns and profitability. For companies such as Statoil and Shell, who have the goal of being a major player in the offshore wind industry, it means less to them that the economic rationale without subsidies might stagger a bit (ICN, 2018). This is best exemplified by Shell's win of the 700 MW Borssele 3&4 tender in the Netherlands, given that Shell to date only has experience of 55 MW in offshore wind (Shell, 2017). Another example of competition is the lease auction for a site off the coast of New York in the US to be developed for offshore wind held in December 2016. Statoil won the auction after a record 33-round bidding process over two days, elevating the price to USD 42m for c.79,000 acres (BOEM, 2016).

Figure 29 – Auction for the site off the coast of New York



Source: Authors' own creation from (BOEM, 2016)

For this reason, already established players, such as E.ON, have paused their offshore wind investments as prices are too low in their view (Energy Watch, 2017). According to recent market share statistics from BNEF (2017), E.ON is the second largest offshore wind developers after Ørsted, measured by commissioned capacity with 17% market share.

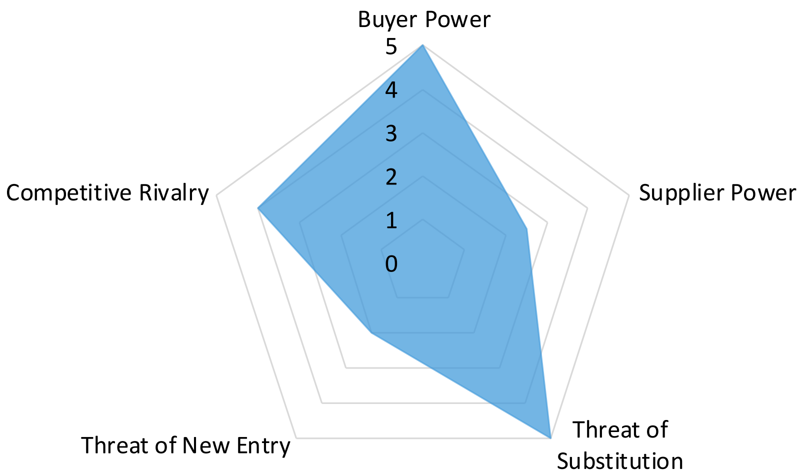
Players like Statoil and the like with larger financial muscle than Ørsted have the ability to increase their bargaining power against their competitors. This is a result of the large CAPEX requirements for installing offshore projects. They are better positioned to submit low bids on projects by leveraging older assets used in oil exploration and strong balance sheets as a way to enter the offshore wind industry (ICN, 2018).

One possible solution for established players, such as Ørsted, is to focus on more complex rather than plain vanilla markets. By targeting complex markets, Ørsted is only seeing competition from focused players. By utilising its competitive advantage, later illustrated in the value chain analysis, Ørsted should be able to retain its market shares. In summary, given the macro-environment identified in the PESTEL and the attractiveness of the offshore wind industry in terms of growth, there is an intense competition for suppliers to meet the demand from governments by submitting competitive bids.

Five Forces Summary

Summing up the Five Forces analysis, it can be concluded that the level of bargaining power by the buyers in terms of governments is high, putting pressure on the suppliers such as Ørsted. Further downstream, however, Ørsted has power over its suppliers to a certain extent. The threat of substitution is all about the LCoE from the different renewables. Currently, hydro is the energy source with the lowest LCoE; however, offshore wind is on track to being able to compete. The threat of new entry is limited by the high CAPEX requirements and know-how needed to enter the industry. The degree of rivalry is high and increasing given the already established industry coupled with the entry of new companies, such as Statoil and Shell. In total, based on the Porter's Five Forces framework, the offshore wind industry is closer to being defined as unattractive than attractive to enter.

Figure 30 – Five Forces summary



Source: Authors' own creation

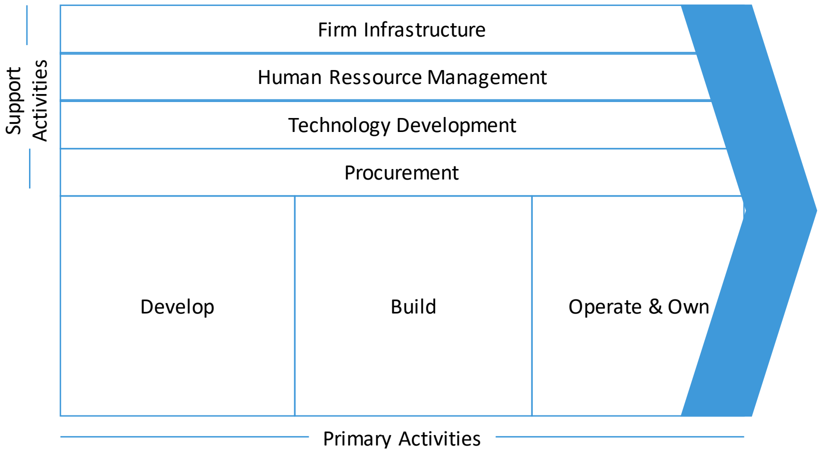
4.2. Internal Analysis

The following internal analysis aims to uncover Ørsted's internal capabilities, determining whether they have a sustained competitive advantage or not. The analysis seeks to answer this question by merging two academic frameworks: Porter's Value Chain analysis and VRIN.

4.2.1. Value Chain Analysis: Porter's Value Chain

The following section aims to explore distinctive and dynamic resources that may lead to a sustained competitive advantage. The section is based on a reworked Porter's Value Chain (figure 31), substituting the primary activities with Ørsted's value chain (Develop, Build, Operate & Own) as they equal each other out. Following that, the VRIN framework is used to evaluate whether the identified resource provides Ørsted with a sustained competitive advantage. Firstly, the support activities are analysed as they naturally drive the primary activities.

Figure 31 – Modified Value chain



Source: Authors' own creation

4.2.1.1. Support activities

In terms of Ørsted, the offshore wind business functions around the general and banal concept that inputs are created from wind, with the output being electricity. The primary activities thus refer to the daily operations making use of inputs: wind, through production into outputs, electricity. Support activities support these primary activities in its transformation of input to output. Each support activity has the ability to have a supportive role in several of the primary activities (Grant, 2015).

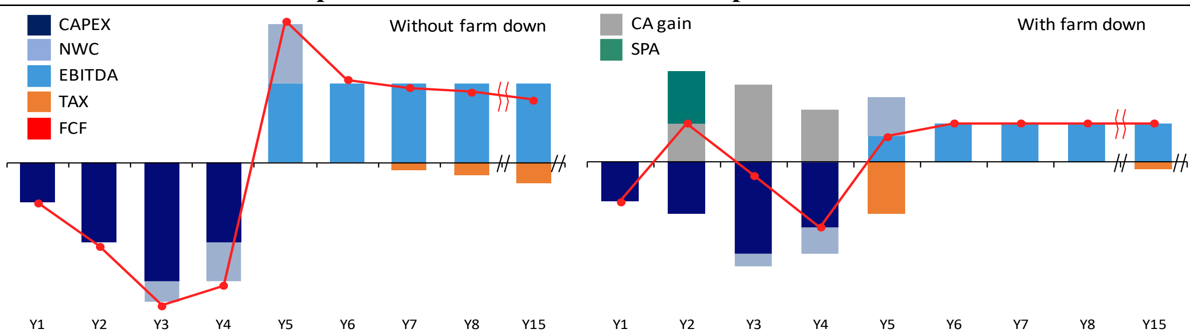
4.2.1.1.1. Firm infrastructure

As stated in the introduction, Ørsted now only focuses on renewables with the goal of having more than 95% of their heat and power generation coming from renewable energy. Having divested a large part of non-related businesses, Ørsted is now a pure offshore wind player, meaning it does not have any activities within onshore wind. The company was a first mover in offshore wind energy and is currently positioned as a clear market leader. With the Wind Power division driving the majority of the value of Ørsted, most of the resources are centred around this division. In other words, their infrastructure is built to serve the Wind Power division. Hence, Ørsted is positioned to capture the full growth of the offshore wind industry. According to the Bloomberg database and Ørsted (2016a), Ørsted has a full set of in-house capabilities in each major part of the value chain, while most of its competitors either lack some skills or have none in-house in several parts of the value chain. Thus, they have to seek these beyond their own organisation. This leaves them dependent on decisions made by other companies when they execute an offshore wind farm project. Therefore, Ørsted's infrastructure is valuable and rare. However, competitors can imitate it over time, which they likely will since any company earning a ROIC over WACC introduces more competitors and imitation. Ørsted's infrastructure results only in a temporary competitive advantage, which is a product of being the first mover.

Farm-down model

Ørsted's farm-down model is one of the most important support activities within their firm infrastructure (Ørsted, 2016a). Without the farm-down model, it is questionable whether Ørsted would have succeeded in offshore wind given the company's financial problems in 2012, which is highlighted later in the financial analysis. The simple version of the farm-down model is that Ørsted divests a 50% stake in its wind farms 12-24 months after it has taken the final investment decision (FID) for the project (Ibid.). However, in reality, it is slightly more complex than this with several contracts signed through each state in the development process (Ibid.). Ørsted has provided an illustration of free cash flow with and without the farm-down model (see figure 32). Without the farm-down, the free cash flow is significantly more volatile due to the high CAPEX base. However, the gains are higher due to Ørsted then owning 100% of the cash flow. In contrast, with the farm-down model, the free cash flow is stable and even positive in year two with an SPA and CA gain, which are abbreviations for share purchase agreement and construction agreement (Ibid.). It is safe to say that Ørsted mitigates its risks by divesting 50% of its stake. They retain a stable cash flow, high credit rating, low cost of capital, and reduced need for invested capital. Thereby, the farm-down model leads it to leverage on scale and gain stronger competitive ground through a reduction in the LCoE.

Figure 32 – Illustrative example of the Farm-down model's impact on financials



Source: Authors' own creation from (Ørsted, 2016b)

Looking at Ørsted's record for the farm-down model, it has secured more than DKK 42bn. under the farm-down model between 2010 and 2016, with a diverse list of recognised financial partners, such as PensionDanmark, PKA and KIRKBI (Ørsted, 2016a). The strong record should support finding future investors for more farm-downs. This makes the farm-down model valuable, but the question is whether or not it is rare. Generally, there are two sources of finance for offshore wind projects: corporate finance and project finance (Poudineh et al., 2017). In corporate finance, the project is financed through the balance sheet of the parent company and the finance is based on the risk profile of the main company as a whole, not the specific project itself (Ibid.). This financing method, which is traditionally preferred by large utility companies with strong balance sheets, often results in lower risks and a consequent lower cost of capital. In the project finance approach, however, the main sources of capital are lenders (i.e., banks) and the cash flow of the project determines the key financial parameters. However, in this approach, the project assets, rights, and interests are held as secondary security or collateral, so lenders have no recourse to the assets of sponsor companies (Ibid.). Many of Ørsted's competitors are dependent on debt financing/project financing (WindEurope, 2018). Consequently, this will lead to increased capital costs for some of Ørsted's competitors. Hence, Ørsted's farm-down model is also seen as rare. It can be assumed that competitors can imitate the farm-down model as the nature of farm-downs are non-proprietary. Ørsted's strong record with divesting 50% gives confidence to new investors. It will likely be costly for competitors to imitate the farm-down model, as their lack of track record might increase investors' required return due to financial theory saying that investors are compensated for taking a higher risk (Damodaran, 2012). To some extent, the farm-down can be substituted with other financing tools. For example, in the divestment of 50% of Gode Wind 1 to GIP, Ørsted structured a private placement bond with Talanx (Ørsted, 2016a). For these reasons, the farm-down model is a resource that fulfils the requirements for a temporary competitive advantage.

Supply chain optimisation

Ørsted has played an important role in broadening and developing the supply chain in the offshore wind industry. This has led to increased competition amongst suppliers and reduced the risk of bottlenecks (Ørsted, 2016a). Several suppliers have been attracted to the offshore wind industry, as it offers the market growth that many other industrial sectors have been lacking in recent years (Poudineh et al., 2017). Back in 2012, there was a scarcity of Ørsted's key components such as wind turbines and installation vessels, while the supply of other components, such as export cables and foundations, was merely in balance in the market (Ibid.). Today, the market for all major component groups is oversupplied, with the exception of export cables and offshore substations where the market is in balance (Ibid.). A big step for Ørsted in its sourcing was the move away from single- and towards dual-supply for wind turbines (Ørsted, 2016a). Ørsted has a multi-contracting approach, with 150 to 200 contracts in total for each project, which can be considered as valuable (Ibid.). Compared to its peers, it is rare, as most of its competitors follow a split contract approach, signing 5 to 10 main contracts with aggregators of services (NEU, 2016). This is something that Ørsted can do because of its unique scale, which allows it to dilute the overheads. The benefit is the ability to economically and technically scrutinise all the details of the contracts, which allows Ørsted to squeeze savings and make efficiency improvements more rapidly than its peers (Ørsted, 2016a; NEU, 2016). Depending on the size of the competitor, it can be difficult to imitate Ørsted's multi-contracting approach. It is difficult to substitute contracts with another resource, making it non-substitutable. In total, Ørsted's optimised supply chain gives them a sustained competitive advantage.

Know-how

The learning experiences from executing 3GW of offshore wind projects have provided Ørsted with a second-to-none in-house expertise, providing it with the ability to design and optimise projects with a "total life-cycle cost of wind farm" mindset. It also means that Ørsted has a better understanding of the risks of executing a large offshore wind farm project, which should minimise the number of mistakes and wrong decision-making. The steep learning curve has been achieved more rapidly through the farm-down strategy, as building scale has been an available opportunity in a relatively short timeframe (Ørsted, 2016a). Furthermore, when benchmarking the average availability achieved per year, Ørsted has realised a notable improvement after taking over the responsibility for wind turbines (Windpower, 2009). This demonstrates Ørsted's know-how in driving top availability at its wind farms. Ørsted's record in terms of the execution of construction shows only minor deviations from budgets and schedules, meaning that subsidy milestones have never been jeopardised. Ørsted has actually managed to beat its FID in recent projects (Ørsted, 2016a). Due to all of the above, Ørsted undoubtedly possess valuable, rare, inimitable and non-substitutable know-how, making it a sustained competitive advantage for Ørsted.

Trading

Ørsted's Trading division, which is part of the Distribution & Customer Solutions division, is responsible for the Ørsted's trading and exposure management and sells the energy produced to the market (Ørsted, 2016a). It takes in parts of the other business units' exposure, balances them out, and hedges the remaining positions in the market to lock in prices (Ibid.). Ørsted has a robust power portfolio based on its offshore wind power production. Trading receives power from Ørsted's and third parties' wind power production, which it then trades (Ibid.).

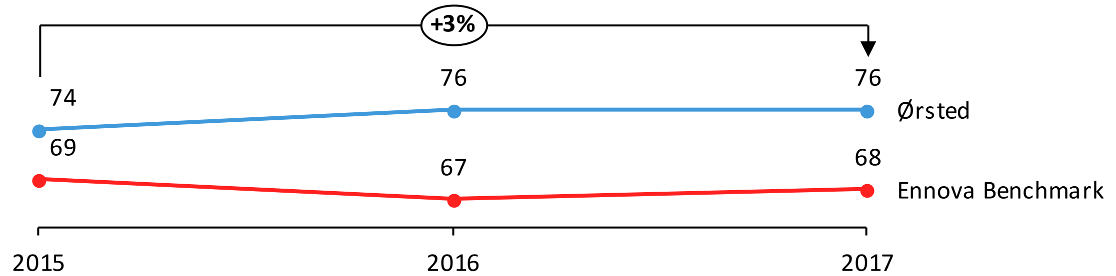
Ørsted has set clear hedging policies for its commodity-based businesses. The purpose of these is to protect the value of its assets, decrease cash flow volatility and safeguard its credit profile (Ibid.). From Wind Power, Ørsted's commodity exposure is outright power from its production. Ørsted also carries out currency hedging as it is primarily exposed to the British pound and to a lesser extent the US dollar (Ibid). The purpose of

Ørsted's currency risk management is to reduce the currency risk over a five-year horizon. The main principle in its currency hedging policy is to hedge currency exposure once it is deemed relatively certain that the underlying cash flows in the foreign currency will materialise. Currency risk is therefore hedged concurrently with the hedging of the energy price risk. Currency related to divestments and investments is hedged once the amount is certain (Ibid.). The geographical revenue split from the PESTEL documents the exposure towards the British pound. As the currency risk is managed by the trading department in order to mitigate risks towards currency, it is a valuable resource for Ørsted. However, a trading division in a power company cannot be considered rare as all competitors are assumably hedging their market exposure. For these reasons, Ørsted's trading function is considered a competitive parity.

4.2.1.1.2. Human resource management

Ørsted's Wind Power unit consists of 2,253 employees, making it the largest offshore wind organisation in the market and three times the size of the second-largest offshore wind organisation (Ørsted, 2016a; WindEurope, 2018). In terms of resources, the majority of Ørsted's employees are engaged in building and operating wind farms. Ørsted comments in their IPO prospect that their greater number of employees in the Wind Power division allows them to specialise and, to a larger degree, construct and operate a greater number of offshore wind farms in parallel (Ørsted, 2016a, p. 139). Bloomberg reports that Ørsted has one of lowest employee turnovers compared to its peers, indicating that they are able to motivate, engage and retain skilled employees. This can therefore be assessed as valuable. In their annual report, Ørsted reports that they are working continuously to maintain and increase employee satisfaction. Hence, the employee satisfaction in Ørsted is above comparable companies (see figure 33).

Figure 33 – Employee satisfaction



Source: Authors' own creation from (Ørsted, 2017a)

Furthermore, Ørsted has a strong managerial competence, as exemplified by the CEO, Henrik Poulsen, who as CEO of TDC gained relevant experience from a listed corporation, bringing a high degree of investor confidence in his ability to deliver operational and financial performance (Milne, 2016). Besides leading a strategic divestment programme since his start (boosting cash flow by more DKK 21bn.), he and his team have secured capital injections of DKK 11bn. from external investors (Ørsted, 2016a). However, highly skilled personnel are in demand and employee satisfaction should not be considered rare. Thus, making Ørsted's HR management a competitive parity.

4.2.1.1.3. Technology Development

Technological innovation is a key to driving cost optimisation and fulfilling the valuable dimension of VRIN. As earlier stated, the development of turbines is one of the key drivers. Given its leading position, Ørsted is a first mover on many of the technological advances in the industry, giving them a rare technological know-how. Through the years, Ørsted has utilised larger and larger turbines, which is an important determinant in lowering LCoE (Ørsted, 2016a). In 2009, Ørsted used Siemens' 3.6MW turbine for its Walney 2 project. Six years later, in 2015, it took the final investment decision for the Burbo Bank Extension project, where it used MHI Vestas' 8MW turbine (Ibid). All else equal, moving from a 3.6MW turbine to an 8MW turbine meant that Ørsted could install less than half of the number of turbines and still get the same overall capacity for a given project.

One of the challenges for offshore wind relative to onshore wind has been the different foundations required to match variations in the seabed (Poudineh et al., 2017). This has historically led to a lack of standardisation when it comes to foundations. As a result, there are different types of foundation technology which have been used (Ibid.). By far, the most used technology is a monopile foundation with gravity and jacket foundation as runners-up. Although monopile technology is leading today, it is not necessarily the technology of the future (Ibid.). Offshore wind foundations face several challenges, such as projects moving further from shore and into deeper waters, as well as strict regulation on underwater noise during installation (Ibid.). Suction bucket technology is one attempt to develop more efficient foundations (Fouroffshore, 2016). Suction bucket foundations are typically jacket foundations that stand on three giant suction buckets. The suction buckets anchor the foundation to the seabed. The advantages of suction buckets are faster installation and reduced environmental impact during construction (Ibid.). Ørsted is a first mover in suction bucket technology and has already used it for its Borkum Riffgrund 1 project and plans to use it further for its Hornsea 1 and Borkum Riffgrund 2 projects. Ørsted writes the following on their website:

"As an alternative, we pioneered the so-called suction bucket jacket foundations on one of our German offshore wind farms, and we expect to use this technology on selected future projects in combination with monopile foundations" (Ørsted, 2018f, p. 1).

The keyword in this quote is *pioneered,* which is a phrase that can be used to describe Ørsted's technological development. It has contributed significantly to reducing LCoE and made it possible for Ørsted to make competitive bids in auctions. Therefore, their technological development is difficult to imitate. Given the focus on technological advantages in order to drive down LCoE, as previously described in the PESTEL, the technological development is non-substitutable. Hence, Ørsted's technological development fulfils all of the VRIN requirements for having a sustained competitive advantage.

IT tools

Following the technological development, Ørsted has, over the years, built up a portfolio of proprietary IT tools (Ørsted, 2018f). These IT tools help optimise the design of a wind farm in order to maximise output and minimise costs. They enable Ørsted (and its sub-suppliers) to design major components that reduce overall costs, and also enable it to reduce costs on wind farm projects it has acquired from other developers (Ørsted, 2016a). Together with SmartWind Technologies, Ørsted has installed an advanced radar system collecting three-dimensional data on the wind flow in the Westermost Rough offshore wind farm off England's east coast (Ørsted, 2018g). The project, the first of its kind in the world, represents a paradigm shift in wind measurements. In other words, Ørsted's IT tools fulfill all the VRIN requirements for having a sustained competitive advantage.

4.2.1.1.4. Procurement

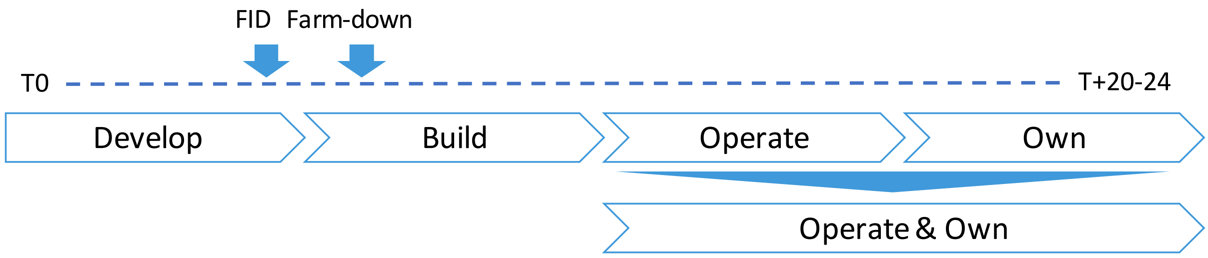
As seen in appendix 13 once procurement is initiated, it takes two years to be completed. It utilises 15 percent of the total costs (Freshney et al., 2017). Procurement is therefore an important support activity for all offshore wind asset companies. Ørsted's focus on procurement is to follow a code of conduct (CoC) for its suppliers and business partners (Ørsted, 2017g). The CoC includes general expectations, such as complying with international and national laws and the like (Ibid.). This is seen in Ørsted's conference calls where they refuse to go into details regarding their suppliers when asked by analysts (Ørsted, 2017c; Ørsted 2017f). However, throughout the years, Siemens Gamesa has supplied 86% of Ørsted's operational and under construction offshore projects, with Vestas awarded the remainder (Ørsted, 2016a). By using multiple suppliers, they encourage competition in the supply chain, driving price down and performance up, thereby reducing the cost of electricity (Ibid.).

It would be a fair assumption that Ørsted has a close relationship with its suppliers, especially with its multi-contracting approach (Ibid.). Building relationships with capable, competitive and innovative suppliers is essential to delivering new projects successfully, making procurement a valuable resource for Ørsted. During a conference call, Ørsted was asked about the possibility of changing their place in the value chain by acquiring a turbine manufacturer or if they will stay as constructor and operator of assets (Ørsted, 2017c, p. 19). Ørsted responded that they will stay where they are in the value chain and have no plan to acquire any equipment supplier (Ibid.). If Ørsted's procurement was not optimal, they would probably vertically integrate a supplier in their value chain. This, however, is not rare compared to competitors, giving Ørsted no competitive advantage in its procurement.

4.2.1.2. Primary activities

Ørsted develops, builds, operates and owns its wind farms (Ørsted, 2016a). This gives it the ability to design and optimise projects with a total life-cycle cost mindset for the wind farm. Further, it gives Ørsted experience and expertise along the entire value chain, which allows for a better understanding and management of risks. If Ørsted is benchmarked against its competitors, it is the only player within the offshore wind industry with a truly dedicated end-to-end business model (Ibid.).

Figure 34 – Primary activities



Source: Authors' own creation from (Ørsted, 2016a)

4.2.1.2.1. Develop

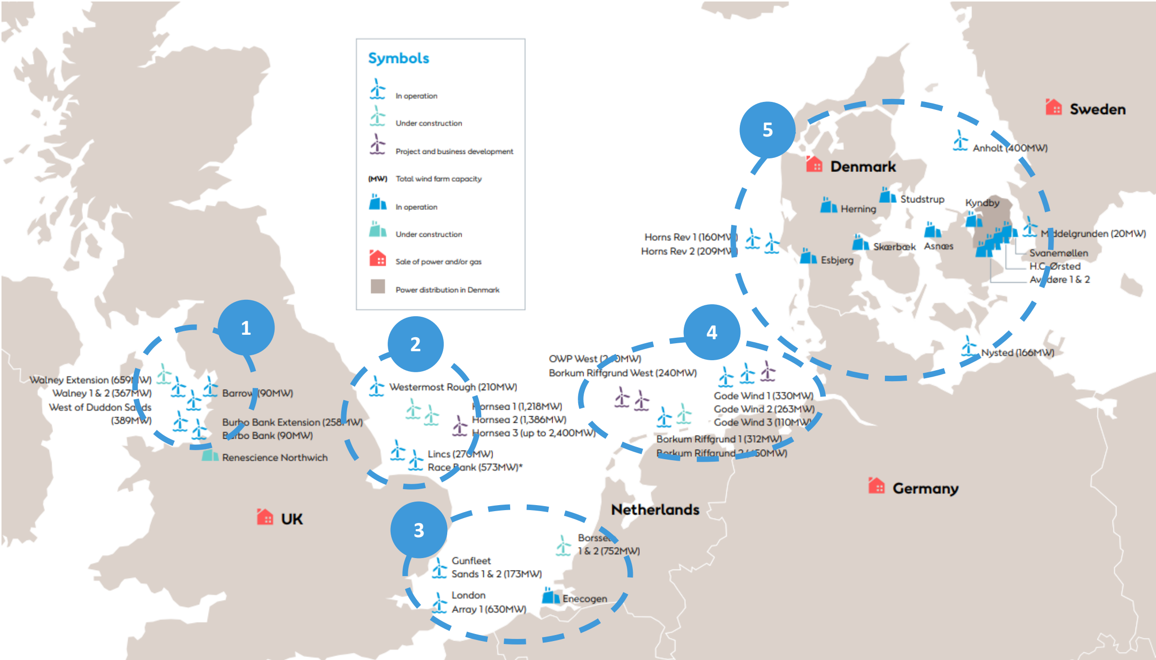
During the Development phase, Ørsted is engaged in activities like conducting feasibility studies, site assessments, environmental testing assessment, design studies, project development, licensing and financial services (Ørsted, 2016a). Assessing site conditions requires detailed surveys such as wind measurements and geotechnical surveys (Ibid.). During the late stages of the Development phase, the FID is made and determines whether to continue or terminate the project. If no FID is taken and the project cannot be divested, these expenses are considered sunk costs (Ibid.). The main activities to create value in the Development phase include know-how and IT tools. Thus, Ørsted has a sustained competitive advantage during the first step in the value chain.

4.2.1.2.2. Build

Following the end of the Development phase, the project transitions into the Build stage. This stage is the most demanding phase of a wind power project in terms of resources and costs (Ibid.). In this stage, Ørsted systematically divests 50% of its stake in the project around 12-24 months after the FID, as depicted in figure 34.

In terms of actual work in the Building phase, Ørsted works on the logistics, installation and design of wind farm with the goal of ensuring the highest yield at the lowest costs (Ibid.). In terms of logistics, Ørsted has a cluster approach to its site selection, which helps it to realise synergies when it takes sole responsibility for the operations. The cluster approach can thus ensure lower logistics costs, fewer technician hours with fewer facilities needed and lower inventory levels. Figure 35 depicts Ørsted's clusters.

Figure 35 – Ørsted’s Wind Farm Clusters



Source: Authors’ own creation from (Ørsted, 2017d)

The support activities during the Build phase includes supply chain optimisation, know-how, farm-down, procurement and technological development (vessels and turbines). Three out of the five support activities are characterised as having a sustained competitive advantage; hence, this stage has a sustained competitive advantage. If this was not the case, then Ørsted’s farm-down model would probably not have been successful as investors would have required too high of a return compared to Ørsted’s minimum return requirements in order to compensate for build risks.

4.2.1.2.3. Operate & Own

Despite divesting 50% of the project in the previous phase, Ørsted wants to remain in full control of the operation and maintenance (O&M) (Ørsted, 2016a). Hence, the project company signs an O&M agreement with Ørsted, typically defined by being a long-term contract of 15 years with a regular payment schedule (Ibid.) Ørsted typically assumes the majority of risk related to procurement, construction, cost overruns and delays (Ibid.). The Operate & Own phase is further comprised by PPAs between Ørsted and the project company, ensuring that Ørsted buys the power, making up for the divested 50%, and re-sells it in the market (Ibid.) This enables Ørsted to harvest portfolio synergies in power trading from its Trading division. The O&M agreement and PPA between the project company and Ørsted both contribute to Ørsted enhancing its profit margin while limiting risk and harvesting synergies from scale. Through the lens of an investor, these steps are consequently able to lower risk and complexity as it allows for a more passive ownership of the projects. The main activities to create value in the last phase include know-how, firm infrastructure and trading. Thus, Ørsted is assumed to have a competitive parity during the last step in the value chain.

Supply Chain Summary

The modified Porter's supply chain analysis has provided valuable insights into the internal capabilities of Ørsted. By divesting the oil & gas business, Ørsted has become leaner and is able to focus and funnel their know-how into offshore wind. Support activities—such as technology development, IT tools and an optimised supply chain—are means of sustainable competitive advantages as they set the agenda for Ørsted's daily operations. The farm-down model has served Ørsted well throughout the years as they are able to mitigate risks and improve their financial position; however, these are substitutable, making it a temporary competitive advantage. The primary activities that are proposed as the value chain of Ørsted, split into three parts are: Develop, Build and Operate & Own. The Development phase is considered a sustained competitive advantage. This is where Ørsted engages in activities prior to building; these include site assessments, design studies, project development, etc. The last part of the Development phase is also the phase of the FID. The Build phase is where the farm-down takes place, as well as building the actual wind farms and leveraging clusters to support lower costs. The Build phase is a sustained competitive advantage. The last part of the value chain is the Operate & Ownership phase, and it is the only phase in the value chain with a competitive parity. In this phase, Ørsted formulates and signs O&Ms and PPAs to ensure a continuous stream of revenues.

5. Financial Analysis of Ørsted

The main goal of this chapter is to look at how Ørsted has performed financially in recent years. It is important to perform a careful analysis of past performance before forecasting future cash flows (Koller et al., 2010). Financial reports from the last 10 years are used, as this period is assumed to be sufficiently long enough to show trends and business cycles (Petersen & Plenborg, 2012). Ørsted's income statement, balance sheet and cash flow statement can be found in Appendix 1, 2 and 3.

5.1. Financial Statement Analysis

Since the financial statements are not designed for valuation of Ørsted's operations, this section reformulates the financial statements. From the reformulations, net operating profit less adjusted taxes (NOPLAT) and invested capital (IC) can be calculated in order to determine return on invested capital (ROIC). The analytical income statements and balance sheets will be prepared, as described in Petersen & Plenborg (2012) and Koller et al. (2010).

Ørsted's financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS) (Ørsted, 2017a). However, Ørsted introduced a new business performance measure in their 2011 annual report (Ørsted, 2011). According to Ørsted, the business performance measure represents the underlying financial performance of the group and is adjusted for temporary fluctuations in the market value of contracts. Apart from this, there is no difference between business performance and the IFRS results (Ørsted, 2017a, p. 25). For these reasons, the business performance measure will be used.

Only a detailed description of Ørsted's financial statements is provided. A significant number of the items will not need any explanation as they are obviously connected to their respective classification. This section will offer argumentation when justification of the classification is more intricate.

5.1.1. Analytical Income Statement

The analytical income statement requires every accounting item to be classified as belonging to either operations or finance and exclude non-operating income and interest expenses (Petersen & Plenborg, 2012). When determining NOPLAT, it is essential to be consistent with the reformulation of the balance sheet, meaning that only the profit generated by invested capital is included (Koller et al., 2010). The analytical income statement can be found in Appendix 4.

Operating Leases

Ørsted is leasing some of their equipment instead of purchasing it (Ørsted, 2017a). Industries with heavy investment requirements often use operating leases (Koller et al., 2010). This leads to a distorted picture of the company's profitability and capital structure. When Ørsted chooses to lease its assets, it will have an artificially low operating profit because the related interest expense is included in the rental expenses (Ibid.). Interest expenses are a financing item and therefore should be added back to EBITA. Accordingly, taxes need to be adjusted so the interest tax shield is removed (Ibid.). Furthermore, the leased asset needs to be capitalised on the balance sheet, which is included in the next section on invested capital. Information about operating leases can be found in the footnotes in Ørsted's annual reports (Ørsted, 2017a). From 2012 onwards, Ørsted has provided a sufficient calculation of the present value of the operating leases. However, there is no information about the present value for earlier years. Thus, the asset value must be estimated (Koller et al., 2010).

$$\text{Asset Value}_{t-1} = \frac{\text{Rental Expense}_t}{k_d + \frac{1}{\text{Asset Life}}}$$

In 2012, 2013, 2014, 2015 and 2016, Ørsted uses 4.5% to discount their lease payments, and therefore this rate will be used to discount the previous years. By having the asset value for 2012 already calculated by Ørsted (2012), an implied asset lifetime can be found by reformulating the original equation seen above:

$$\text{Implied Asset Life} = \frac{\text{Asset Value}_{t-1}}{\text{Rental Expense} - k_d * \text{Asset Value}_{t-1}}$$

It turns out that the implied asset life for 2012 is 12.58, which is reasonable when looking at the notes since Ørsted had natural gas storage facilities in Germany until 2025 (Ørsted, 2012). As a comparison, the median asset life among 7,000 firms over 20 years was 10.9 years (Lim et al., 2003). EBITA will be adjusted with the implicit interest expense calculated below.

Table 2 – Implicit interest expense

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Lease Payment	6	55	87	850	529	414	401	354	545	753	746	885
Interest rate	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	3,5%
Median Asset Life	12,58	12,58	12,58	12,58	12,58	12,58	12,58	12,58	10,69	8,16	7,66	5,35
Asset Value	**442**	**699**	**6.828**	**4.249**	**3.326**	**3.221**	**2.844**	**3.933**	**4.495**	**4.248**	**3.986**	**6.095**
Implicit Interest	**20**	**31**	**307**	**191**	**150**	**145**	**128**	**153**	**217**	**219**	**194**	**234**

Source: Authors' own creation from Ørsted's annual reports from 2007-2017

Operating Cash Taxes on EBITA

The accounting item, tax on profit (loss) for the year, relates to operating as well as financing items. Since accounting practice does not distinguish between tax on operations and tax on financial items, there is a need to divide income tax expenses into tax on operations and tax on financing (Petersen & Plenborg, 2012). The tax on financing must be added back as they are not related to EBITA. This segregation is accomplished by estimating the tax shield from net financial expenses and the operating lease interest expense. This is done by multiplying each item by the Danish corporate tax rate of 22% to estimate the tax shield (KPMG, 2018). Finally, Koller et al. (2010) recommends using the cash taxes actually paid instead of the taxes reported. This is done by subtracting the increase in deferred tax liabilities from operating taxes on EBITA. From 2007-2011, Ørsted's deferred tax liabilities have been growing over time, so reported taxes overstate actual cash taxes and vice versa in the later years. When using cash taxes, deferred tax liabilities are treated as an equity equivalent, as seen in the analytical balance sheet in appendix 5.

Other items

<u>Share of profit (loss) in associates and joint ventures</u>: The classification of this item depends on whether the investments are considered to be part of the firm's core-business or not (Petersen & Plenborg, 2012). The item has been present all years, and a major part of it is related to Ørsted's core business (Ørsted, 2017a). Therefore, it is included in NOPLAT and will be a part of invested capital.

<u>Gain on divestment of enterprises:</u> This item relates to Ørsted's divestment of non-core businesses. It is related to Ørsted's divestment of their oil & gas business. In 2016, the post consisted primarily of a gain on the divestment of Gas Distribution to Energinet (Ørsted, 2016c). This item is excluded from NOPLAT, and the related receivable from the divestment must be considered as a financial item in the analytical balance sheet. This way, Ørsted's profitability is not impacted by single divestments.

5.1.2. Analytical Balance Sheet

The reformulation of the balance sheet leads to the invested capital, which represents the total capital needed to fund operations (Petersen & Plenborg, 2012). The analytical balance sheet can be found in Appendix 5 and summarised in Appendix 6.

$$\text{Operating Assets} - \text{Operating Liabilities} = \text{Invested Capital} = \text{Debt} + \text{Equity}$$

Hybrid Capital (HC)

The HC that was issued by Ørsted in January of 2011 was classified as 100% equity by the rating agencies (Ørsted, 2016a). HC is treated as less important than other debt and features characteristics of both debt and equity (Koller et al, 2010). Ørsted chose this type of financing as part of their mix with credit ratings in mind, as a higher level of HC was translated into a higher credit rating, meaning a higher solvency ratio (Ørsted, 2016a). Recently, however, the rating agencies have changed their definition of HC, classifying the old HC as debt rather than 100% equity, putting pressure on the credit ratings (Ibid.). This meant that, in July 2013, Ørsted had to exchange their former HC and issue new HC (Ibid.). As described, the old HC was classified as 100% equity. However, the new HC was classified with a 50% weighting on equity and 50% debt. In order to achieve investment grade credit ratings of BBB+, a DKK 13bn. equity injection was made in 2014 to increase the equity portion in the capital structure (Ibid.). The reformulated balance sheet accounts for the 50/50 split as classified by the credit rating agencies by adjusting the debt up by half of the hybrid capital and the equity down by 50%. For the above reasons, it is important to be aware of the impact of HC when comparing Ørsted to its competitors.

Operating leases

The operating leases must be capitalised as part of invested capital and as a debt-equivalent liability (Petersen & Plenborg, 2012). Ørsted's debt is increased by the earlier calculated asset value associated with the operating leases. To ensure consistency, it is important when calculating cost of capital that the operating lease is included in the estimation of debt.

Cash and cash equivalent

Ørsted holds a relatively large amount of cash, which cannot be considered a part of their operating asset (Koller et al., 2010). However, a proportion is assumed to be working cash as Ørsted needs cash for daily operations and collateral. Ørsted does not disclose which part of their cash is operating cash and which part is excess cash. Koller et al. (2010) estimates that 2% of revenue is a good estimation for working cash. Plenborg & Petersen (2012) argues that if the cash position remains stable across time, it seems fair to treat cash and cash equivalents as excess cash. Ørsted's cash holding is fairly stable from 2010-2017. Therefore, 1% of revenue is assumed to be working cash. The residual excess cash will be classified as a financial, interest-bearing asset.

Other items

Investments in associates: The item is treated as operating since the corresponding item "Share of profit (loss) in associates and joint ventures" is classified as operating in the income statement.

Gain on divestment of enterprises: As mentioned in the analytical income statement, the item is classified as a non-core item and therefore the relating receivable must be a financing item.

Asset held for sale Ørsted classifies "assets held for sale" and the associated liabilities as separate items in the balance sheet. The items are instead classified as financial items, as the disposal of those assets will reduce Ørsted's borrowings or increase their cash holding. Therefore, they are excluded from operating working capital and treated as part of financing.

5.2. Historical Financial Statement Analysis

The reformulation of the financial statements has provided a clean measure of invested capital and its related NOPLAT. Before determining whether ROIC is at a satisfactory level or not, WACC needs to be estimated. WACC is the required rate of return on invested capital. Subtracting ROIC from WACC yields economic value added (EVA), which shows whether Ørsted, from a financial perspective, has a sustainable competitive advantage (Plenborg & Petersen 2012).

5.2.1. Cost of capital

This section will calculate the WACC and compare the values to Ørsted's peers, though these are rarely truly comparable. Their values will be used to sanity check the calculated estimates for Ørsted.

5.2.1.1. Capital Structure

When computing weights for debt, equity and preferred stock, there are two options. Generally, it is preferable to estimate market values for each component and compute weights instead of using the book values from the financial statements (Damodaran, 2012). This is because WACC is a forward-looking measure and captures the cost of raising new funds to finance projects (Ibid.). The market value of equity is calculated as the number of shares outstanding times the current stock price. As of March 31st, the market cap of Ørsted was DKK 164,789m., which equals the market value of equity for Ørsted (Ørsted, 2018e). The market value of debt is usually more difficult to obtain directly since few companies have all of their debt in the form of bonds outstanding trading in the market (Damodaran, 2012). However, Ørsted has most of its debt outstanding in the form of bonds (Ørsted, 2017a). The market value of their bond amounted to DKK 32,959m. and their bank debt to DKK 2,108m. on 31 December 2017 (Ibid.). This gives a total of DKK 35,067m. as the market value of debt. The present value of Ørsted's operating lease commitments needs to be added to this amount. This present value is computed by discounting the lease commitment each year at the pre-tax cost of debt for Ørsted. The present value of lease commitments is DKK 6,095m.

As stated earlier, 50% of Ørsted's HC is defined as belonging to debt, which needs be added to the market value of debt. This gives a total market value of debt of DKK 47,782m. Accordingly, Ørsted's debt-to-equity (D/E) ratio, based on market values, is 29%, which equals 78% equity (MVE) and 22% debt (MVD) in the WACC-calculation. The question is whether or not a D/E of 29% represents Ørsted's target capital structure. In their annual reports, Ørsted does not disclose any information regarding their target capital structure in terms of D/E, but they do disclose that their long-term target is for funds from operations (FFO) to be around 30% of the adjusted interest-bearing net debt (Ørsted, 2017a). Currently, the ratio is at 50.3%, so the question is whether Ørsted will achieve this goal by lowering their debt or by increasing their profit margins? According to Koller et al. (2010), the capital structure of Ørsted should be compared to their peers' average capital structure, as Ørsted's capital structure should converge towards an industry average. Ørsted will likely have a high portion of equity compared to debt in their target capital structure because of their previous problems with their credit rating and use of HC. To ensure consistency, the capital structure used when computing the beta will also be used as Ørsted's target capital structure.

5.2.1.2. Risk-free rate

Ørsted's cash flows are denominated in DKK and to avoid issues such as inflation, the local Danish government bond is used as the risk-free rate (Plenborg & Petersen 2012). The duration of the Danish government needs to match the duration of the forecasted cash flows (Damodaran, 2012). For this reason, the current 10-year Danish government bond is chosen as the best proxy for the current risk-free rate. The current yield on the bond is 0.5% as of March 31st, 2018, according to Bloomberg. As mentioned in the economical part of the PESTEL, there has been a general reduction in government bond yields across Europe due to QE. It is questionable whether the risk-free rate will remain at this low level going forward. The consequence of applying a low risk-free rate is that it will result in a lower WACC, which, all else being equal, creates a higher valuation (Damodaran, 2012). Ernst & Young (2015) advises using an average government yield over a selected period. Hence, it was decided to use the 10-year historical average of the 10-year Danish government bond as a proxy for a normalised risk-free rate. The 10-year historical average of the 10-year Danish government bond is calculated to 1.95%. In comparison, Fernandez et al. (2017) reports in his survey of 4,368 answers from professionals, that the average risk-free rate in Denmark is 1.6% and the median is 1.9%. Thus, 1.95% seems to be fair and will be the risk-free rate when calculating the cost of equity.

5.2.1.3. Beta

The estimation of the beta is one of the most critical parts in the process of risk adjusting the discount rate to market risk. Furthermore, it is the only factor in the CAPM formula that is company specific. If Ørsted's current capital structure of 78% equity and 22% debt turns out to also be the target capital structure, then the WACC will be highly sensitive to the beta value (Damodaran, 2012).

To account for Ørsted's divestments of oil & gas and its current mix of businesses, a bottom-up beta approach is chosen. To ensure consistency, all the data used below is found through the same external source: Bloomberg. Bloomberg reports both an adjusted and a raw beta. The adjusted beta assumes that the beta of a company converges to the market average of one. The strategic analysis highlighted that the offshore wind industry is expanding rapidly and is not sensitive to the general economy. Therefore, the raw beta will be used instead of the adjusted beta. The raw beta is the slope of the regression of the company's stock return against the market index. The raw beta reflects the company's levered beta. To account for company-specific financial leverage, the levered beta must be unlevered (Damodaran, 2012). The average unlevered beta is estimated for each of Ørsted's divisions. This is done by finding peers that are similar to Ørsted's Wind Power, Distribution and Customer Solutions, and Bioenergy and Thermal division. Only two peers are identical to the Bioenergy and Thermal division: Drax and Enea. For the other two divisions, there are sufficient comparable companies.

With the peers defined, the average levered beta, corporate tax rate and median D/E ratio are computed for each business. Alternatively, the levered beta could be unlevered for each company and an average could be taken but, given the standard errors of the individual regression betas, it will give a noisy beta (Damodaran, 2012). According to Damodaran (2012) the unlevered betas need to be adjusted for cash because investment in cash and marketable securities have a beta that is close to zero:

$$\text{Beta unlevered, corrected for Cash} = \frac{\text{Beta unlevered}}{1 - \frac{\text{Cash}}{\text{Enterprise Value}}}$$

The total unlevered beta for Ørsted is calculated by taking a weighted average of the unlevered betas based on Ørsted's EBITDA segmentation. Finally, the unlevered beta needs to be re-levered to reflect Ørsted's market capital structure.

$$\text{Beta levered} = \text{Beta unlevered} * \left(1 + (1 - \text{Tax}) * \frac{\text{D}}{\text{E}}\right)$$

As mentioned previously, the capital structure used to re-lever the beta should also be the target capital structure for Ørsted. None of the median capital structures from the peers reflect Ørsted's capital structure. Ørsted has a much lower debt compared to its peers and will likely not issue more debt with their goal of having a 30% FFO to adjusted net debt. Moreover, Ørsted is planning to increase its dividend by a high single-digit rate compared to the dividends for the previous year up until 2020, reflecting that they are satisfied with their current capital structure (Ørsted, 2017a). As a result, Ørsted's current capital structure is assumed to be their target capital structure. Hence, it is used to re-lever the unlevered beta and to calculate the WACC. The calculated bottom-up beta for Ørsted is 0.67.

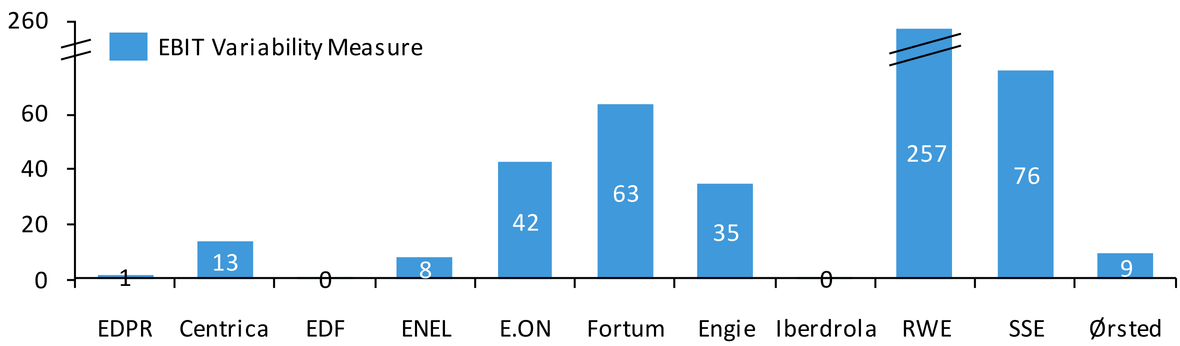
Table 3 – Calculation of Beta

Business	Number of Peers	Average Levered Beta	Median MVD/MVE	Tax	Unlevered Beta	Cash/Firm Value	Unlevered Beta Corrected for Cash	EBITDA Weight
Wind Power	10	0,8	86%	24%	0,49	11%	0,55	90%
Distribution	7	0,9	91%	23%	0,51	4%	0,53	9%
Bioenergy & Thermal	2	0,5	108%	20%	0,26	19%	0,32	1%
Weighted Unlevered Beta	0,55							
Ørsted's Capital Structure	29%							
Ørsted's Relevered Beta	**0,67**							

Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

The beta of 0.67 reflects that investing in Ørsted's stock involves less systematic risk than investing in the market portfolio (Damodaran, 2012). Stocks with a beta that is less than one generally moves more independently than the broader market, confirming that the energy sector is not perfectly correlated with the general economy, as energy is almost always in demand. From a theoretical point of view, this is counterintuitive. The industries in which Ørsted operates in are all asset heavy and capital intensive. Subsequently, Ørsted's investment in fixed costs is large compared to operational costs, which implies high operating leverage. High operating leverage corresponds to high betas under normal circumstances (Ibid.). Ørsted's operating leverage can be measured by the EBIT variability measure (Ibid.). The measure takes each year's change in EBIT and divides it by the change in revenue. Hence, the measure shows how quickly EBIT changes with revenue. The higher the number, the greater the operating leverage. Figure 36 shows that Ørsted has operating leverage at the lower levels compared to the peers. Coupled with Ørsted's low financial leverage, Ørsted's beta should be in the lower end compared to its peers. This is the case with the found beta of 0.67. The average EBIT variability measure among all the peers is 45.84; as a reference point, the average across entertainment companies is 1.35 (Damodaran, 2012).

Figure 36 – Ørsted and competitors' EBIT Variability Measure



Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

Ørsted's beta of 0.67 must be a reflection of the subsidising governments bearing a large portion of the risk related to the investments. With the risk of no subsidies, Ørsted will bear all the risk associated with building offshore wind farms. In relation to this, Martin Neubert, the newly appointed head of Ørsted's Wind department, commented:

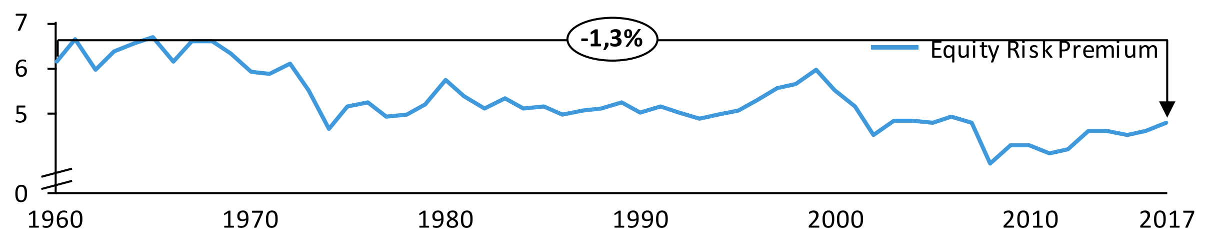
"It is an unfair distribution of risk that no one can control or assess … Ørsted may opt to build projects if the risk becomes too large … it is good for the politicians who then can say that it is not them who are taking the risk" (Børsen, 2018b. l. 3-15).

His comment reflects the riskiness of offshore wind and that the found beta of 0.67 is a function of government support. The question is whether the beta should be based on theoretical correctness or beliefs about the development in subsidies. This stressed the importance of using market values when computing a beta. The market value of equity, a function of the share price times number of shares outstanding, reflects the market's expectations to Ørsted's future cash flows. The share price is up around 45% year-to-date (see figure 1) reflecting that investors are not nervous about the zero subsidies. Therefore, the WACC calculation will be based on a beta of 0.67.

5.2.1.4. Equity Risk Premium

The equity risk premium is the spread between historical returns and returns on the market portfolio and risk-free investments (Damodaran, 2012). As mentioned in the theoretical review, the implied equity risk premium will be used. The implied valuation approach requires estimating the equity and earnings in future periods, solving backwards for the implied cost of equity (Ibid.). The drawback of this method is that it relies on significant assumptions about future growth and return on capital and, thus is very sensitive to these inputs. However, it is the method that best reflects the equity risk premium investors are actually paying. Figure 37 shows how the measure has changed since 1960. According to Damodaran (2017) the current ERP is 4.95%. In comparison, Fernandez et al. (2017), using the survey approach, reports an average ERP for Denmark as 4.5% for 2017. Thus, 4.95% will be the ERP when calculating cost of equity. Denmark is assumed to reflect the total geographical equity risk premium as the credit ratings for the countries that Ørsted operates within are identical (Damodaran, 2018). However, if Ørsted seeks more businesses in, e.g., Taiwan, it could have a slightly negative impact on their ERP, making WACC higher.

Figure 37 – Equity Risk Premium

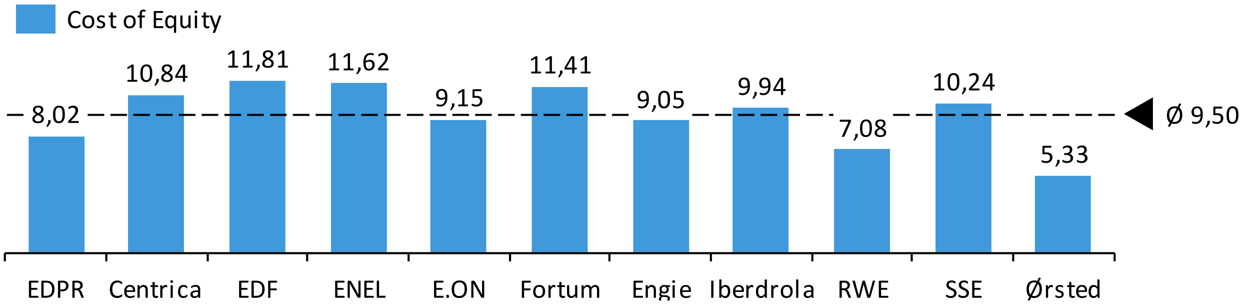


Source: Authors' own creation from (Damodaran, 2017)

5.2.1.5. Cost of Equity

Plenborg & Petersen (2012) argues that for smaller and less liquid stocks, an additional risk premium should be added to compensate for smaller stocks being more volatile. Due to the size of Ørsted and the volume in their stock, no company-specific liquidity or risk premiums are added. With the risk-free rate of 1.95%, beta of 0.67, and the market risk premium of 4.95%, the cost of equity is equal to 5.33%. As a rule of thumb, the cost of equity is normally 3-4% above the risk-free rate, which is also the case here (Vibig et al., 2008). In comparison, figure 38 shows the cost of equity for Ørsted's peers. Due to the low beta, the cost of equity for Ørsted is the lowest among the companies.

Figure 38 – Ørsted and competitors' cost of equity



Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

5.2.1.6. Cost of Debt

From the 2017 annual report, it can be found that Ørsted's weighted average effective interest rate for general borrowing was 5.3% in 2017 (Ørsted, 2017a, p. 127). This represents the current cost of borrowing for Ørsted. However, looking at the historical borrowing rate, the 2017 rate is higher than previous years. For this reason, the rate will be challenged with more theoretical correct approaches to calculate the cost of debt (Damodaran, 2012).

Ørsted's yield to maturity on its outstanding bonds can be used to determine the cost of debt (Ibid.). According to Bloomberg, the current yield to maturity for a bond maturing in 2032 is 3.97%. However, according to Koller et al. (2010), when the credit rating is low, the yield to maturity is a poor proxy for the cost of debt. Another approach is to look at Ørsted's credit rating and default spread. Bloomberg reports that the Moody's credit rating on Ørsted is Baa1, while Standard & Poor's has a rating of BBB+. This is at the bottom of the investment grade, reflecting that there is a default risk in investing in bonds issued by Ørsted. Standard & Poor's define the rating as:

"... exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to weaken the obligor's capacity to meet its financial commitments on the obligation" (S&P, 2018, table 1).

The credit rating translates into a credit spread of 1.27%, which gives a pre-tax cost of debt of 3.07% (Damodaran, 2012). This is at the lower end of the spectrum compared to Ørsted's historical borrowing rates and the yield to maturity. When discounting operating leases, the discount rate used is the pre-tax cost of debt (Ibid.). Ørsted reports that it used 3.5% in 2017 and 4.5% in earlier years to discount its lease payments (Ørsted, 2017a). These values are in line with the other calculated values. Lastly, a synthetic rating can be estimated from Ørsted's interest coverage ratio (Damodaran, 2012). However, according to Damodaran (2012) the formula needs to be adjusted to include Ørsted's use of operating leases:

$$\text{Modified Interest Coverage Ratio} = \frac{\text{EBIT} + \text{Operating Lease Expense}_{t0}}{\text{Interest Expenses} + \text{Operating Lease Expense}_{t0}}$$

Table 4 – Modified Interest Coverage Ratio

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Modified interest coverage ratio	2,14	1,98	0,94	1,60	1,00	-0,65	0,30	-0,13	-0,61	1,49	2,98
Corresponding Credit Rating	Ba2/BB	B1/B+	Caa/CCC	B2/B	Caa/CCC	D2/D	C2/C	D2/D	D2/D	B3/B-	Baa2/BBB
Spread	2,38%	2,98%	8,64%	3,57%	8,64%	18,60%	13,95%	18,60%	18,60%	4,37%	1,27%
Risk Free rate	1,95%	1,95%	1,95%	1,95%	1,95%	1,95%	1,95%	1,95%	1,95%	1,95%	1,95%
Pre-tax cost of debt	4,33%	4,93%	10,59%	5,52%	10,59%	20,55%	15,90%	20,55%	20,55%	6,32%	3,22%

Source: Authors' own creation from Ørsted's annual reports from 2007-2017

Table 4 illustrates Ørsted's problem with its credit rating and why it needed to issue hybrid capital in order to borrow debt at a reasonable rate. Particularly in the years from 2012-2015, the credit rating is characterised as extremely speculative with very high credit risk. However, the ratio did become better in 2016-2017 and it is currently at investment grade. The value for 2017 is 3.22% and corresponds to a BBB rating, which is close to the official rating. The table below summarises the findings and an average of these values is used as the pre-tax cost of debt.

Table 5 – Cost of Debt

Historical rate	Bond YTM	Default Spread	Lease (kd)	Modified ICR	Average
5,30%	3,97%	3,07%	3,50%	3,22%	3,81%

Source: Authors' own creation

The final input needed to estimate the cost of debt is the tax rate. The Danish corporate tax rate is 22% and preferred over the effective tax rate since it can fluctuate over time (Koller et al, 2010; KPMG, 2018). The Danish tax rate is also close to the EU average of 21.29%, which is important due to Ørsted's European operations (KPMG, 2018). This results in an after-tax cost of debt of 3%.

5.2.1.7. WACC

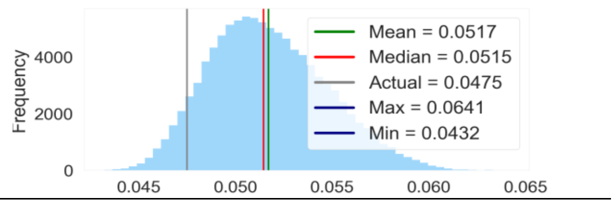
After estimating all the inputs, the last step is to calculate the WACC. The WACC is equal to 4.75%, which reflects the low beta. According to Morgan Stanley, the most troublesome aspect of the calculation is holding the WACC constant when the leverage ratio changes throughout the year (Vibig et al., 2008). Therefore, they prefer to use a single measure that represents the average of all the individual annual WACCs (Ibid.). To test whether the found WACC is a realistic long-term WACC, a Monte Carlo simulation is done with 100.000 simulations. The input variables are seen in table 6. With rising interest rates, the risk-free rate will not be lower anytime soon, hence the minimum and most likely are the same. The beta range is based on the bottom-up calculation. Given the confidence of the beta calculation, the beta will not be much lower. The maximum beta is inspired by Ørsted's peers and with the use of the accounting beta approach, it is adjusted downwards to reflect Ørsted's lower operating and financial leverage (Damodaran, 2012). The range for cost of debt reflects the previously defined range.

Table 6 – WACC assumptions

WACC Assumptions	Min	Most likely	Max
Risk free rate	1.95%	1.95%	2.50%
Beta	0.6	0.67	0.9
MRP	4.50%	4.95%	5.50%
Cost of debt	3.70%	3.81%	5.30%

Source: Authors' own creation

Figure 39 – WACC Monte Carlo

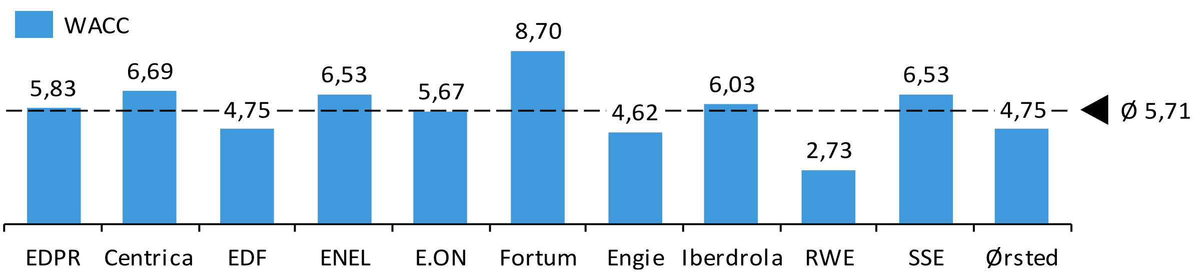


Source: Authors' own creation with Python

The distribution in figure 39 shows that 4.75% is at the lower end of the distribution. This a function of not believing that the beta will be much lower than 0.6 and with a max of 0.9, skewing the WACC to the right. The most extreme events are a minimum WACC of 4.3% and a maximum WACC of 6.4%, which are realistic scenarios due to the nature of the triangular distribution. Having stored the variables for each simulation, the sensitivity for each input can be measured. Each variable regressed against WACC clearly shows the beta's influence on the WACC (Appendix 14). Hence, having a carefully researched beta is important.

It can be discussed whether WACC should be higher. In a recent conference call regarding Ørsted's zero subsidy win at a German auction, Ørsted commented that their WACC for a zero-subsidy project is 2.5% higher than their normal WACC for wind power projects (Ørsted, 2017f, p. 5). If Ørsted should win more zero-subsidy auctions, the 4.75% WACC is arguably too low. However, Ørsted withdrew from the auction in the Netherlands, reflecting they carefully assessed the earnings spread over WACC (Reuters, 2017b). Furthermore, Ørsted's farm-down model allows them to diversify faster into a larger number of projects, which reduces the relative exposure of Ørsted's cash flows to the contribution of one single project. With this advantage, Ørsted's WACC should be at the lower end compared to their peers. Ørsted's WACC of 4.75% seems reasonable compared to the peers with a median WACC of 5.83%. Therefore, a WACC of 4.75% (beta of 0.67) is used with the acknowledgement that it could be in the lower spectrum of Ørsted's real WACC. The potential weakness and consequence of this choice will be accounted for when performing Monte Carlo simulations of the DCF.

Figure 40 – Ørsted and competitors' WACC



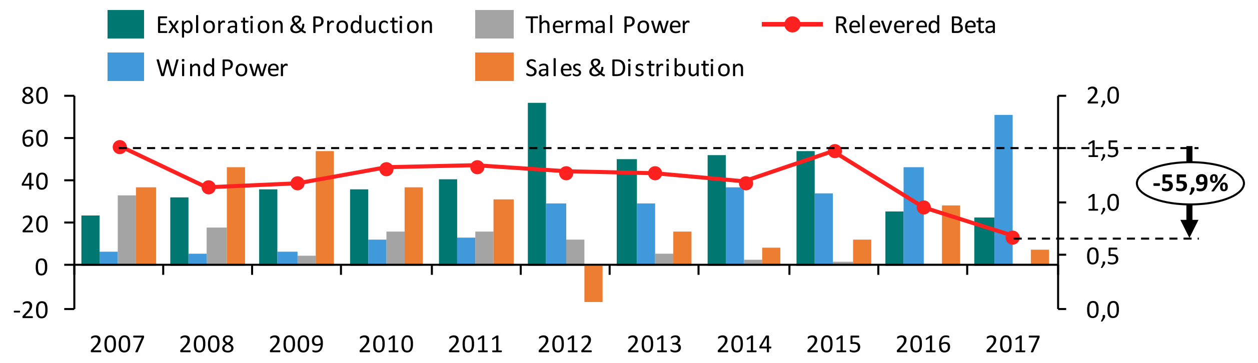
Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

5.2.1.8. Historical WACC

The historical WACC calculation is slightly modified to the WACC used for discounting future cash flows. The historical WACC reflects Ørsted's historical business mix, where the division Exploration and Production of oil & gas was included. Furthermore, Ørsted had businesses in Norway, also reflecting different geographical risks (Ørsted, 2010a). However, all of the countries Ørsted has historically operated in have the same credit ratings, reflecting that the implied historical equity risk premium from Denmark is covering the geographical risk (Damodaran, 2018). Ørsted was a private company until the IPO in 2016, so the market values for equity and debt had to be estimated from peers' capital structure (Damodaran, 2012).

The historical WACC shown in Appendix 15, is higher than the current, which is a result of a higher risk-free rate but also a higher unlevered beta. In the early years, the Power division, accounting for Wind Power and Thermal Power, had a significantly higher beta, which corresponds to higher operational risk. This is a reflection of offshore wind not being a truly global mainstream generation source due to its high LCoE compared to fossil fuels. Investors at this time required a higher compensation when investing in Ørsted. The lower beta in the later years is a product of renewable energy becoming an important energy source in many of the European countries and governments starting to support the renewable companies through subsidies, which lowers the risk for investors. The current WACC, representing the risk for investors going forward, of 4.75% is a natural extension of the trend seen over the years. Figure 41 shows how the beta has changed historically with an increasingly higher portion of EBITDA stemming from Wind Power. From 2007 the beta has decreased c. 56%.

Figure 41 – Historical WACC – EBITDA for each business with the relevered beta



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

5.2.2. ROIC

In order to get the most meaningful insights and information about whether Ørsted's success can be accredited to the industry only or to the company itself, Ørsted's financial performance is again compared to its closest peers. The financial analysis will follow the well-known DuPont model (Petersen & Plenborg, 2012).

From the reformulation of the income statement and the balance sheet, NOPLAT and invested capital were determined, respectively. Dividing those two numbers yields ROIC. The calculation of invested capital is based on the average capital to reflect the fact that NOPLAT is earned during the course of the year, while the balance sheet reflects a point in time (Ibid.).

Table 7 – Ørsted's historical ROIC

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
NOPLAT	5.784	7.133	4.309	6.939	5.054	-4.961	3.574	2.070	4.126	12.200	14.901
Invested capital incl. Goodwill	60.757	74.034	84.198	88.290	98.462	91.948	87.358	75.064	66.357	66.628	78.301
Average		67.395	79.116	86.244	93.376	95.205	89.653	81.211	70.711	66.493	72.465
Invested capital excl. Goodwill	60.435	73.587	83.535	87.639	98.089	91.458	86.867	74.783	66.232	66.503	78.176
Average		67.011	78.561	85.587	92.864	94.773	89.163	80.825	70.508	66.368	72.340
ROIC incl Goodwill		10,58%	5,45%	8,05%	5,41%	-5,21%	3,99%	2,55%	5,84%	18,35%	20,56%
ROIC excl Goodwill		10,64%	5,48%	8,11%	5,44%	-5,23%	4,01%	2,56%	5,85%	18,38%	20,60%

Source: Authors' own creation from Ørsted's annual reports from 2007-2017

The difference between ROIC with and without goodwill is insignificant, meaning the operating performance is not distorted by price premiums paid for acquisitions (Koller et al., 2010). Ørsted's ROIC was declining from 2008-2014. In 2012, Ørsted had invested heavily in new business areas, especially in offshore wind and oil and gas production (Ørsted, 2012). Earnings from the investments would not materialise until the new plants were in operation. At the same time, the Energy Markets division, which is part of the original business, saw a substantial reduction in its earnings due to oversupply and low margins in the European gas market (Ibid.). Ørsted had to recognise major impairment losses on its gas-fired power stations in 2012 (Ibid.).

The negative ROIC of -5.21% in 2012 corresponds to losing 5.21 cents for each euro invested (Petersen & Plenborg, 2012). The poor performance resulted in a credit downgrade from Standard & Poor's with a negative outlook (Rigsrevisionen, 2016). A further downgrade to BBB- or Baa3 was possible, which would mean Ørsted should pay around DKK 15.7bn. back to loan providers (Ibid). Rigsrevisionen (2016) reported that Ørsted's debt compared to their earnings were at the maximum limit; it was exceeded in 2012 and their increasing investment rate in offshore wind raised concerns. To improve the capital structure, Ørsted issued hybrid capital, which was recognised as 100% equity, but Standard & Poor's later changed it to a 50% equity and debt (Ibid.). Ørsted also considered a capital injection in a subsidiary named Project Red, which would be responsible for all investments in offshore wind (Ibid.). A subsidiary only focusing on offshore wind was considered too risky and instead remained a part of Ørsted's core business (Ibid.). Ørsted announced an action plan in 2012, where the goal was to cut costs by DKK 1bn., divest non-core activities to a value of DKK 10bn., and restructure loss-making activities in the gas market (Ibid.).

When analysing Ørsted's performance from 2007 and 2014, it can be discussed whether the price Goldman Sachs paid for an 18% stake of Ørsted was too low. Using historical performance as predictors for the future ROIC, Ørsted could be considered a risky investment if it was not for the government's support. In general, a median ROIC of 5.64% throughout the years indicates poor performance and an inefficient use of invested capital. It must be kept in mind that Ørsted was going through a costly transformation with the goal of earning a better ROIC with its new strong focus on offshore wind. They accomplished this in 2016 and 2017 with a two-digit ROIC, primarily driven by offshore wind (see table 7).

To get a better understanding of how Ørsted is utilising its invested capital compared to NOPLAT, return on incremental invested capital (ROIIC) can be computed (Mauboussin & Callahan, 2018):

$$\mathrm{ROIIC} = \frac{\mathrm{NOPAT}_{t1} - \mathrm{NOPAT}_{t0}}{\text{Invested capital}_{t1} - \text{Invested capital}_{t0}}$$

It is important to mention that ROIIC is not an economic measure and should not be compared to WACC (Ibid.). ROIIC clearly demonstrates that the years 2009, 2011 and 2012 were troublesome (see table 8). In these years, Ørsted was increasing its invested capital without increasing its NOPLAT, meaning they were not using the invested capital in a profitable way. The years 2013, 2015 and 2016 should be disregarded as the negative ROIIC is due to a negative change in invested capital, not a decreased NOPLAT. This is positive, meaning that Ørsted increased their NOPLAT while decreasing their invested capital. This can be viewed as Ørsted making its business more efficient and cutting costs in order to be an efficient company around its IPO. In the year 2017, they increased their invested capital as well as their NOPLAT. In other words, their current investments in offshore wind started paying off.

Table 8 – ROIIC

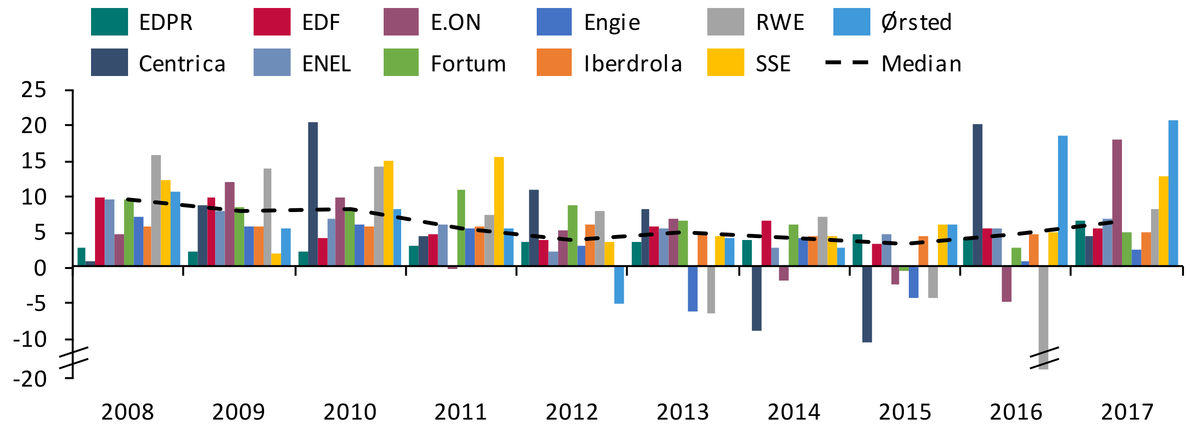
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
NOPLAT	5.784	7.133	4.309	6.939	5.054	-4.961	3.574	2.070	4.126	12.200	14.901
Average Invested Capital		67.395	79.116	86.244	93.376	95.205	89.653	81.211	70.711	66.493	72.465
Incremental NOPLAT		1.349	-2.825	2.630	-1.885	-10.015	8.535	-1.504	2.056	8.073	2.702
Incremental average invested capital			11.721	7.128	7.132	1.829	-5.552	-8.442	-10.500	-4.218	5.972
ROIIC			-24%	37%	-26%	-548%	-154%	18%	-20%	-191%	45%

Source: Authors' own creation from Ørsted's annual reports from 2007-2017

The question is whether Ørsted's low ROIC throughout these years is company specific or a general trend in the industry. To answer this question, Ørsted's ROIC is compared to its closest peers. ROIC without goodwill is used as it is not distorted by the price premiums paid for acquisitions and is therefore a better measure of the underlying operating performance.

Figure 42 displays that Ørsted is not outperforming its peers, but, at the same time, it is not underperforming the median ROIC. Besides 2012, Ørsted is performing with the industry, indicating that the renewable industry has not performed well. The median ROIC from 2012-2015 is at an all-time low due to the companies' heavy investments in renewable energy. The peers' median EBITDA-margin is also significantly lower in those years. None of the companies are outperforming or being the industry leader. In the later years, 2016 and 2017, Ørsted is starting to outperform its competitors with its 20.6% ROIC, excluding goodwill.

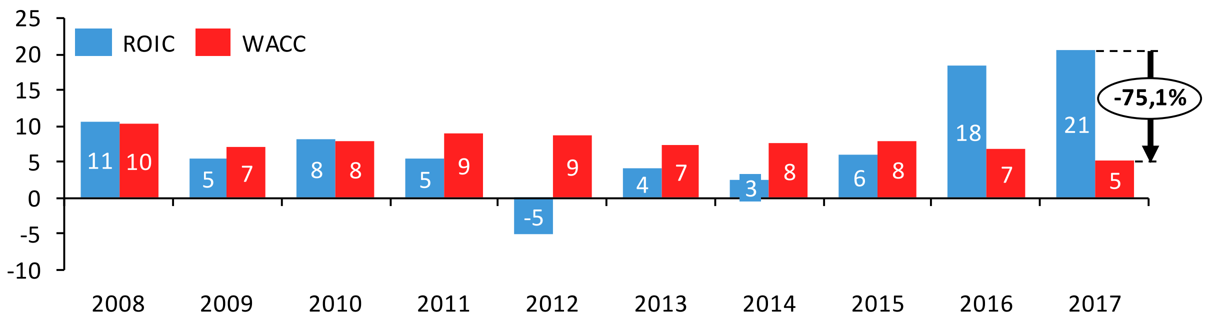
Figure 42 – Ørsted and competitors' ROIC



Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

To interpret whether Ørsted's ROIC is at a satisfactory level or not, it can be compared to the WACC (Petersen & Plenborg, 2012). When Ørsted produces an ROIC higher than the WACC, Ørsted creates value with its investment and thus has a competitive advantage (Ibid.). Figure 43 shows that Ørsted's ROIC is less than WACC in all years except 2016 and 2017, indicating Ørsted was destroying value. Rigsrevisionen (2016) also commented in their review of Ørsted's business in the period 2007 to the third quarter of 2012 that Ørsted's *"… earnings were not sufficient to secure a "positive direct return" covering the cost of capital"* (Rigsrevisionen, 2016, p. 11).

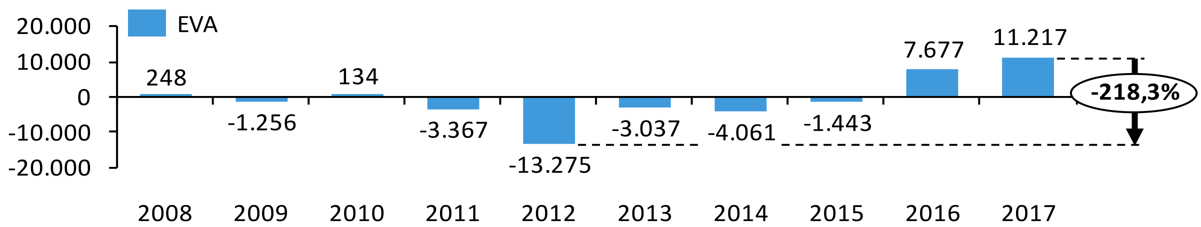
Figure 43 – Ørsted's ROIC and WACC



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

Subtracting WACC from ROIC and multiplying by invested capital leaves the economic value added (EVA) (Petersen & Plenborg, 2012). In figure 44, Ørsted's EVA over the historical period is displayed. Except for 2016-2017, Ørsted is not able to create value with the funds invested into the operations.

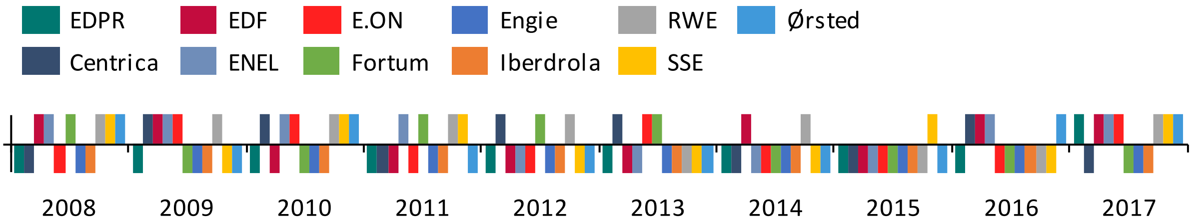
Figure 44 – Ørsted's EVA



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

Compared to the industry, none of the peers were performing better than Ørsted. A variable of 1 or -1 is assigned depending on whether the EVA is positive or negative. In the years 2012-2015, most of the peers are destroying value with their investments.

Figure 45 – Ørsted and competitors' EVA



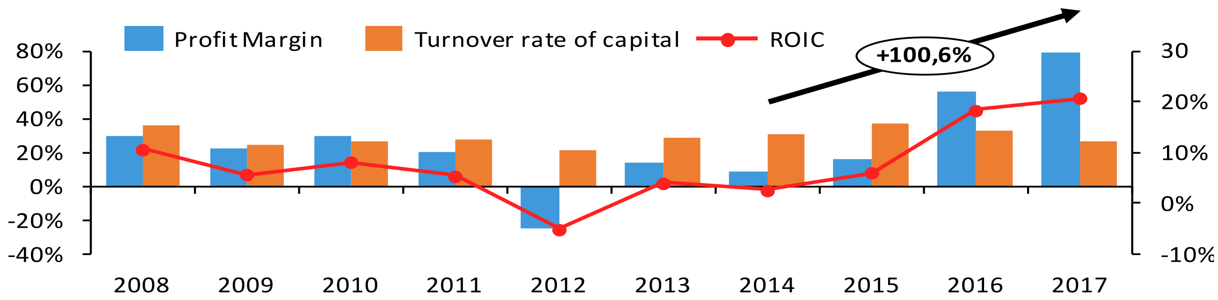
Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

5.2.2.1. Decomposition of ROIC

ROIC is not able to explain whether performance is driven by a revenue and expense relation or by optimisation of capital turnover (Petersen & Plenborg, 2012). To be able to answer this question, it is necessary to decompose the ratio into the profit margin and the turnover rate of invested capital (Ibid.). The equation presented below is, according to Koller et al. (2010), one of the most powerful equations in financial analysis:

$$\text{ROIC} = \text{Profit Margin} * \text{Turnover rate of invested capital}$$

Figure 46 – Decomposition of ROIC

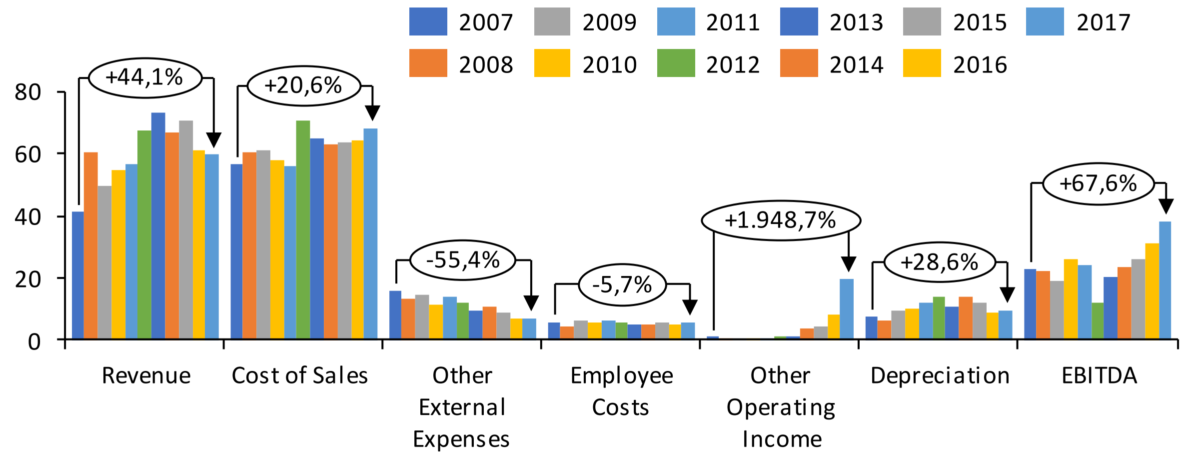


Source: Authors' own creation from Ørsted's annual reports from 2007-2017

The decomposition of ROIC reveals that Ørsted's ROIC is almost purely driven by the profit margin. In other words, the improvement of expenses relative to revenue. The ROIC in the earlier years has been impaired by the low profit margin. The turnover rate of invested capital remains relatively stable over the years. The turnover rate is 26% in 2017, indicating that Ørsted's invested capital is tied up for 380 days. This is not surprising, though, as Ørsted is operating in an industry with large capital expenditures and fixed costs. However, with Ørsted's heavy investments throughout the years, the turnover rate of invested capital should be decreasing and impacting ROIC negatively. Ørsted has made divestments in both operating and non-operating assets to release capital to invest in offshore wind and other projects, which has made the turnover rate stable (Rigrevisionen, 2016). In order to deepen the understanding of the evolution of the profit margin and asset turnover, it is necessary to decompose the two ratios further (Petersen & Plenborg, 2012). Therefore, a common-size analysis of the income statement and days-on-hand analysis for each item in the balance sheet is conducted (Appendix 7 & 8).

The common size analysis of the income statement scales each item as a percentage of revenue (Appendix 7). From figure 47, the primary driver of the profit margin is the increase in revenue. Revenue has been steadily increasing from 2007 to 2013, showing that Ørsted has expanded its business. Revenue declines in the later year, while cost of sales remains stable. Two other items have been the driving factors of the improving profit margin. One is the lower other external expenses, which consists of activities related to offshore wind installations (Ørsted, 2017a). With their first offshore wind farms, they reported budget overrun on the construction of the offshore wind farm (Ørsted, 2016a). Ørsted has since become more efficient at controlling their costs when building offshore wind parks (Ibid.). At present, they have built more offshore wind farms than any other developer in the world, meaning their costs are low (Ibid.). This is why Ørsted now has the ability to bid at a low price at the offshore wind auctions. The second item that is driving the profit margin is other operating income. This item relates to the divestments of their offshore wind farms (Ørsted, 2017a). In 2017, the item consisted of farm-downs of 50% of their ownership interests in the offshore wind farms Walney Extension (UK) and Borkum Riffgrund 2 (Germany) (Ibid.). As previously mentioned, Ørsted's business model is built around its farm-down model, with Ørsted divesting 50% of the project typically 12-24 months after taking the final investment decision. The divestments reduce the risks associated with building offshore wind farms and improves the profitability.

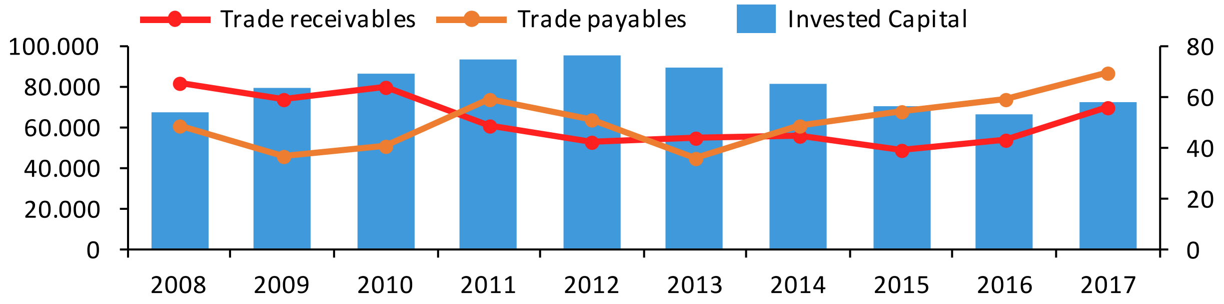
Figure 47 – Common size analysis of Ørsted's income statement



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

The days on hand analysis for each item on the analytical balance sheet, making up the invested capital, shows that Ørsted is becoming more efficient in its operations (Appendix 8). The days on hand for trade receivables is decreasing, meaning that Ørsted is becoming better at getting payments from customers or offering fewer days of credit. As of 2017, customers have 55 days of credit compared to 2007 where it was 77 days. This results in a lower invested capital as Ørsted does not need to issue new capital while waiting for their customers to pay. In contrast, the trade payables are increasing, which means Ørsted gets more days of credit from its suppliers. This also reduces the need for more invested capital. The difference between the items indicates that Ørsted used to pay back faster than receiving payments resulting in a higher invested capital. The trend reverses in 2014 and, consequently, the needed invested capital is less, thus increasing the ROIC.

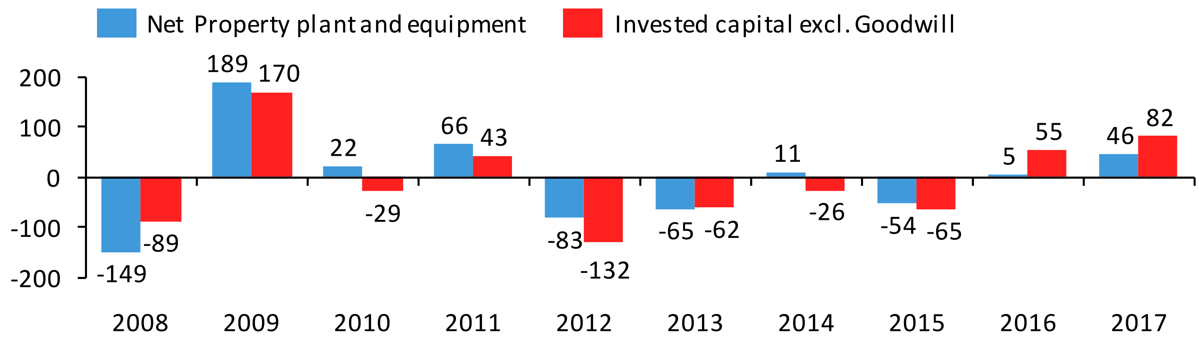
Figure 48 – Days on hand analysis of the balance sheet



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

The days-on-hand analysis also shows that property, plant and equipment (PPE) is responsible for a major part of the change in the turnover rate of invested capital. Ørsted's invested capital is used to fund investments in PPE, which is not surprising with Ørsted's ambitious build-out plans (Ørsted, 2017a).

Figure 49 – Days on hand analysis of the balance sheet PPE and invested capital

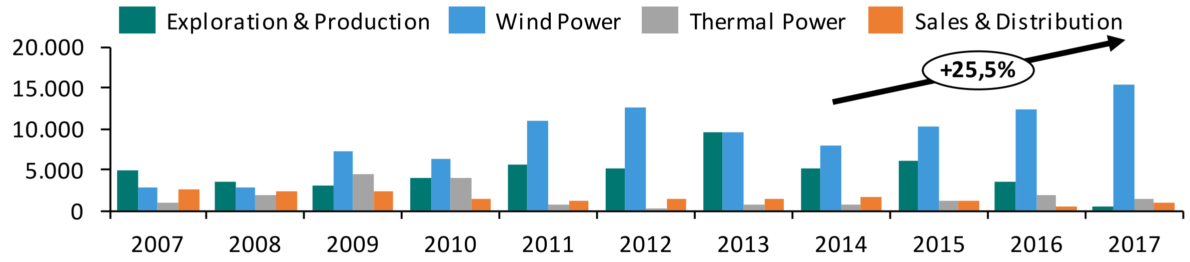


Source: Authors' own creation from Ørsted's annual reports from 2007-2017

Performance of Business Segments

For further insight into the drivers behind Ørsted's financial performance throughout the years, the performance for each business segment can be analysed. Figure 50 shows the development of investment activity and the distribution between business areas in the period of 2007-2017. The gross investment in Wind Power is dominating from 2011, whereas the other segments are stable or declining. The investments in Exploration & Production were also a main contributor until 2014 when Ørsted starts to solely focus on Wind Power.

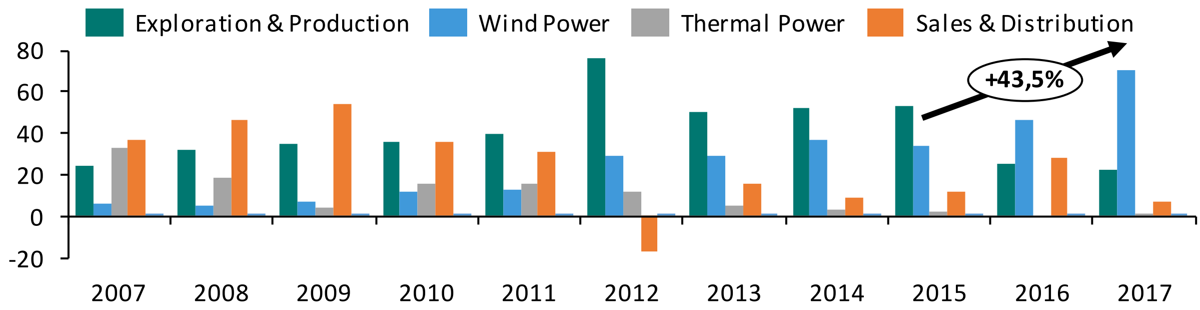
Figure 50 – Gross investments in each business



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

Figure 50 and figure 51 tell the whole equity story behind Ørsted's development. Sales & distribution has been the major contributing factor to Ørsted's EBITDA for a long time with strong performance. In 2012 it reported a negative EBITDA due to the low margins in the European gas market. Exploration & Production has performed well and is also one of the business segments where Ørsted was positioned as one of the market leaders (Ørsted, 2016a). However, Wind Power dominates the picture with an increasing EBITDA almost every single year from 2012. The contribution from Bioenergy and Thermal power is low compared to the other segments. Figure 51 illustrates that Wind Power has been the main driver behind Ørsted's development in ROIC. Therefore, going forward, Wind Power is the key value driver of the investment case.

Figure 51 – Each business' EBITDA



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

Performance of wind power

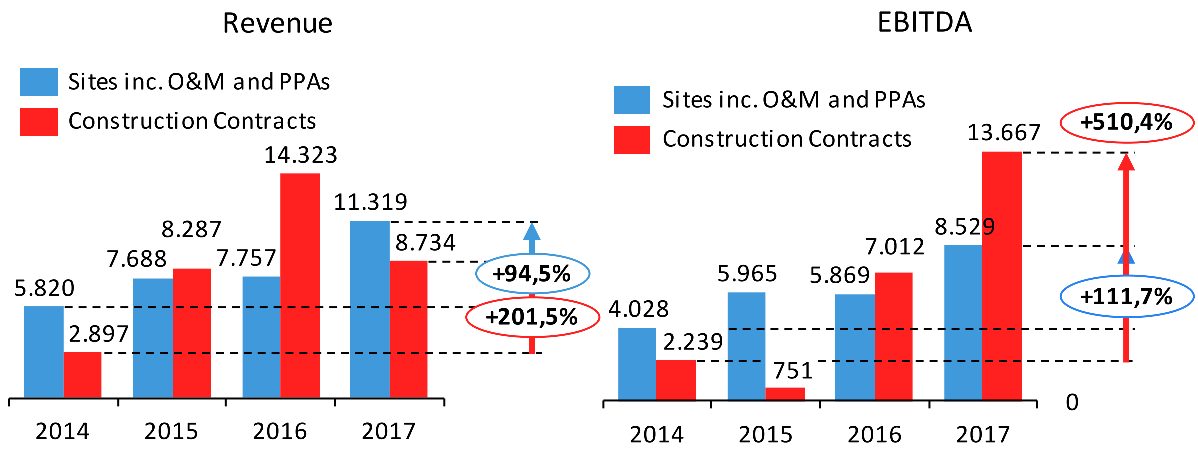
As described in the value chain analysis, the primary activities in Wind Power can be separated into three stages (Develop, Build, Operate & Own). Subsequently, the three stages can be observed in Ørsted's breakdown of EBITDA for Wind Power (Ørsted, 2017a). It is separated into the following three categories:

1) Sites inc. O&M and PPAs
2) Construction Contracts
3) Other incl. A2SEA

The post "Other incl. A2SEA" is income from the installation of offshore wind turbines using vessels in A2SEA. However, it was divested in August 2017 (Ibid.). Therefore, Wind Power has two key revenue drivers:

1) Sites inc. O&M and PPAs 2) Construction Contracts gains. Ørsted only reports the items from the start of 2014, limiting the analysis. Figure 52 shows revenue and EBITDA for the two items.

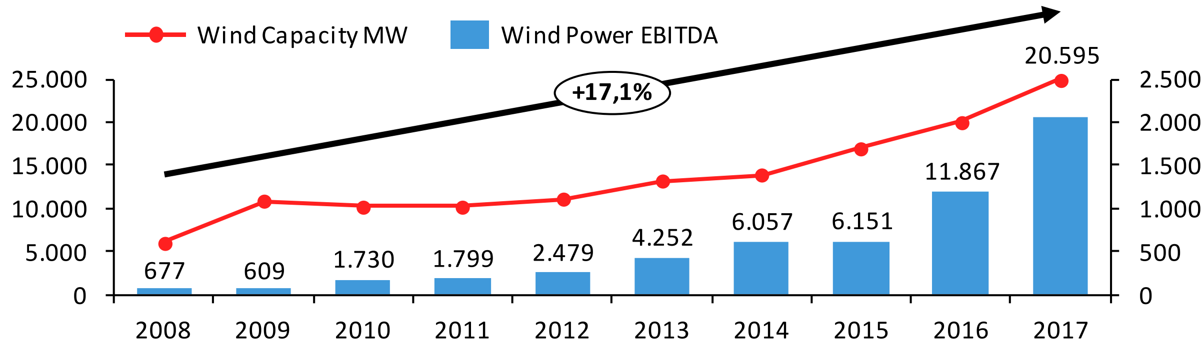
Figure 52 –Financial performce of "Sites inc. O&M and PPAs" and "Construction Contracts"



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

The item "Sites inc. O&M and PPAs" have shown a stable performance over the years as the power prices have historically been secured by subsidies. Hence, the power market price has had a limited effect on revenue from production. Revenue from construction contracts should, by nature, be more volatile and less predictable than revenue from production, as illustrated in figure 52. Revenue from construction gains depends on the timing of the farm-downs. In total, both items have contributed to wind power's increasing EBITDA. Figure 53 shows Wind Power's EBITDA and their wind capacity over the years. Certainly, the investments in offshore wind have been paying off.

Figure 53 – Wind power EBITDA and Capacity MW



Source: Authors' own creation from Ørsted's annual reports from 2007-2017

There are several reasons why wind power's EBITDA has been growing steadily throughout the years and driving the increasing ROIC. Ørsted's early start in offshore wind coupled with their high-risk appetite opened the doors for high returns. In the UK in particular, from 2010-13 subsidy levels were uncertain and subject to government review (Ørsted, 2010b). In addition, offshore wind construction costs were still high at this point (Ibid.). However, Ørsted remained committed and was rewarded with an attractive pipeline of projects up to 2020. In the 2017 earnings transcript, CEO, Henrik Poulsen, commented:

"I think everyone in the UK, including the government, recognises that four years ago we were the ones who were willing to step up and lead the industry forward and it is only fair that we are being rewarded for taking that type of strategic and financial risk" (Ørsted, 2017c, p. 15).

These projects were converted into a low-risk EBITDA for Ørsted. In total, Ørsted has been very aggressive with its offshore wind expansion. This is reflected in the comment by Rigsrevisionen (2016), nervous about Ørsted's increasing investment rate in offshore wind. Finally, it is important to remember that the overall driver behind Ørsted's Wind Power division has been the increasing demand in renewable energy and the lower LCoE as discussed in the strategic analysis.

5.3. Risk Analysis

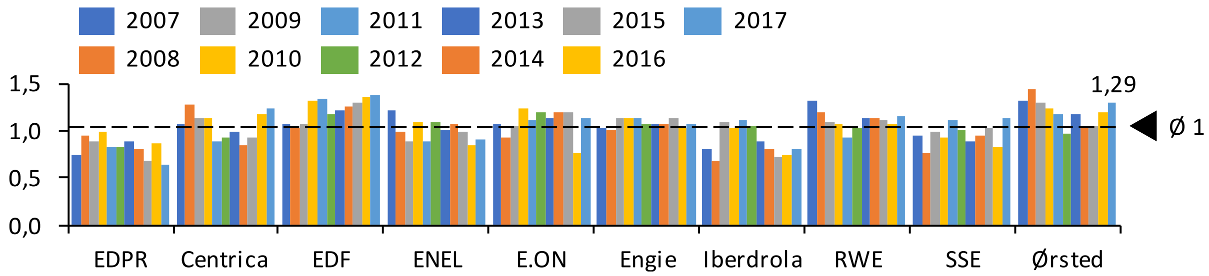
According to Koller et al. (2010) it is important to consider how a company has financed its performance. Especially assessing the sustainability of the capital structure and how the company will deal with a potential downturn (Ibid.). This section will give a brief picture about the liquidity risk for Ørsted and its competitors.

The current ratio is a short-term risk measure, explaining the likelihood that current assets will cover the cost of current liabilities in case of liquidation (Petersen & Plenborg, 2012). It is defined as:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

A high current ratio is preferable, as the company is then able to pay back its liabilities with its assets. As such, current ratio can be used to make a rough estimate of Ørsted's financial health. According to Petersen & Plenborg (2012), a ratio of two or more is an indication of low short-term liquidity risk, but this rule is difficult to generalise across industries. Figure 54 shows that the current ratio is low. The average for the peers over the years is around 1, indicating that the companies have had short-term liquidity risk. If inventory turns into cash much more rapidly than the accounts payable become due, then a company's current ratio can comfortably remain less than one (Ibid.). This is not the case with Ørsted and its peers as they are operating in an industry with low turnover. All else being equal, this increases invested capital, lowers the ROIC and likely causes concern at credit rating agencies. Ørsted's current ratio has been improving from the all-time low in 2012. The ratio is now back to the 2009 level, setting the stage for less liquidity risk in Ørsted. EDPR seems to be the company with the highest liquidity risk of not being able to cover its short-term liabilities. EDPR has also expanded heavily into both on- and offshore wind, building up a large portion of liabilities (EDPR, 2017).

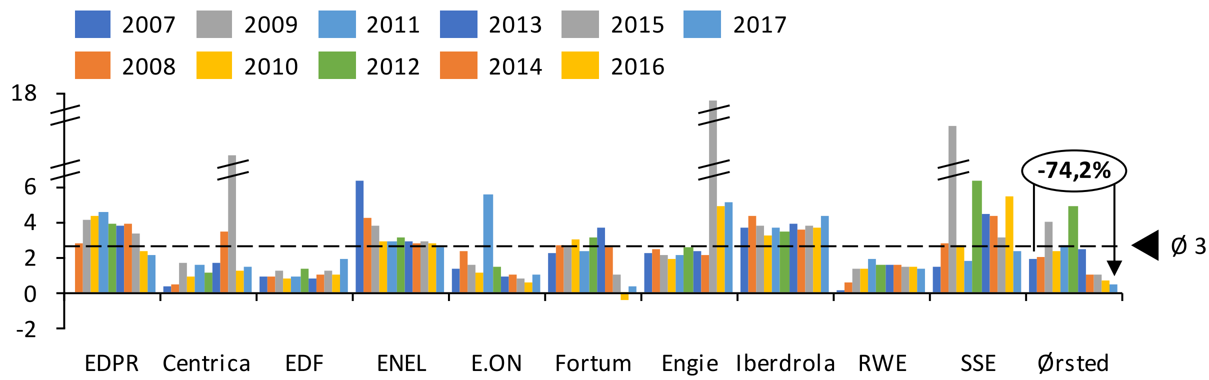
Figure 54 – Ørsted and competitors' current ratio



Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

Net debt/EBITDA is also a widely used ratio recognised by credit rating agencies (Petersen & Plenborg, 2012). The ratio evaluates the long-term liquidity risk by assessing the time in years it takes to pay back debt if net debt and EBITDA are held constant (Ibid.). Ratios higher than four or five indicate that the company is unlikely to be able to handle their leverage as well as take on additional debt for future growth (Ibid.). This is a useful measure for utilities since it can gauge the effectiveness and profitability of the large CAPEX projects, such as offshore wind farms. Figure 55 shows all peers' net debt/EBITDA. In 2017, Ørsted's ratio was 0.49, and it is close to having the lowest financial leverage. This is largely a function of Ørsted's farm-down model. If all hybrid capital was seen as debt, then the ratio would be 0.78 and still be at the lower end compared to peers. Having such a low liquidity risk has been an advantage for Ørsted, especially when several competitors faced balance sheet pressure that prevented them from concentrating more capital and management in the offshore wind business (Freshney et al., 2017). It can be observed that Engie and Iberdrola are struggling to keep their net debt/EBITDA level under the critical line. This indicates that they have had and will have limited opportunity to take on debt for future growth. The low risk will be a competitive advantage for Ørsted when trying to expand its business in Taiwan and the US with larger CAPEX requirements.

Figure 55 – Ørsted and competitors' net debt/EBITDA

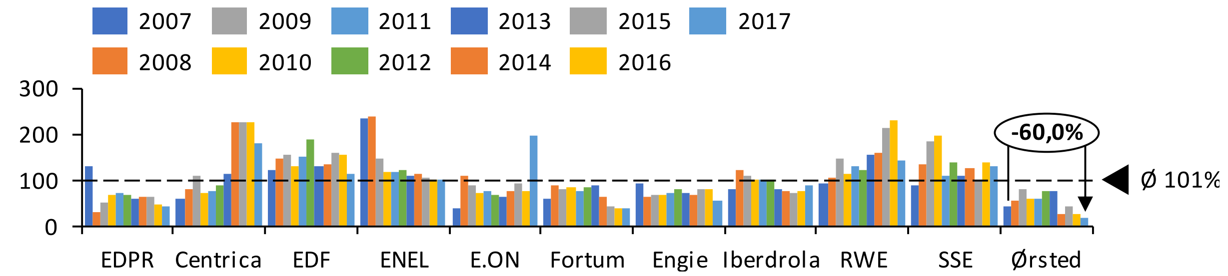


Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

The most common indicator of long-term liquidity risk is financial leverage (Petersen & Plenborg, 2012). The financial leverage is calculated by dividing debt with equity. Figure 56 illustrates the historical financial leverage of Ørsted and the peer group. The more leverage, the higher the long-term liquidity risk. Looking at the book values of equity and debt, Ørsted has by far the lowest financial leverage. It would be even lower if

100% of Ørsted's hybrid capital was defined as equity as they do in their annual reports (Ørsted, 2017a). Similar to Ørsted, most of the peers have increased their leverage in the early years. The following period from 2010-2012 was conversely dominated by cost reduction and divestments, primarily as a result of the troubled financial climate and credit downgrades, which led to stagnation and decreases in leverage (Ørsted, 2016a). RWE is the company that has presented the steadiest increase in net debt, while the other peers have had single years with a significant change in leverage due to acquisitions.

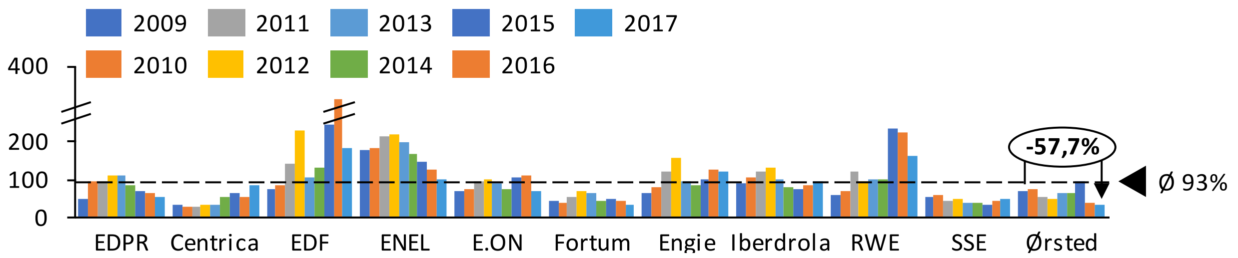
Figure 56 – Ørsted and competitors' debt-to-equity book values



Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

Petersen and Plenborg (2012) argue that if market values are available, they should be used as they are closer to realisable value. Figure 57 shows that if market values are used, Ørsted's leverage is more in line with its peers and at the lower end.

Figure 57 – Ørsted and competitors' debt-to-equity market values



Source: Authors' own creation from Ørsted's annual reports from 2007-2017 and Bloomberg

The risk analysis indicates that Ørsted has a sound financial risk profile. Ørsted is in no way close to a bankruptcy and satisfies all long-term debt ratios. Going forward, Ørsted will have the balance sheet to scale its operations into complex and new markets.

6. SWOT

Following the strategic and financial analysis, the main points will be presented in the SWOT framework. The SWOT will be the foundation for the financial forecasts. The strategic and financial analysis has provided insight about the internal factors that represent strengths and weaknesses for Ørsted and the external factors that represent opportunities and threats. This section summarises the key findings.

6.1. Strengths

Firm infrastructure

Having divested a large part of non-related businesses, Ørsted is now a pure offshore wind player, meaning it does not have any activities within onshore wind. With Wind Power driving the majority of the value of Ørsted, most of the resources are centred around this division. In other words, their infrastructure is built to serve the wind power division. Fortunately, the Wind Power division is earning an ROIC over WACC, reflecting that this division has a competitive advantage. Hence, Ørsted is positioned to capture the full growth of the offshore wind industry.

End-to-end business model

If Ørsted is benchmarked against its competitors, it is the only player in the offshore wind industry with a truly dedicated end-to-end business model. Ørsted has a full set of in-house capabilities in each major part of the value chain, while most of its competitors either lack some skills or have no in-house capabilities in several parts of the value chain.

Farm-down model

Ørsted's farm-down model is one of the most important support activities within their firm infrastructure. Without the farm-down model, it is questionable whether Ørsted would have succeeded in offshore wind with the company's financial problems in 2012. With the farm-down model, Ørsted's WACC is at the lower end of the peers. Thereby, the farm-down model leads it to leverage on scale and gain stronger competitive ground through a reduction in the LCoE. The strong record should support finding future investors for more farm-downs.

Multi-contracting approach

Ørsted has a multi-contracting approach, with 150 to 200 contracts in total for each project. Compared to its peers, it is rare, as most of its competitors follow a split contract approach, signing 5 to 10 main contracts with aggregators of services. This is something that Ørsted can do because of its unique scale, which allows dilution of the overheads, and allows Ørsted to squeeze savings and create efficiency improvements more rapidly than its peers.

Know-how

The learning experiences from executing 3GW of offshore wind projects have provided Ørsted with a second-to-none in-house expertise, providing it with the ability to design and optimise projects with a "total life-cycle cost of wind farm" mindset. It also means that Ørsted has a better understanding of the risks of executing a large offshore wind farm project, which should minimise the number of mistakes and wrong decision-making.

Technology

Ørsted is a pioneer on many of the technological advances in the industry, giving them a rare technological know-how. This has contributed significantly to reducing LCoE and has made it possible for Ørsted to make competitive bids in auctions. Therefore, their technological development is difficult to imitate. For example, though the years, Ørsted has utilised larger and larger turbines and is a first mover in suction bucket technology. Furthermore, over the years, Ørsted has built up a portfolio of proprietary IT tools. These IT tools help optimise the design of a wind farm in order to maximise output and minimise costs.

Logistics

In terms of logistics, Ørsted has a cluster approach to its site selection, which helps it to realise synergies when it takes sole responsibility for the operations. The cluster approach can thus ensure lower logistics costs, fewer technician hours with fewer facilities needed and lower inventory levels. This is reflected in the days-on-hand analysis of the balance sheet.

Financial Leverage

In 2017, Ørsted's net debt/EBITD ratio was 0.49, and Ørsted is close to having the lowest financial leverage. This is largely a function of Ørsted's farm-down model. Having such a low liquidity risk has been an advantage for Ørsted, especially when several competitors faced balance sheet pressure that prevented them from concentrating more capital and management in the offshore wind business. The low financial leverage will be a competitive advantage for Ørsted when trying to expand its business in Taiwan and the US with larger CAPEX requirements.

6.2. Weaknesses

Non-diversified

In practice, the source that provides energy with the lowest LCoE is considered more attractive. By having a scope of different renewable energies, governments can easily substitute one with another. Ørsted's business model depends mainly on LCoE from offshore wind. As such, Ørsted faces threats from other renewable sources such as hydro, which are not within the operational scope of Ørsted at the moment.

Irrationality and lack of strategic thinking

As previously described, Ørsted was one of the driving and leading entities behind the zero-bids. However, as noted, the bids might have come a tad too early, as the bids essentially have the possibility—under the wrong market conditions—to cause unprofitable investments where the returns of projects are below the WACC. Bidding for unprofitable projects should indeed be noted as irrational behaviour as the projects are very low relationship-driven, thus a better relationship cannot justify the unprofitable bid as it would likely lead to more unprofitable bids. Ørsted is already an established, well-known player within the industry and should not engage in capturing unprofitable market shares. In the end, the zero-bids might lead to a higher level of speculation within the industry as bidding for an unprofitable project demands a technological advance, such as larger turbines with larger output until that project starts being installed. However, it should be noted that Ørsted withdrew from the auction in the Netherlands, reflecting that they carefully assessed the earnings spread over WACC.

Lack of size

With zero-bids, the offshore wind industry is a competition of who has the strongest balance sheet. Ørsted is not the strongest financially when competitors such as Statoil enter the market, forcing Ørsted to be clever about its strategy.

6.3. Opportunities

CO2 Targets

The goal of reducing CO2 entails a shift from the conventional fossil fuels towards renewable energy sources, such as offshore wind. Offshore wind is particularly well positioned to play an important role in the ongoing energy transformation and EC targets. BNEF (2017) estimates offshore wind will be the fastest-growing renewable technology in the years to come.

Governmental aid

In summary, with the overall emission targets, the governments are clearly interested in building offshore wind farms. This is also reflected in the EC being interested in pooling funds towards helping companies like Ørsted set up offshore wind projects. If there are no sellers, e.g., Ørsted, then the government might be forced to increase the prices so suppliers can build at a profitable rate.

Strategic divestments

The strategic divestments are split into two, the first being that of the divestment of Ørsted's business division and the second is the strategic divestment of projects. In September 2017, Ørsted divested its upstream oil and gas business to INEOS in order to restructure and rethink its core business portfolio. This divestment is expected to help Ørsted focus on its core business and, through further development and growth, increase its revenue.

New markets

The markets in Europe have far from consolidated. However, as previously stated by Ørsted's head of wind, subsidy-free projects have made it extremely difficult to remain profitable. As such, Ørsted has looked beyond their usual markets and across oceans towards markets that seem more profitable due to their low level of market saturation and possibilities for subsidies. While the current portfolio is concentrated on the UK, Germany and Denmark, thanks in large part to attractive support schemes there, Ørsted is also targeting geographical expansion from 2020, with the US and Taiwan representing the most attractive long-term opportunities. However, markets in Asia will offer new types of geographical challenges for Ørsted, such as deeper waters, earthquakes and typhoons.

6.4. Threats

LCoE & new technologies

In order for Ørsted to remain competitive, a large focus has to be put on lowering the LCoE. Ørsted plans to reduce its cost of electricity by 2020 to EUR 100 per MWh (Ørsted, 2018f). This implies that offshore wind will be chosen by the government since the LCoE of offshore wind is then cheaper than other sources. The threat arises if the new technologies—such as solar, hydro or a completely different third option—begin to decrease the LCoEs of those projects and Ørsted is too slow on implementing and executing newer technologies not formerly used. Following newer technologies also raises the question of know-how. If Ørsted fails to spot the relevant technologies that are able to disrupt the renewable energy markets by driving down LCoE, chances are they do not possess the know-how in terms of installing and operating the projects based on a new technology. In turn, this leaves Ørsted vulnerable to competitors or new entrants that have been working and improving on the technology for some time.

Power prices

In case the politicians across markets 'copy' each other regarding zero subsidies, Ørsted is going to be exposed fully to the power prices. The power prices are volatile. Without any form of subsidies or PPAs, Ørsted has no other option than to hedge away some of the risk in the power market.

Politics and subsidies

The complex nature of offshore projects entails a large governmental involvement. As such, the legislation and overall political goals have a large impact on Ørsted. As described, subsidies are either decreasing or disappearing, making it harder for Ørsted to establish new projects. In Ørsted's IPO prospect, they state that approximately 62% of the revenue from their operational offshore wind farms in FY 2015 was derived from subsidies and other financial support (Ørsted, 2016a, p. 52). The zero subsidies pose a threat as it is a large part of the old and current business model.

Interest rates

Rising interest rates pose a risk for the offshore wind industry. Most of the companies in this industry have credit ratings at the lower end of investment grade, making it expensive for them to finance their project. On an absolute basis, rising interest rates are a threat for Ørsted and its competitors. If the farm-down model continues to be successful then, on a relative basis, rising interest rates are an opportunity for Ørsted, as the competitors might run into financial trouble.

Only Two Turbine Suppliers

Ørsted's high degree of reliance on only two turbine suppliers exposes them to risks. Delays, increased prices for turbines, or lack of spare turbine parts due to limited supply all constitute a risk for Ørsted.

New entrants

The threat of new entrants is low, mainly due to the massive CAPEX requirements needed to run instalments of offshore projects. However, the financial muscles from former oil companies will change the competitive environment.

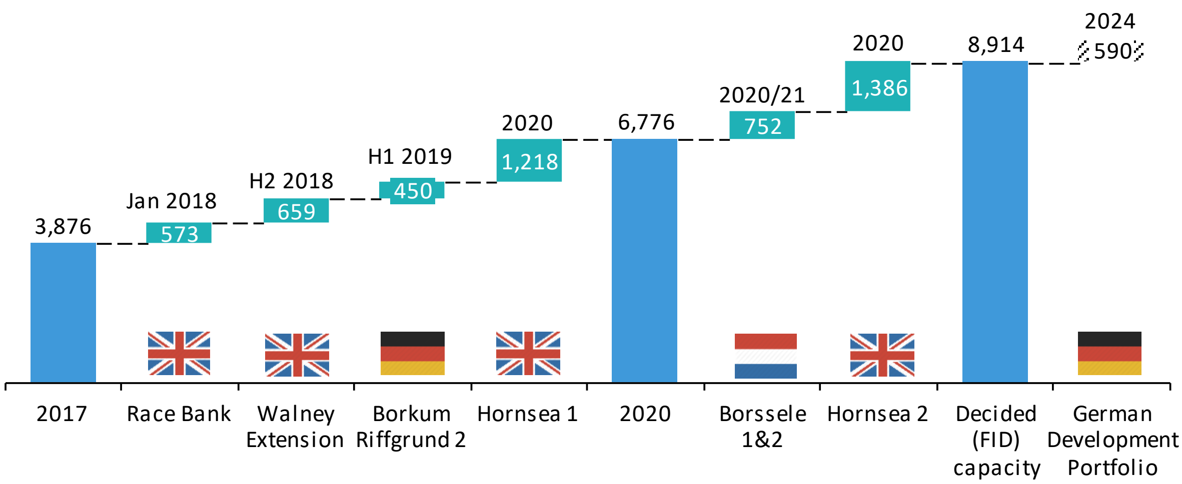
7. Budgeting

To discount future cash flows, a pro forma income statement, balance sheet, and cash flow statement are conducted. The strategic and financial analysis serves as the basis for these forecasts. The sales-driven approach is preferred, where most of the items are a percentage of the revenue (Petersen & Plenborg, 2012). The forecast period is 2018–2027, and the terminal period from 2028 onwards represents a steady state. Due to the length of the forecasting period, trends in the industry and the peers' future financials are preferred over a more refined value driver approach (Ibid.). The difference between the historical and pro forma values can be found in appendix 10.

7.1. Revenue & EBITDA

The key to Ørsted's value creation for the coming years is its 2020 and 2025 build-out plan (Ørsted, 2017a). With the current build-out plan, Ørsted has secured subsidies contracts; hence, it is not fully exposed to power prices (Ibid.). The build-out plan is set to more than double Ørsted's installed capacity of offshore wind. With its current pace, Ørsted should comfortably reach its target to build 11-12 gigawatts by 2025, given it is the world's largest developer, has a strong balance sheet, and is able to find financial partners to share costs with its farm-down model. Obviously, their build-out plan will consume additional growth capital. Ørsted plans to complete a 50% farm-down of the 1.2GW Hornsea Project One project either in the second half of 2018 or in 2019, which is going to be a material driver of their capital headroom (Ibid.). Hence, new offshore wind farms, stable income from subsidies, and the proceeds from selling stakes in projects, combined with lower operating costs, are set to boost EBITDA in the short term. Ørsted's ROIC should be improving as the company insulates itself against the effects of commodity-price volatility, which led to a sharp ROIC reduction in 2012-13. Furthermore, the revenue in the UK should gain further from rising inflation as CFD payments are indexed to inflation (Baringa, n.d.). This will be for projects already in operation, such as Ørsted's Burbo Bank Extension.

Figure 58 – Ørsted's build out plan



Source: Authors' own creation from (Ørsted, 2017e)

After 2025, the number of offshore wind FIDs will be the most important driver. In other words, the number of additional projects Ørsted will win in Europe, the US and Taiwan over the years. At this point in the time, the level of LCoE, as well as the subsidies for offshore wind will be the most critical parameters. As shown in figure 18 in the PESTEL, subsidies have continued to decrease while capacity increases. Lower LCoE is assumed to be the driver in this equation, which is determined by the technology, which was highlighted in figure 15 of the PESTEL.

Ørsted has and will be dependent on subsidies, so the question for post-2025 is whether technology has driven the LCoE to a level where subsidies are no longer needed. On the other hand, if the LCoE stays at current levels, Ørsted will still be dependent on subsidies. This is critical as new entrants are keen to be a part of the offshore wind industry by bidding low at the auctions to capture market shares. Now, these new entrants come from related industries, such as oil & gas, and bring a larger financial capacity.

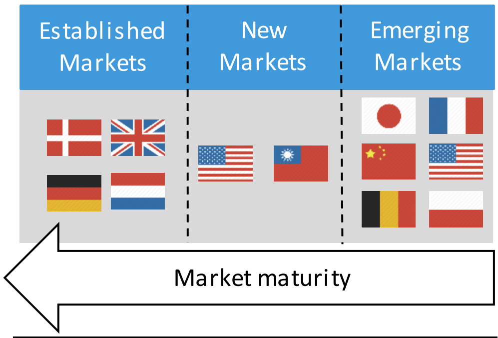
Therefore, to forecast Ørsted's financial performance post-2025, the LCoE needs to be forecasted as well as politicians' willingness to pay subsidies. There is a high degree of uncertainty around these forecasts. The easiest way to forecast this is by looking at the future size in wind turbines. These are expected to steadily increase over the years (see figure 15). The subsidy trend seen in Germany, the Netherlands and the UK of wanting to lower their prices means zero subsidies can be expected to stay. This makes it increasingly difficult for Ørsted to run a profitable offshore wind business in Europe.

New markets as a solution

One way that Ørsted can overcome the obstacle of low profitability is by shifting to more towards complex markets where they can utilise their sustained competitive advantage and know-how. For the reasons stated, the key focus will be on tenders outside of continental Europe (such as the U.S. East Coast in 2018-19 and Taiwan later this year), where the competition is less fierce and earnings are more predictable (PPAs in the US, CFDs in Britain). Ørsted was a first mover in the UK and now has the first mover advantage in Taiwan and the US. This could justify a premium like the premium received in the UK. As a result, there is potential for double-digit returns outside Europe. After purchasing a 35% stake in Taiwan's 128-megawatt Formosa 1 offshore wind farm, Ørsted sees about 2 gigawatts of additional capacity being available in the country (Ørsted, 2017c). Generous feed-in tariffs in Taiwan, compared to the recent zero-subsidy tender results in Europe, may enable Ørsted to preserve margins.

The worst-case scenario in terms of Ørsted's high dependence on Taiwan and US would be if the two countries decide to mimic Europe's zero-subsidy trend, which by definition means that Ørsted's investment case has a high degree of political risk and uncertainty.

Figure 59 – Ørsted's markets

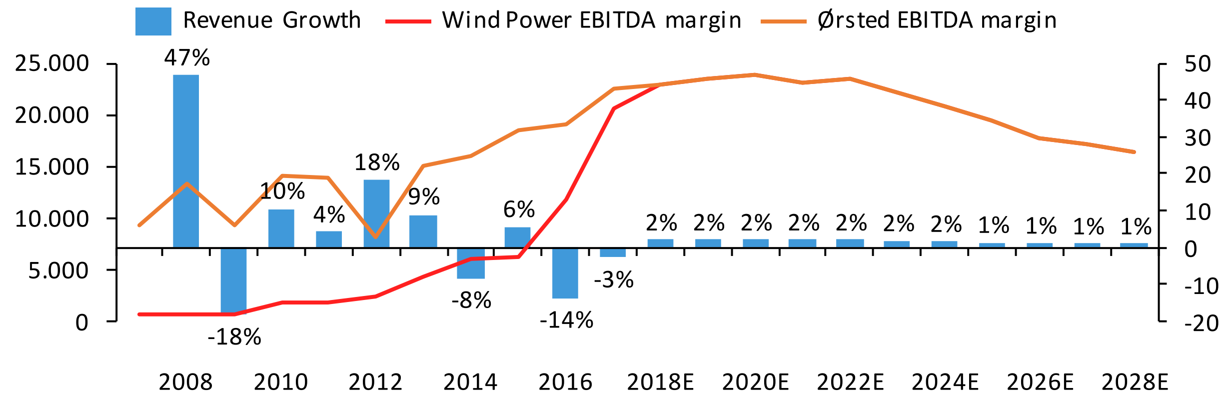


Source: Authors' own creation from (Ørsted, 2017e)

Since 2007, Ørsted's revenue has a CAGR of 3.72%. Looking forward to 2028E, this rate is expected to slow down as competition is expected to increase, but also because the historical high growth rates reflect a profitable and less matured offshore wind industry. Ørsted's position today is far more mature, and a lower growth rate is a natural consequence. In the next 10 years, a revenue CAGR of 1.6% is assumed, which equals a c2% growth in revenue year-on-year. In the terminal year, Ørsted's revenue will grow at 1%, less than the risk-free rate and hence the economy, which is a consequence of the negative outlook for Ørsted post-2025. Offshore wind is maturing, and this means, as in any other industry, a declining internal rate of returns, exemplified by Innogy expecting a 5.75% IRR (Warburg Research, 2017).

While farm-down gains add complexity to the clean earnings and sustainable growth rate of the company, Ørsted has guided CAGR of 13-14% in underlying EBITDA from wind power towards 2023, which is a fair estimate when looking at the historical EBITDA with CAGR of 42.3% from 2007 and its build-out plan (Ørsted, 2017a). Since 2014, the CAGR has been 12.27%, reflecting strong recent performance in Wind Power. The farm-down of Hornsea 1 will have a positive impact on EBITDA in the following years. With the expansion in the US and Taiwan, there are higher expected cost levels with a different climate and less matured renewable politics; therefore, the EBITDA margin will be lower in the years after 2025. However, by 2024, Ørsted expects turbines of 13-15MW in size to be available, enabling it to increase power production and reduce installation time, which will have a positive effect on the EBITDA margin (Ørsted, 2017c; Ørsted 2017f). It is assumed that the EBITDA margin of 38% in 2017 will be relatively stable until 2024E, when it will gradually decrease to 23% in the terminal year. The costs associated with the revenue will be implied based on the forecasted EBITDA margin.

Figure 60 – Ørsted's Revenue, EBITDA margin forecast



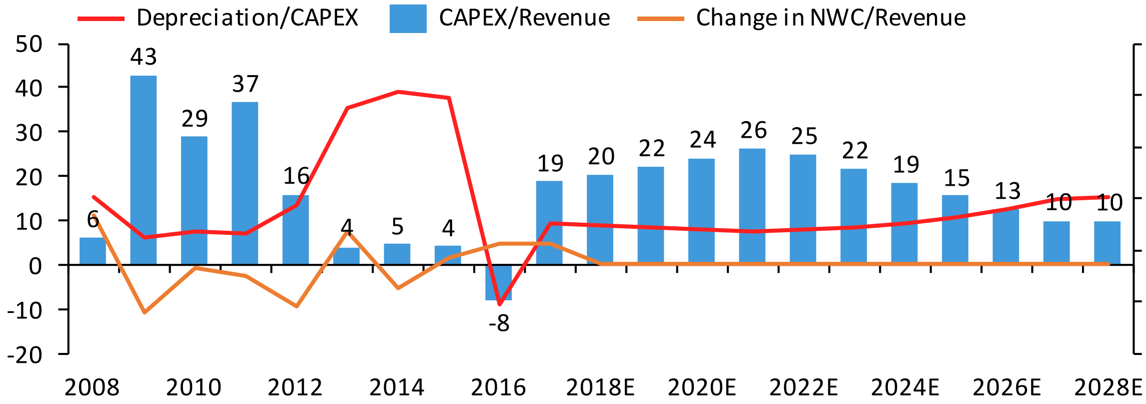
Source: Authors' own creation from Ørsted's annual reports from 2007-2017

7.2. CAPEX, Depreciation & Net working capital

Ørsted's ambition of reaching 11-12GW installed capacity by 2025 will naturally increase their CAPEX requirements. They expect more 85% of their gross investments towards 2023 will be within offshore wind (Ørsted, 2017a). Therefore, the key drivers for CAPEX the coming years will be larger turbines, larger sites, faster installation cycles and increased supply chain competition. Ørsted has lowered the CAPEX guidance given at the IPO of DKK 22-24m. per MW to around DKK 20m. per MW for the six projects in the IPO build-out plan, reflecting the cost reductions (Ørsted 2016a; Ørsted, 2017a). Ørsted's historical levels of CAPEX since 2012 are a reliable proxy for future CAPEX levels, as they want to continue expanding. CAPEX will be driven by revenue growth as top-line growth must be supported growth in Ørsted's asset base. CAPEX is sat equal to depreciation in the terminal year to ensure that Ørsted's CAPEX base remains steady in perpetuity. Otherwise, the valuation would be influenced by an expanding or diminishing asset base, which would not be representative of a steady-state business. Depreciation will be a function of CAPEX instead of revenue, as it should increase only following an expenditure (Damodaran, 2012).

The net working capital to revenue ratio has followed an increasing trend in the last years, as Ørsted has a greater activity in turnover and, simultaneously, there was an effort to better control the operating liabilities illustrated in the days-on-hand analysis. The reported revenue dropped in 2017, which made the ratio between NWC and sales increase to 12%. Going forward, the ratio will stay at 12% growth, with the increase in revenue reflecting that Ørsted will increase its spending on inventory to support revenue growth.

Figure 61 – Ørsted's Depreciation, CAPEX and NWC forecast

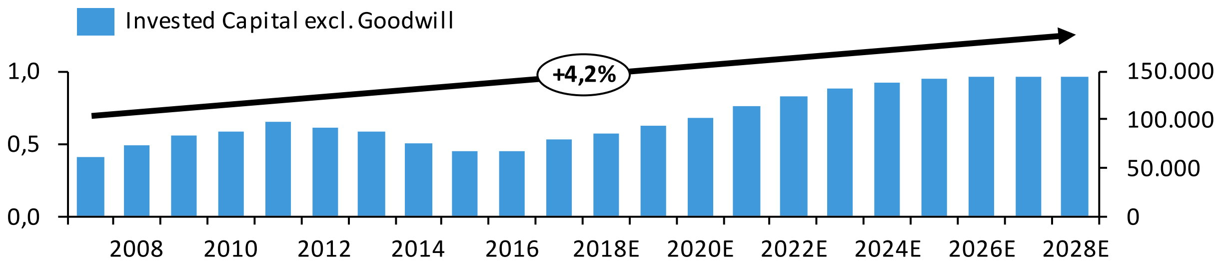


Source: Authors' own creation from Ørsted's annual reports from 2007-2017

7.3. Invested capital

The invested capital is expected to increase steadily throughout the years until it reaches a steady state in 2028. Ørsted has already divested most of their non-core businesses, which held invested capital constant in the historical period. Should Ørsted ever face bottlenecks, offshore wind would still be their strategic core and, presumably, they would divest their other two divisions, holding the turnover rate of invested capital constant. This way, Ørsted will harvest the full potential of the offshore wind industry. Invested capital is calculated by using the primo invested capital and adding reinvestments, which is a sum of CAPEX, change in net working capital, capitalised operating leases minus depreciation. This way, invested capital will increase since Ørsted must reinvest to grow, which can be expensive depending on the spread between ROIC and WACC. Note that operating leases are included in reinvestments as consistency between free cash flow and the cost of capital is paramount (Koller et al., 2010). As stated in the theoretical review, the DCF was inspired by the EVA-model. By calculating the invested capital with use of the increase in reinvestments, ROIC can be defined. This enables the strategic analysis to be story behind the valuation since, according to Koller et al. (2010), ROIC in combination with WACC, can determine the competitiveness of an industry. Therefore, by using parts of the EVA model, the valuation will be coherent with the strategic and financial analysis.

Figure 62 – Ørsted's invested capital forecast



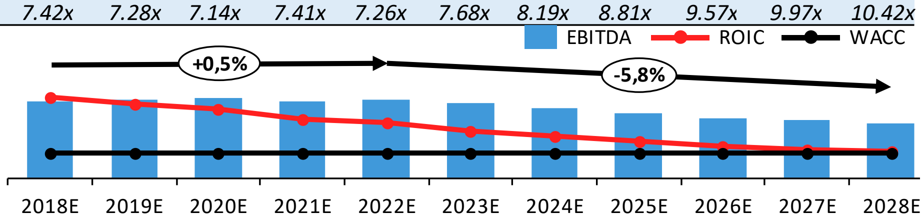
Source: Authors' own creation from Ørsted's annual reports from 2007-2017

8. Valuation

A two-stage unlevered discounted cash flow model is preferred to value Ørsted. The first stage is calculating the present value of the forecasted horizon; the second stage is calculating the terminal value with the use of the Gordon growth formula (Petersen & Plenborg, 2012). The cash flow is discounted with the earlier computed WACC and discounted mid-year to reflect that cash flows are received throughout the year (Koller et al., 2010).

Figure 63 – DCF Model

DCF Model	Base year	1	2	3	4	5	6	7	8	9	10	Terminal
Revenue growth		*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*1.80%*	*1.60%*	*1.40%*	*1.20%*	*1.00%*	*1.00%*
Revenues	59504	60,694	61,908	63,146	64,409	65,697	66,880	67,950	68,901	69,728	70,425	71,129
EBITDA margin	38%	*37.83%*	*37.83%*	*37.83%*	*35.71%*	*35.71%*	*33.17%*	*30.63%*	*28.08%*	*25.54%*	*24.27%*	*23.00%*
EBITDA	22,509	22,959	23,418	23,887	23,000	23,460	22,182	20,810	19,350	17,810	17,093	16,360
Depreciation growth		*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*1.80%*	*1.60%*	*1.40%*	*1.20%*	*1.00%*	*1.00%*
Depreciation	5739	5,854	5,971	6,090	6,212	6,336	6,450	6,554	6,645	6,725	6,792	6,860
EBITA	**16770**	**17,105**	**17,448**	**17,796**	**16,788**	**17,124**	**15,732**	**14,257**	**12,705**	**11,085**	**10,301**	**9,500**
Lease Adjustment	234	243	248	253	258	263	268	272	276	279	282	285
Adjusted EBITA	**17004**	**17,348**	**17,695**	**18,049**	**17,046**	**17,387**	**16,000**	**14,528**	**12,980**	**11,364**	**10,582**	**9,784**
Tax rate	12%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
NOPLAT	**14901**	**13,532**	**13,802**	**14,078**	**13,296**	**13,562**	**12,480**	**11,332**	**10,125**	**8,864**	**8,254**	**7,632**
Depreciation	5739	5,854	5,971	6,090	6,212	6,336	6,450	6,554	6,645	6,725	6,792	6,860
CAPEX	11136	12,361	13,721	15,230	16,905	16,384	14,479	12,574	10,670	8,765	6,860	6,860
△ NWC	2862	143	146	149	152	155	142	128	114	99	84	85
△ Capitalized Op. Leases	2109	83	85	87	88	90	83	75	67	58	49	49
Reinvestment	**10368**	**6,733**	**7,980**	**9,375**	**10,933**	**10,292**	**8,253**	**6,224**	**4,205**	**2,197**	**200**	**134**
FCFF	**4533**	**6,798**	**5,822**	**4,703**	**2,363**	**3,269**	**4,226**	**5,108**	**5,920**	**6,667**	**8,054**	**7,498**
Invested Capital	*78176*	*84,909*	*92,890*	*102,265*	*113,198*	*123,490*	*131,744*	*137,968*	*142,173*	*144,370*	*144,570*	*144,704*
ROIC		*15.94%*	*14.86%*	*13.77%*	*11.75%*	*10.98%*	*9.47%*	*8.21%*	*7.12%*	*6.14%*	*5.71%*	*5.27%*
WACC		*4.75%*	*4.75%*	*4.75%*	*4.75%*	*4.75%*	*4.75%*	*4.75%*	*4.75%*	*4.75%*	*4.75%*	*4.75%*
Spread		*11.19%*	*10.11%*	*9.02%*	*6.99%*	*6.23%*	*4.72%*	*3.46%*	*2.37%*	*1.39%*	*0.96%*	*0.52%*
Discount factor		98%	93%	89%	85%	81%	77%	74%	71%	67%	64%	
PV (FCFF)		6,642	5,430	4,188	2,008	2,653	3,274	3,778	4,179	4,493	5,182	
Terminal Value	199,884	*12.22x*	*<- EV/EBITDA Exit Multiple*									
PV Terminal value	128,610											
% Of Enterprise Value	*75%*	*<- The higher value from the TP compared to EV, the more uncertainty*										
PV FCFF	41,828	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Enterprise value	**170,438**	**167,641**	**169,784**	**173,147**	**179,011**	**184,247**	**188,774**	**192,635**	**195,868**	**198,507**	**199,884**	**199,884**
EBITDA	22,509	22,959	23,418	23,887	23,000	23,460	22,182	20,810	19,350	17,810	17,093	16,360
Implied EV/EBITDA	*7.57x*	*7.30x*	*7.25x*	*7.25x*	*7.78x*	*7.85x*	*8.51x*	*9.26x*	*10.12x*	*11.15x*	*11.69x*	*12.22x*
(-) NIBD	10,956	*7.42x*	*7.28x*	*7.14x*	*7.41x*	*7.26x*	*7.68x*	*8.19x*	*8.81x*	*9.57x*	*9.97x*	*10.42x*
(-) Minority interests	3,807											
Value of Equity	155,675											
Number of shares	438.38											
Implied Share Price	**355.11**											
Actual Price as of 31/03	392.00											
Upside/Downside	-9.41%											



Source: Authors' own creation

Since the cash flow is discounted to the firm, adjustments must be made to get value per share (Damodaran. 2012). Net interest-bearing debt (NIBD) and minority interest are subtracted from the enterprise value. In the calculation of NIBD, non-interest-bearing assets, such as excess cash, are already accounted for. The found share price from the base case DCF is DKK 355.11, reflecting a 9.4% downside from the share price as of March 31st, 2018. Hence, a sell recommendation is initiated from the base case scenario.

The majority of the enterprise value (75%) comes from FCFF in the terminal period. The higher the value from the terminal period, the higher the uncertainty regarding the estimates (Damodaran. 2012). As a result, great attention must be paid to terminal value assumptions. For this reason, the implied terminal EV/EBITDA is calculated to check the validity of the assumptions. The implied terminal multiple is 12.22x EV/EBITDA, which can be considered too high when comparing to peers, indicating that the calculated share price is too high. Petersen & Plenborg (2012) argues that the analyst should reconsider the DCF inputs if the implied EV/EBITDA is higher than peers. However, according Damodaran (2012) there is a difference between doing an intrinsic and a relative valuation; therefore, no adjustments are made. Dividing the terminal year NOPLAT with the FCFF gives the reinvestment rate in perpetuity. The reinvestment rate in perpetuity is 1.76%, while the long-term growth rate is 1%, showing that Ørsted cannot grow without reinvesting. At the same time, the reinvestments result in further growth. The graph at the bottom of the DCF shows how ROIC converges to WACC meaning that Ørsted will have a lesser competitive advantage over the years, which the strategic analysis concluded. This is consistent with the theory that suggests ROIC should fade towards WACC in the terminal period unless the company has a sustainable competitive advantage or disadvantage (Koller et al., 2010). However, it is assumed that the spread remains slightly positive as Ørsted with its know-how should be able to make investments that have a positive spread even though profit margins in offshore wind are decreasing the competition.

8.1. Bull case

The bull case is a successful growth case with a 100% success rate in Taiwan and the US while keeping WACC constant at 4.75%. Successful expansion in Taiwan could add around DKK 25-30 per share to the DCF, while the US is likely close to twice that. Here, the revenue CAGR is equal to 2% and the terminal growth rate will be at 1.95%, equal to the risk-free rate. Ørsted will pursue business intelligently without trying to take market shares at a negative spread. Hence, ROIC is higher than WACC in the terminal year. A 100% successful penetration of the two markets would add close to 20% upside to the current base case, totalling a DKK 426 per share, c. 9% up from the current share price.

8.2. Bear case

In the bear case, the best returns are over. Governments have moved to competitive tenders for wind rather than administratively set prices. This has pushed down returns and now the offshore wind race is all about financial power. Companies like Statoil will keep bidding at auctions without subsidies taking market shares from Ørsted. Taiwan and the US will start copying Europe's zero subsidies, exposing Ørsted fully to the power price. In simple terms, Ørsted's revenue is a function of MW x power price. With an uncertain power price, Ørsted will be exposed to a volatile cash flow and a lot of uncertainty. In this scenario, WACC is increased with 2.5% like Ørsted did for its zero-subsidy project in Germany. ROIC will be less than WACC in the terminal year, reflecting that Ørsted is destroying value with its offshore wind business. The share price in the bear case is DKK 192, c. 51% down from the current share price. Based on the strategic analysis, the bear case is a more realistic scenario than the bull case.

8.3. Sensitivity Analysis

A valuation should always be followed by a sensitivity analysis. This examines the valuation's robustness when exposed to alternative assumptions to its main drivers. A valuation is not any better than its assumptions (Peterson & Plenborg, 2012). In the DCF, the share price is very sensitive to the terminal value assumptions (75% of enterprise value).

The terminal value is a function of the long-term growth rate and the WACC. To ensure that the WACC range in the sensitivity table is appropriate, the range from the earlier computed Monte Carlo distribution is used. Figure 64 shows how Ørsted's share price is affected by the two variables.

Figure 64 – Sensitivity table

			Bear			Base			Bull	
			0.60%	0.70%	0.80%	0.90%	**1.00%**	1.10%	1.20%	1.30%	1.40%
WACC	Bear	5.50%	267	271	276	282	287	293	299	305	311
		5.25%	284	289	295	301	307	314	320	328	335
	Base	5.00%	303	309	316	323	330	337	345	353	362
		4.75%	325	332	339	347	**355**	364	373	383	393
		4.50%	349	357	366	375	385	395	405	417	429
	Bull	4.25%	377	386	396	407	418	430	443	457	472
		4.00%	409	420	432	444	458	472	488	504	522

Source: Authors' own creation

From the sensitivity table, changes in the terminal period growth rate have a significant impact on the share price. The realistic values yield a range from DKK 323-395, only DKK 395 is above the current market share price of DKK 392. This means that if the DCF used a 25 bps. lower WACC and 10 bps. higher terminal growth rate, then the current share price is at fair value. This implies that if the DCF was to be reverse engineered, which is common practice among professionals, then the inputs would not change much (Petersen & Plenborg, 2012). However, the Monte Carlo simulation of WACC implied that the WACC used in the DCF is in the lower end and the median WACC is 5.15%. With all else being equal, this results in a share price of DKK 316. In summary, the base case left a reasonable spread, which is dependent on the realistic scenario defined in the budgeting chapter. Ørsted may well experience a more optimistic or pessimistic case in the future, depending on the changes in the industry. To incorporate potential changes in the industry, a more refined approach is needed.

Monte Carlo Simulations

The Monte Carlo simulation allows the analyst to run thousands of simulations with random variables within a set distribution (Vibig et al., 2008). The simulation will run the DCF model x number of times, changing all the input variables and showing how realistic the base, bull and bear cases are. Having carefully researched Ørsted, triangular distributions are preferred with its inputs of minimum value, most likely value and maximum value. As mentioned in the theoretical review, it is important to include correlations in Monte Carlo simulations rather than assuming that variables are independent. Instead of working with absolute values of capital expenditures, change in net working capital and depreciation, it is recommended to make them revenue-driven (Vibig et al., 2008). Therefore, a variation of the following formula is used to estimate expected FCFF, where EBIT is replaced with EBITDA. Accordingly, depreciation is made a function of CAPEX. A correlation matrix is performed after the simulations to check if the variables vary as they should.

$$\mathrm{FCFF} = \mathrm{Rev}_{t-1} * (1+g) * \frac{\mathrm{EBIT}}{\mathrm{Rev}} * (1-\tfrac{e}{t}) + \frac{\mathrm{D\&A}}{\mathrm{Rev}} - \frac{\mathrm{CAPEX}}{\mathrm{Rev}} - \frac{\mathrm{NWC}}{\mathrm{Rev}} * (\mathrm{Rev}_{t-1} * (1+g) \pm \mathrm{Adj}$$

The variables in the DCF are listed in table 9 and based on the strategic analysis. The simulation of WACC is the same inputs as used in the previous simulations of WACC. Finally, to determine the most important value driver in the base case DCF, every simulated share price is stored with all its input variables. This way, the DCF can be adjusted, if needed, depending on the soundness of strategic rationale behind the value driver.

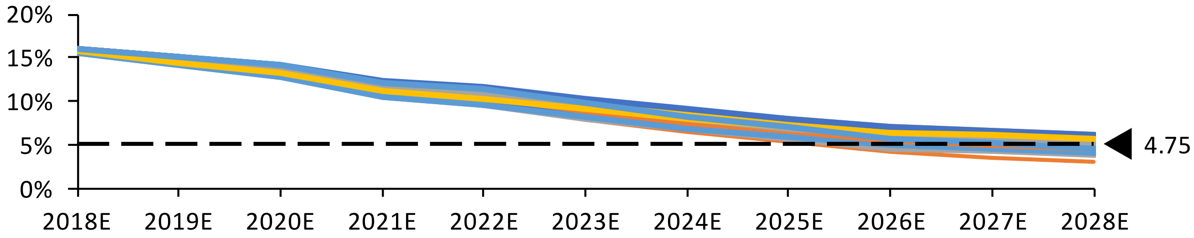
Table 9 – DCF assumptions

DCF Assumptions	Min	Most likely	Max
Revenue growth rate	0%	2%	4%
Terminal year growth	0.5%	1%	1.95%
Target EBITDA margin	18%	23%	26%
Depreciation & CAPEX	10%	11%	15%
NWC % of Revenue	8%	12%	15%

Source: Authors' own creation

Having stored the outcome of each simulation, the development of ROIC can be checked. If ROIC was substantially higher than WACC in terminal year, the inputs need to be checked. All simulations provide a realistic simulation of ROIC, giving high confidence in the inputs and outputs. In the most extreme scenarios, the ROIC is 2.96% or 7.31% in the terminal year, not far from WACC.

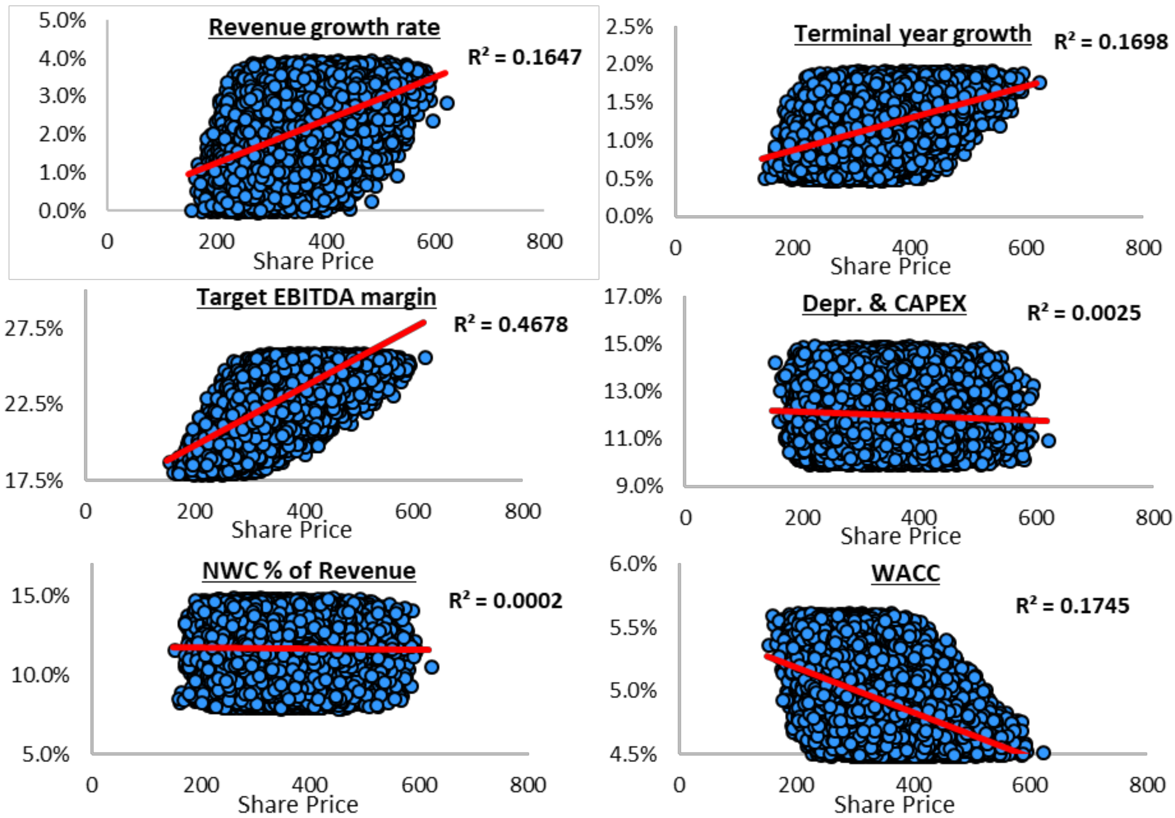
Figure 65 – Simulations of ROIC



Source: Authors' own creation

Running regressions across all inputs shows the DCF's sensitivity to each variable. Figure 66 gives a clear picture. The DCF is highly dependent on the target EBITDA margin, not surprising as this variable is the case where Ørsted will make or break it in the future. Therefore, the more precise the minimum, most likely and maximum EBITDA margin, the better. Another interesting observation from figure 66 is the fact the EBITDA margin has a higher explanatory power than WACC, indicating that more time shall be spent on the EBITDA margin than the WACC. WACC's explanatory power is in line with the growth rates in the revenue and terminal period—all fundamental drivers of the share price.

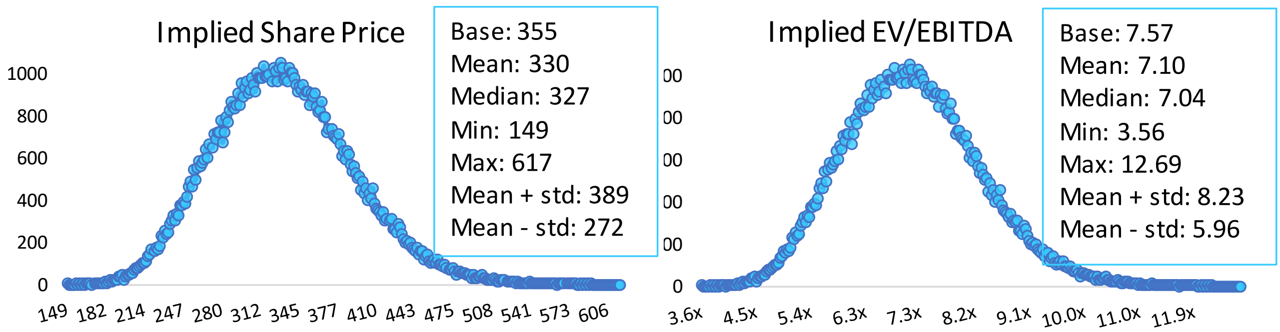
Figure 66 – Regression analysis of DCF inputs from monte carlo simulations



Source: Authors' own creation

Having confidence in the parameters, the distributions of the Monte Carlo simulations can be assessed. The two distributions in figure 67 show the range of possible share prices and EV/EBITDA. The median share price is DKK 327, which corresponds to an 8% drop in the share price compared to the base case. The reason for this can be seen the inputs to the triangular distributions. The target EBITDA margin has a larger downside than upside, the minimum WACC is 4.3%, and the maximum WACC is 6.5%, also stated in the computation of WACC. In other words, with Monte Carlo, the potentially too low WACC used in the base case has been accounted for, reflecting the possibility of Ørsted's zero-subsidy WACC.

Figure 67 – Results of the monte carlo simulations



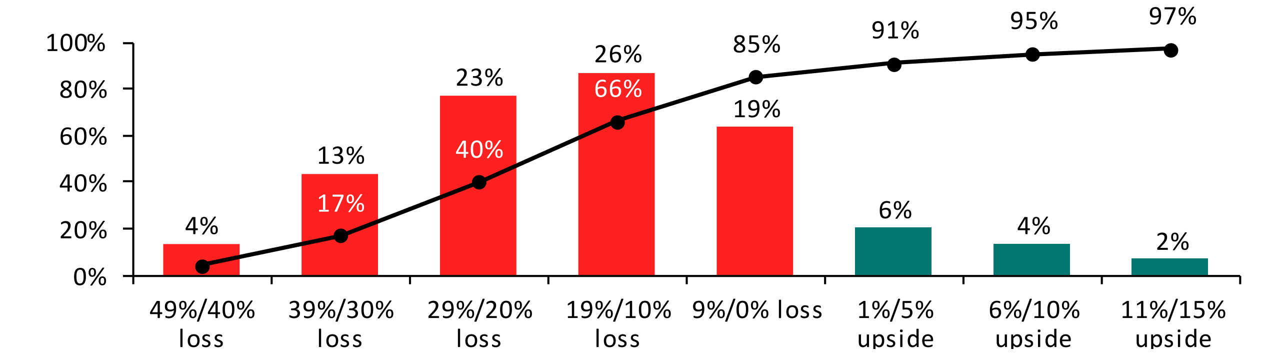
Source: Authors' own creation

From the previously computed sensitivity table, DKK 327 is approximately equal to a 25 bps. increase in WACC, all else equal. In other words, the median of DKK 327 is in the realistic square of the sensitivity table. In addition, a filter can be applied so only the share price of DKK 327 is analysed. In the 100,000 simulations, there are 701 instances where the share price is equal to DKK 327. All are very close the base case DCF assumptions in table 9. The average spread between ROIC and WACC in the terminal year is 0.07%, reflecting that Ørsted will perform with the industry without creating or destroying value. For these reasons, the median share price from the Monte Carlo simulation is considered more likely than the base case share price. However, an 8% difference is relatively small, and the inputs are almost identical, later shown in figure 69.

Based on the spread between the mean plus minus one standard deviation, it can be stated that with 68% probability (empirical rule) the fair share price is between DKK 272 and DKK 389. It is a vague statement, but the upper case is less than bull case share price, indicating that the bull case is truly a blue-sky scenario. If the implied EV/EBITDA distribution is analysed in context with the later relative valuation chapter, then the median of 7.04x is almost at the harmonic mean for the peers, also indicating that DKK 327 is a highly realistic share price. The standard deviation range of 5.96-8.23x is in accordance with values from the peers, providing further confidence to the parameters. However, the minimum and maximum multiple is not seen among the peers and therefore is not regarded as realistic for Ørsted.

As the share price was DKK 392 at the cut-off date, the probability of the fair share price being lower or higher is tested. Figure 68 shows the potential upside to the current price and stores the size of each win/loss into bins with a cumulative probability line. The figure illustrates the downside risk to the current share price. There is an 85% chance of loss based on the 100,000 Monte Carlo simulations. The most probable loss is a loss of between 10-19%, equalling a share price of DKK 317-352 in the future.

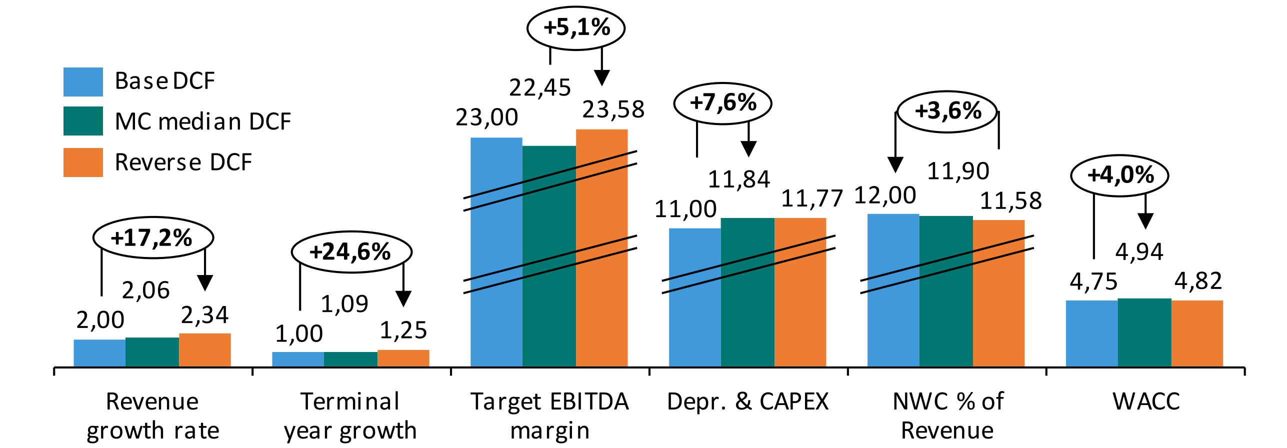
Figure 68 – Potential upside to the current share price



Source: Authors' own creation

Finally, the simulations allow for a detailed reverse engineering of the DCF. Here, the share price is set to DKK 392 and the corresponding input variables used to reach this value are analysed. There are 370 combinations of input variables yielding this value. The median terminal ROIC is 5.66% with a median WACC of 4.82%, reflecting that the market believes that Ørsted is able to sustain its competitive advantage over the long run. From the strategic analysis, this is considered as dependent on Ørsted's success in Taiwan and the US. Figure 69 shows how the assumptions vary depending on the base case, median Monte Carlo (MMC) value and the reverse engineered DCF (RDCF) from the current share price. The largest difference is observed in the terminal year growth rate; otherwise, the inputs are not that different.

Figure 69 – DCF inputs for all models



Source: Authors' own creation

In sum, after performing Monte Carlo simulations with 100,000 simulations, the median of DKK 327 is relatively close to the base case scenario of DKK 355 and is in the realistic square of the sensitivity table, meaning only minor adjustments are made to the input variables. Going into the relative valuation, the standpoint from the intrinsic valuation will be DKK 327. In other words, there is not much upside potential from the DCF model, setting the stage for a sell recommendation.

8.4. Relative Valuation

A relative valuation is done to see how companies similar to Ørsted are valued by the market. Multiples rely on market price, which reflects the opinions of multiple investors as opposed to the present value models that rely on analysts' bias. (Peterson & Plenborg, 2012).

Ørsted should be valued against its peers on EV/EBITDA. The advantage of using EV/EBITDA is that it is unaffected by differences in depreciation and amortisation. Depreciation is a non-cash item and reflects the value of previous, not future, investments (Koller et al., 2010). Furthermore, the peers can be expected to acquire more in the future in order to grow. The EV/EBIT and P/E multiples become inflated during periods of overinvestment (Ibid.). These factors suggest using the EV/EBITDA multiple. EV multiples must be adjusted for non-operating items; therefore, to compare Ørsted with its peers, an adjusted EBITDA is used (Plenborg & Petersen 2012). Forward-looking multiples are used since the enterprise value in the numerator reflects future expected value, meaning EBITDA is based on 2018-2021E and enterprise value is the current (Koller et al., 2010). The peer group used—the one found in the strategic analysis—was also used in the calculation of the beta for consistency.

Table 10 – Relative valuation

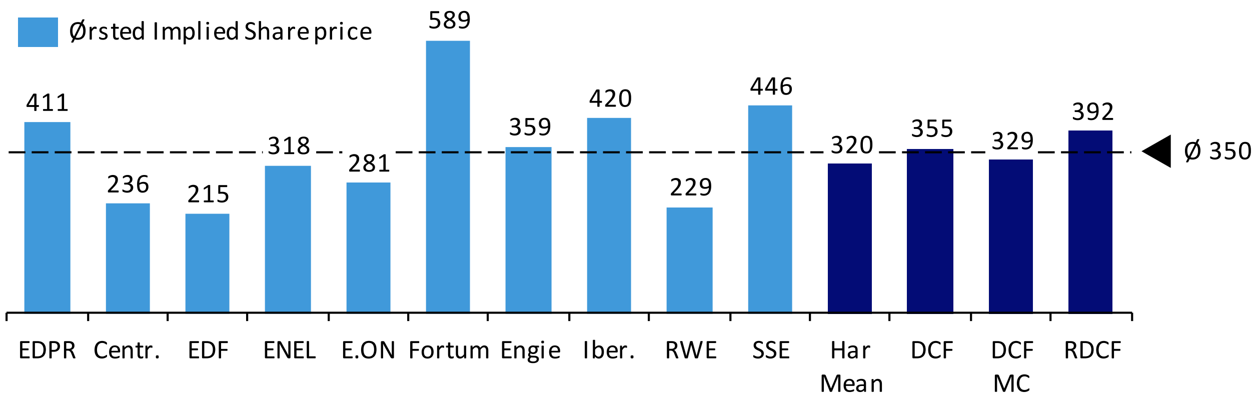
Peers	MCAP (DKKm)	52-Week	EV/EBITDA				Ørsted Implied Share Price			
			2018E	2019E	2020E	2021E	2018E	2019E	2020E	2021E
EDP Renovais	51.966	99%	8,5x	7,9x	7,6x	7,6x	411	389	380	365
Centrica	70.118	64%	5,2x	5,2x	5,2x	5,2x	236	246	247	238
EDF	249.911	97%	4,7x	4,4x	4,2x	4,0x	215	204	197	178
ENEL	393.924	89%	6,7x	6,4x	6,2x	6,1x	318	309	305	287
E.ON	143.756	84%	6,0x	5,7x	5,2x	4,8x	281	270	247	218
Fortum	122.108	100%	11,9x	11,5x	11,0x	10,8x	589	582	565	532
Engie	252.600	91%	7,5x	7,1x	6,8x	6,3x	359	343	336	297
Iberdrola	298.962	83%	8,7x	8,1x	7,6x	7,3x	420	400	380	348
RWE	98.017	87%	5,0x	5,0x	5,1x	4,9x	229	233	241	222
SSE	115.155	83%	9,2x	8,9x	8,7x	8,2x	446	443	441	395
Harmonic Mean	122.879	86%	6,8x	6,5x	6,3x	6,0x	320	314	307	282
Median	132.932	88%	7,1x	6,7x	6,5x	6,2x	338	326	320	292
Minimum	51.966	64%	4,7x	4,4x	4,2x	4,0x	215	204	197	178
Maximum	393.924	100%	11,9x	11,5x	11,0x	10,8x	589	582	565	532
Ørsted Bloomberg	164.789	100%	7,8x	10,0x	10,0x	9,6x	377	503	511	471
Ørsted DCF	149.283	100%	7,4x	7,3x	7,1x	7,4x	355	355	355	355
Ørsted DCF MC	144.115	100%	6,9x	6,8x	6,6x	6,9x	329	329	328	329
Ørsted RDCF	164.789	100%	8,1x	7,9x	7,7x	8,0x	392	389	388	386

Source: Authors' own creation with Bloomberg

At the bottom, four EV/EBITDA estimates are provided from 1) Bloomberg estimate 2) Base case DCF 3) Median Monte Carlo (MMC) 4) Reverse-engineered DCF. The rationale behind this is to test each intrinsic valuation with a relative valuation. With the exception of the MMC case, Ørsted is trading slightly higher than the harmonic mean of 6.8x. However, this is still in range with the rest of the peer group, implying that the share price in each scenario is fair. The MMC case is trading almost at the harmonic mean. A harmonic mean of 6.8x results in an implied share price of DKK 320, approximately 2% less than the MMC case. The maximum implied value is DKK 589 and the minimum is DKK 215. These are not values that are seen as realistic for Ørsted in the future.

However, when comparing to peers, their current share price as a percentage of its 52-week high should be taken into account (Rosenbaum & Pearl, 2009). This is a widely used metric that provides perspective on valuation and gauges the current market sentiment and outlook for both the individual company and its broader sector (Ibid.). If a given company's percentage is significantly out of line with that of its peers, it is generally an indicator of company-specific as opposed to sector-specific issues (Ibid.). That is the case for Centrica with a 64% of its 52-week high. If Centrica is removed, the harmonic mean is 7x, resulting in a DKK 333 share price, only 1% more than the MMC case. In general, the 52-week measure is high for all the peers with Ørsted, Fortum, EDPR, and EDF as best performers. The harmonic mean of these three peers is 7.27x, resulting in a share price of DKK 347.

Figure 70 – Ørsted's implied share price



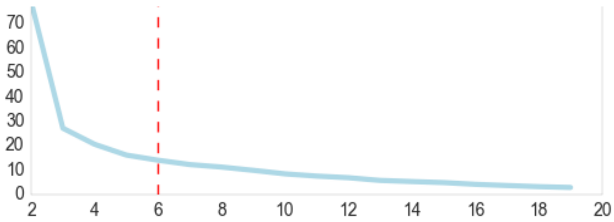
Source: Authors' own creation

In conclusion, when comparing to peers, all DCFs are fair with MMC as the closest to the harmonic mean. But according to Koller et al. (2010), this analysis is flawed:

"The most common flaw in relative valuation is to compare a particular company's multiple with an average multiple regardless of differences in financials. To choose a peer group only use companies with similar growth and ROIC characteristics." (Koller et al., p. 316).

Therefore, to challenge the validity of the relative valuation based on Ørsted's closest peers, machine learning is used. K-means clustering is one of the data mining techniques used to obtain groups of objects that have common characteristics in large enough data (Raschka & Mirjalil, 2017). Thus, the goal is to group companies similar to Ørsted into clusters based on their financial ratios. Bloomberg classifies Ørsted as a member of Europe's top power generators, which consist of 38 companies. From these 38 companies, the ratios WACC, ROIC/WACC, EV/Sales, EV/EBITDA, EV/Invested capital, Sales growth, EBITDA margin, and net debt/EBITDA are calculated. The ratios are then used as variables to define clusters. To define the numbers of clusters, the so-called elbow method is used (Raschka & Mirjalil, 2017). The goal is to define clusters such that the total within-cluster sum of square (WSS) is minimised (Ibid.). The elbow method looks at the total WSS as a function of the number of clusters. WSS should be minimised to the point where adding another cluster does not improve the total WSS (Ibid.). At six clusters, adding one more cluster does not improve the WSS substantially.

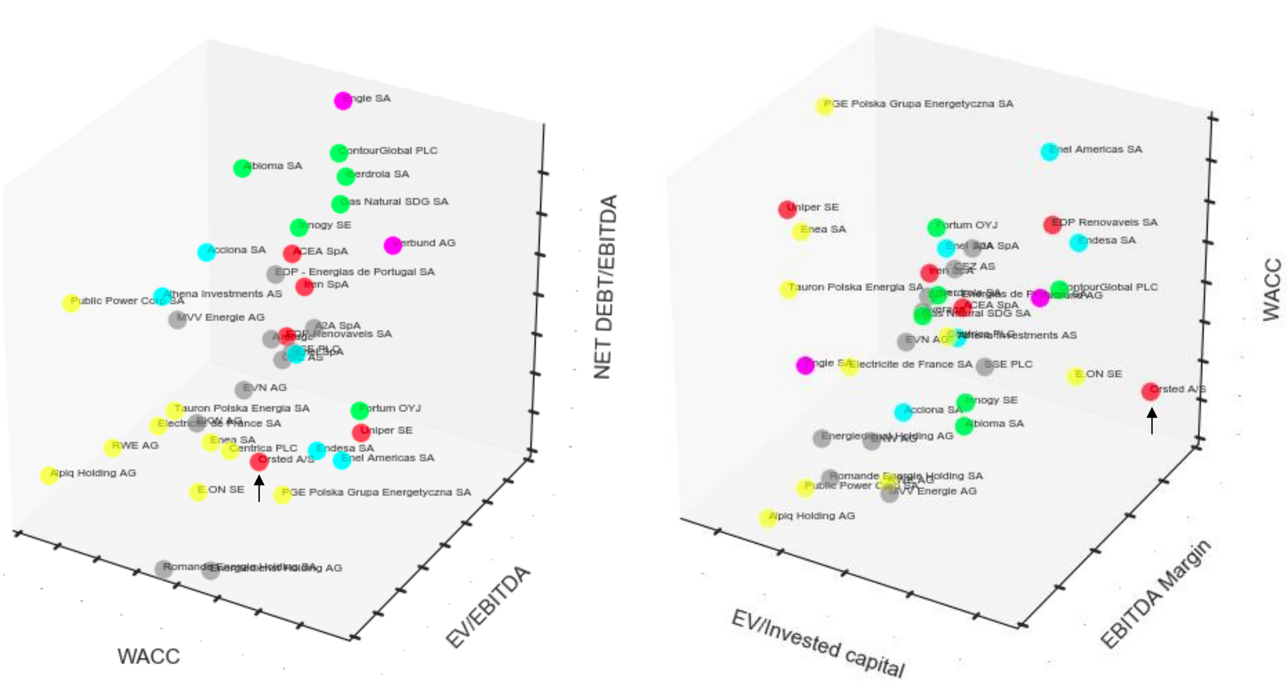
Figure 71 – Elbow curve



Source: Authors' own creation with use of Python

Now, K-means can predict the closest cluster for each company based on all the financial ratios. Figure 72, shows the six clusters in 3D plots based on some of the financial ratios. The algorithm sorts Ørsted into a cluster of EDPR, Uniper SE, ACEA SpA, Iren SpA (see the red circles). Only EDPR is a part of the original peer group and mainly operating within wind. The other companies in the cluster are multi-utility businesses, similar to Ørsted's other two divisions. This could indicate that the market is valuing Ørsted as multi-utility company. Therefore, a sum-of-the-parts analysis could be a more appropriate valuation method for Ørsted. However, it has been clearly stated in the introduction why the valuation is only based on the wind power division.

Figure 72 – K-means clustering of Ørsted and its peers



Source: Authors' own creation with use of Python

The previously defined closest peers to Ørsted are mostly in the same cluster with high EV/EBITDA and net debt/EBITDA. Hence, they are not truly comparable to Ørsted from a financial perspective. Therefore, the EV/EBITDA comparison to EDPR is weighted higher, which is in line with the competitive analysis, highlighting EDPR as the closest peer business-wise. The harmonic mean of Ørsted's cluster EV/EBITDA is 8.3x, totalling a share price of DKK 401 for Ørsted.

If Ørsted was to trade at EDPR's EV/EBITDA of 8.5x, the share price would be DKK 411. A significant upside from the MMC and base case. However, it is worth paying attention to the fact that the RDCF is trading almost in line with EDPR, implying that the market is valuing Ørsted and EDPR equivalent. The correlation matrix in the analysis of peers also highlighted their close relationship. The analysis of EDPR highlighted that in EDP owning 77.5% of EDPR, EDP tried in the summer of 2017 to buy the remaining 22.5% stake in EDPR with the objective of gaining larger exposure to renewables energies (EDP, 2017; RS, 2017). The transaction EV/EBITDA multiple was at 8.7x EBITDA, which the remaining shareholders in EDPR declined (RS, 2017). This has added a premium to EDPR's EV/EBITDA, implying that it could be artificially high compared to its underlying operations.

8.4.1. Comparable Transaction Analysis (CTA)

Transaction multiples reflect actual payments for real-life deals, rather than traded multiples that are subject to supply and demand pressure. They provide guidance to assess what a buyer may be willing to pay for Ørsted.

When acquiring, companies usually do it to gain full control over the company. More often than not, the buying party are willing to pay a larger amount for a controlling stake as it puts them in the "front-seat" of decision making. The extra price paid for the company is called the control premium (Rosenbaum & Pearl, 2009). This makes the multiple higher than the trading multiple. Table 11 shows the comparable transactions to Ørsted.

Table 11 – CTAs

Date	Target company	Acquirer	Type of offer	Premium	EV/EBITDA
03-08-2011	Iberdrola Renovables	Iberdrola	Shares	11,80%	12,58
04-08-2011	EDF Energies Nouvelles	EDF	Shares or Cash	9,20%	13,13
18/11/2015	Enel Green Power	Enel	Shares	1,90%	10,47
27/03/2017	EDP Renováveis	EDP	Cash	9,70%	9,65
03-12-2018	Innogy SE	E.ON	Asset Swap	28,00%	10,5

Source: Authors' own creation from (EDP, 2017; Bloomberg, 2018; RWE, 2018)

The interesting thing about the transactions is that 80% of them are cases where the holding company decide to buy back the renewable subsidiary. This reflects that they want to make the renewable business a part of their core business, perhaps to develop an integrated business model like Ørsted. For example, Iberdrola bought back its renewable subsidiary at a profit in 2011, and now almost exclusively invests in renewables (Iberdrola, 2017). If Ørsted's Wind Power division was a subsidiary, a potential acquisition would be based on the multiples in this table, which EDP did when trying to acquire EDPR (EDP, 2017). This results in a share price of DKK 472 for Ørsted. As described above, the deal did not go through, as EDPR wanted a higher price for the shares (RS, 2017). However, EDP already owned the controlling stake of 77,5% and consequently the premium for the deal was 9,70%. As the table above is dominated by core businesses acquiring or trying to acquire its renewable businesses, it potentially skews the premiums to a low, consequently resulting in artificially low EV/EBITDA multiples. Even though the multiples collected are higher than those of the peers trading in the market, it could be assumed that if an acquirer targeted Ørsted, the premium would be larger than the above, resulting in an even higher EV/EBITDA multiple.

The harmonic mean of all CTAs is 11.11x, totalling a share price of DKK 548 for Ørsted. In summary, the transaction multiples yield a much higher share price range than seen from the intrinsic valuation and market-based multiples.

8.4.2. Market Regression

Finally, as a last resort, a multiple regression is done across the 38 European top power generators. The advantage of including this valuation approach is that the estimates become more precise as the number of firms increases, thus decreasing the impact of accounting differences (Damodaran, 2012). EV/EBITDA is again chosen as the dependent variable and proxies for profitability, while risk and growth are used as independent variables. After running regressions across different variables, testing their t-statistics and p-values, the following two independent variables are used: 1) a function of CAPEX, Depreciation and EBITDA, which is proxy for the reinvestment rate in the business and 2) the one-year sales growth. The variables are tested for multicollinearity, which would distort the statistics. The two inputs' correlation is -4.2%. The resulting R-squared is 27% (Appendix 19). According to Damodaran (2012) the R-squared in a relative valuation will almost never be higher than 70%, most common are levels of 30-35%. Instead, it is important to use variables that are true drivers of the multiple and accept the wider range of possible forecasts (Ibid.).

$$EV/EBITDA = 5.8461 + 5.4554 * (CAPEX - Depreciation)/EBITDA * 1Y\ Revenue\ growth$$

The EV/EBITDA for Ørsted, after plugging in the variables, is 7.15x. This is in line with the earlier computed multiples from the peers. From the equation, it can be discussed whether 1Y revenue growth is too volatile a measure. Table 12 shows the equation's sensitivity to changes in the 1Y revenue growth. The multiple is stable across the different input variables, meaning the reinvestment rate is a driver of the multiple. Therefore, 7.15x is a reliable measure for Ørsted's multiple. The multiple equals a share price of DKK 341, close to both the DCF base case and MMC case, giving more confidence in the sell recommendation and the DCF.

Table 12 – Market regression sensitivity analysis

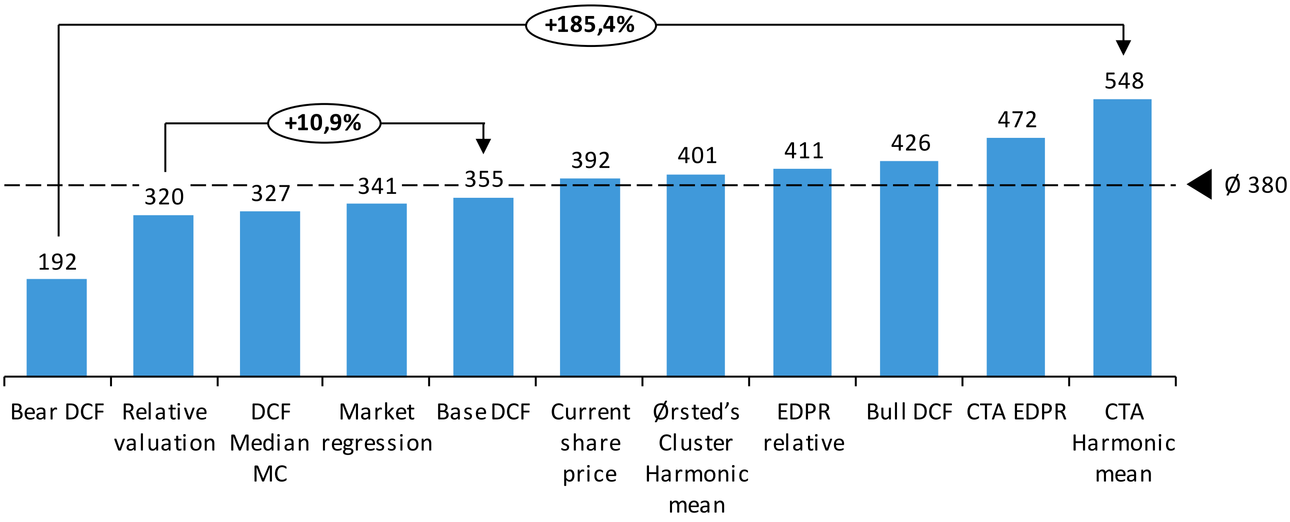
-5%	-4%	-3%	-2%	-1%	0%	1%	2%	3%	4%	5%
7.15x	7.15x	7.15x	7.15x	7.15x	7.15x	7.16x	7.16x	7.16x	7.16x	7.16x

Source: Authors' own creation

9. Discussion

In the following, the result of the different valuation models will be discussed. The valuation range is depicted in figure 73. Ten different share prices are shown with the use of DCF, Monte Carlo, relative valuation with and without machine learning, CTA and market regression.

Figure 73 – Range of share prices for Ørsted

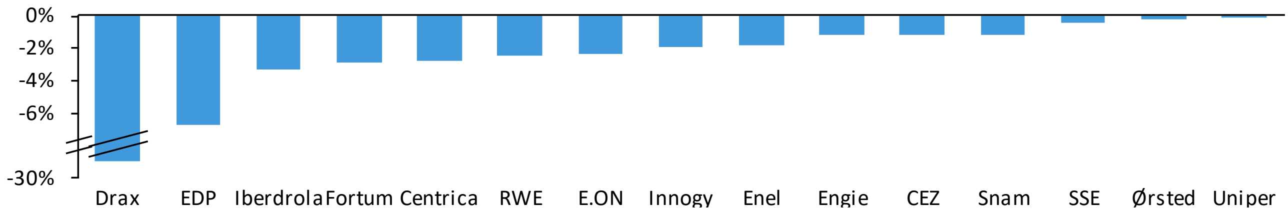


Source: Authors' own creation

The average of all the possible share prices is DKK 380. The average is skewed by the harmonic mean from the CTA due to premiums and the bear case DCF. Overall, there is a reasonably close range between the classic valuation methods shown in the 11% difference between the relative valuation and base case DCF. Having carefully analysed the strategic environment for Ørsted, the share price from the DCF is considered the most realistic, with the outlook post-2025 in mind. In addition, Ørsted is not truly comparable to its peers due to Ørsted's reliance on offshore wind and its farm-down model, which distorts the financials. The median from the Monte Carlo simulation is considered as a more precise estimate than the share price from the base case DCF of DKK 355. The reason is that the inputs into the triangular distribution are realistic values, taking the uncertainty of LCoE and subsidies into account. The concluded price has a potential downside of 20% from its closing price on March 31st, 2018. This implies that the forecasts are more negative than the market view. Thus, a comparison to analysts' target prices will help determine if the projections are too pessimistic. According to Bloomberg, the average target is DKK 382. Looking at historical performances among the analysts, Kristian Johansen from Danske Bank is the best performer. He values Ørsted at price of DKK 325, close to the MMC case.

Even though Ørsted has a beta of 0.67, it is still exposed to systematic risk. The stock market has just experienced one of the best two-year periods in its history and therefore a lot of good news has already been discounted. Specifically, economic and earnings data were very strong. Central banks are likely to reduce the extreme monetary policy accommodation they have provided since the financial crisis. This means higher volatility and less predictable returns. While that does not mean the end of the bull market, it does mean returns will likely be lower this year and come with greater risk. The implication is that stocks may continue to do well, but the market-leading sectors may shift. This may imply that investors will become more defensive, adding bond proxies as rates peak, starting with utilities. The question is whether Ørsted can be characterised as a bond proxy even though it is classified as a utility stock. Research by Gilles et al. (2017) shows that Ørsted is one of the utility companies where 1% increase in interest rates has the lowest impact on their earnings per share (EPS). This supports the fact that Ørsted could be characterised as a bond proxy.

Figure 74 – The impact of 1% increase in interest rate on 2017 EPS



Source: Authors' own creation from (Gilles et al., 2017)

However, the main concern will be the volatility in Ørsted's cash flows going forward, especially when Ørsted will be more and more exposed to the offshore wind industry, where uncertainty is increasing; highlighted in the strategic analysis. In conclusion, DKK 327 is seen as the target price for Ørsted as the 31st of March 2018 and a sell recommendation is initiated.

10. Conclusion

In Ørsted's 2017 annual report, the chairman of Ørsted commented: "*As a result, we are a completely different company today*" (Ørsted, 2017a, p. 5). This comment captures the reason why this thesis chose to value Ørsted. What is the fair value now when Ørsted's Wind Power division will account for the majority of its earnings going forward? To answer this question, the thesis conducted a strategic analysis, financial analysis and valuation.

With Ørsted's divestment of oil & gas, offshore wind will be their primary driver of growth. The strategic analysis, more specifically the PESTEL, revealed that political and legal powers are the key driver behind the offshore wind industry. The goal of reducing CO2 entails a shift from the conventional fossil fuels towards renewable energy sources, such as offshore wind. The driver behind the growth has been and will continue to be LCoE. LCoE will determine whether offshore wind is able to compete with other renewable sources such as hydro and solar power. In addition, other factors such as the subsidies and power prices have a major impact on the growth and profitability of the industry. With zero subsidies, the governments are putting pressure on the suppliers such as Ørsted, consequently introducing larger suppliers with more financial power. However, Ørsted has a sustained competitive advantage with its know-how and technological capabilities, a product of being the first mover. The financial analysis revealed that, so far, offshore wind has been a major driver of Ørsted earning an ROIC over its WACC, creating value for its shareholders, which was helped by their farm-down model. Ørsted has the balance sheet capacity to expand, whereas existing competitors are facing balance sheet constraints. However, Ørsted is not the largest player in the industry. Former oil & gas companies have noticed the growth potential in offshore wind and are committed to taking market shares.

The SWOT framework summarised more threats than opportunities from the strategic analysis, resulting in negative outlook post-2025. Ørsted has secured revenue with its 2025 build-out plan; hereafter, Ørsted's ability to win auctions will be the determinant for their growth. Ørsted will be dependent on their success in expanding its business to the US and Taiwan, where conditions are more favourable.

The intrinsic valuation is built upon the equity story from the strategic analysis, resulting in a share price of DKK 355, 9% lower than the current share price of DKK 392. The base case DCF is challenged with a sensitivity analysis with the use of Monte Carlo. The Monte Carlo uses triangular distributions, meaning a minimum, most likely and maximum is defined. The WACC used in the base case is assumed to be at the lower end, implying that the median WACC in the Monte Carlo simulation is higher, yielding a lower median share price of DKK 329. To ensure a triangular valuation, Ørsted was compared to its peers based on its EV/EBITDA. However, Ørsted is not truly comparable to its peers, making the relative valuation less credible. On a relative basis, Ørsted is trading higher than the harmonic mean, but lower than its closest peer, EDPR. EDPR was also the closest peer from the K-means clustering approach, where 38 peers were compared on their financials. The CTA looked at recent transaction in the offshore wind industry, where several renewables were bought at high multiples, resulting in a high share price for Ørsted, implying that players were interested in acquiring renewable companies. However, the market regression, which is less sensitive to accounting differences, returns a value in the middle of the base case DCF and the Monte Carlo median DCF, increasing the reliability of the intrinsic valuation. Hence, the target share price for Ørsted is DKK 329 as of the 31st of March 2018, implying that Ørsted is overvalued.

10.1. Further Research

Wind Model

The wind speed at Ørsted's wind farm clusters has a significant impact on their quarterly earnings and with Q1 for 2018 coming up, we have decided to build a wind model (Ørsted, 2017a). Throughout the thesis, we have argued that subsidies are at risk of decreasing, or simply are looking to disappear altogether. This poses a major risk to the business model for companies like Ørsted whom, so far, and not accounting for PPAs, depend largely on subsidies to create profitable projects. In turn, this further underpins the effectiveness of a wind model that is able to explain a portion of the revenue for Ørsted. Addressing the problem with zero subsidies, Ørsted is clearly and solely exposed to the power prices, and with decreasing power prices, the combination has the ability to create the 'perfect storm'. Therefore, the ability to forecast earnings from quarter to quarter may have the ability to create abnormal excess returns.

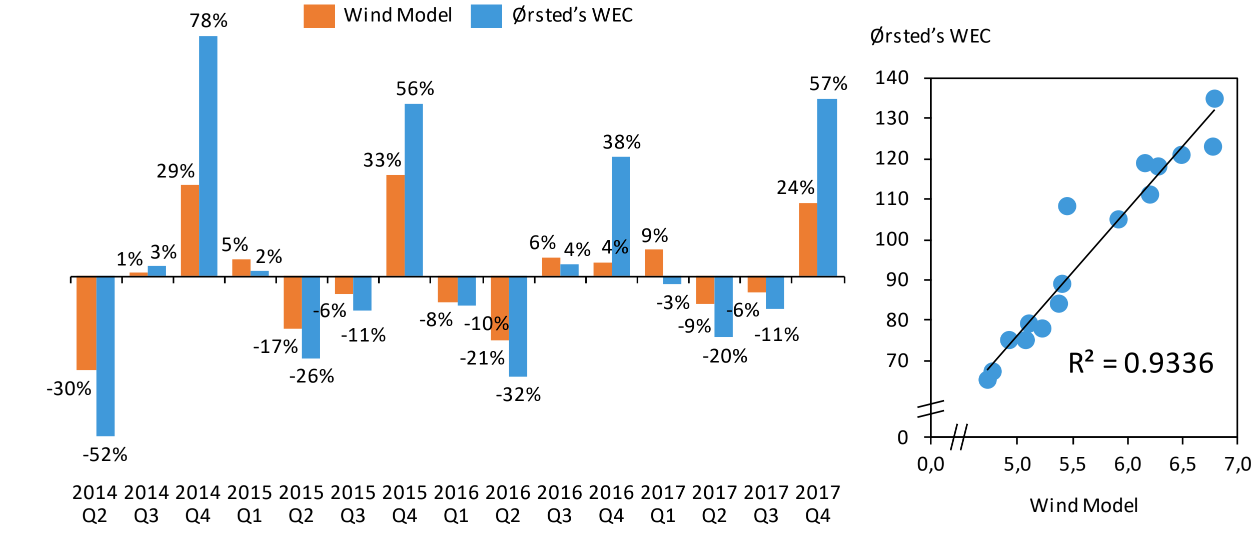
The wind model is basically measuring average wind speeds for weather stations close to clusters of offshore wind farms owned by Ørsted. We have then calculated a weighted average based on the capacity of Ørsted's wind farms. Wind measures are collected from Isle of Man airport, Blackpool airport, Manston, Humberside, Anholt, Esbjerg and Witmund. Appendix 16 shows the locations where data are collected from. The wind data is obtained from (Rp5.ua, 2018).

The ratio used to compare our wind model with Ørsted's reported wind is their Wind Energy Content measure (WEC) (Ørsted, 2015). The measure roughly explains the relationship between actual wind speeds and normal wind speeds based on historical data for the actual site of an offshore wind farm. The resulting WEC percentage is 100% for the year if there is no deviation between the actual wind speeds and the normal wind speeds. Actual wind speeds can vary significantly from normal wind speeds across years and during a year. However, Ørsted introduced a new measure in their annual report from 2017:

"In order to obtain a cleaner measure of the impact of wind on our generation, we now apply the measure of wind speed in metres per second. Wind speed is based on external data sources and is a transparent and easy-to-understand measure of how windy it has been at our offshore wind farms in a given period." (Ørsted, 2017a. p. 37).

They only report this measure from Q1 2016, making the backtest less reliable. Therefore, the model will be compared to both measures. WEC is available from Q1 2014, giving us 16 quarters to backtest. The wind model's measured wind speed is compared to Ørsted's WEC. Figure 75 shows that there is a very high R2 (93%) between our model and the WEC reported by Ørsted.

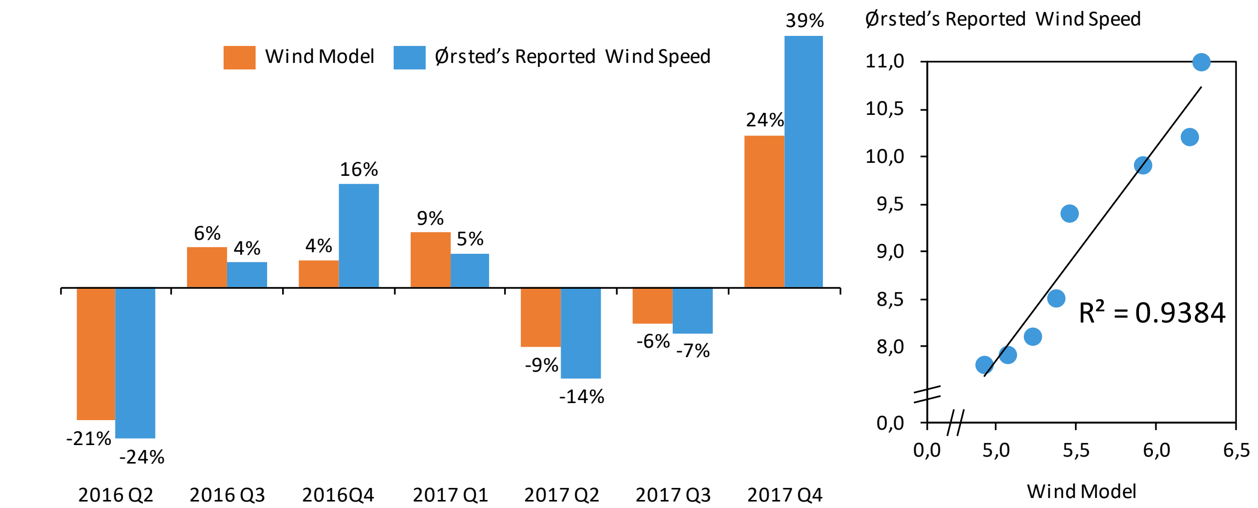
Figure 75 – Wind Model based on Ørsted's WEC measure



Source: Authors' own creation with data from Ørsted's annual reports and wind data from Rp5.ua (2018)

When comparing Ørsted's own wind speed measures to the wind model, the R2 is 94%. There are fewer data points, but both models indicate that the wind model built has a very high explanatory power of the wind speed at Ørsted's wind farms.

Figure 76 – Wind Model based on Ørsted's wind speed measure



Source: Authors' own creation with data from Ørsted's annual reports and wind data from Rp5.ua (2018)

The strength of this model is that the model is based on standard quarters and Ørsted usually delivers earnings a month or two later, meaning we have the estimated wind speed from the model ready before their reporting earnings. Therefore, the model is very useful for making more precise estimates for revenue and EBITDA from sites in Wind Power. Going forward, it can be argued that the wind model will have an even higher explanatory power with Ørsted's ambitious build-out plan. For further research, the model can be extended to include more wind farms and includes new markets such as the US and Taiwan.

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Appendices

Note the pages with financial statements are rotated so it is easier to see the data

Appendix 1: Income Statement

Income Statement Business performance (DKK million)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Revenue	41.280	60.486	49.454	54.523	56.842	67.243	73.105	67.048	70.843	61.201	59.504
Cost of Sales	-23.328	-36.593	-30.191	-31.385	-31.605	-47.403	-47.224	-42.226	-44.966	-39.260	-40.544
Other External Expenses	-6.596	-8.066	-7.176	-6.334	-7.884	-8.177	-6.955	-7.147	-6.237	-4.078	-4.241
Employee Costs	-2.352	-2.539	-3.023	-2.945	-3.593	-3.639	-3.491	-3.336	-3.804	-3.088	-3.197
Share of Profit (Loss) in Associates and JV							-711	-93	112	25	-119
Other Operating Income	395	82	241	295	280	852	705	2.466	2.933	4.867	11.665
Other Operating Expenses	-77	-33	-43	-57	-270	-244	-425	-323	-397	-558	-549
EBITDA	**9.322**	**13.337**	**9.262**	**14.097**	**13.770**	**8.632**	**15.004**	**16.389**	**18.484**	**19.109**	**22.519**
Amortisation, Depreciation and Impairment losses	-4.539	-5.333	-5.505	-6.023	-7.670	-12.113	-12.963	-17.566	-25.734	-5.232	-6.284
EBIT	**4.783**	**8.004**	**3.757**	**8.074**	**6.100**	**-3.481**	**2.041**	**-1.177**	**-7.250**	**13.877**	**16.235**
Gain on Divestment of Enterprises	29	917	-62	905	225	2.675	2.045	1.258	16	1.250	-139
Share of Profit (Loss) in Associates and JV	-5	-48	74	77	36	-553	-57	-484	-8	-8	-10
Financial Income	1.478	2.746	2.662	3.407	5.811	3.692	3.273	5.261	9.275	8.489	4.253
Financial Expenses	-2.218	-3.880	-4.024	-5.002	-6.093	-5.045	-7.073	-6.971	-11.400	-9.256	-5.295
Profit (loss) before Tax	**4.067**	**7.739**	**2.407**	**7.461**	**6.079**	**-2.712**	**229**	**-2.113**	**-9.367**	**14.352**	**15.044**
Tax on Profit (loss) for the year	**-808**	**-2.924**	**-1.269**	**-2.997**	**-3.197**	**-1.309**	**-1.222**	**-3.171**	**-2.717**	**-2.191**	**-1.765**
Profit (loss) for the year	**3.259**	**4.815**	**1.138**	**4.464**	**2.882**	**-4.021**	**-993**	**-5.284**	**-12.084**	**13.213**	**20.199**
Retained earnings	29.964	32.490	23.944	26.278	29.400	22.592	20.231	17.131	7.058	14.684	52.111

Appendix 2: Balance sheet

Balance Sheet (DKK million)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Assets (DKK million)											
Goodwill	322	447	663	651	373	490	491	281	125	125	125
Carbon Emissions Allowances	0	0	0	0	1.221	938	747	396	290	247	180
Rights	2.037	1.867	2.100	1.722	834	738	688	511	392	190	33
Completed development projects	186	218	245	357	279	175	137	70	68	317	321
In-process development projects	191	189	144	21	22	84	104	111	259	76	30
Intangible assets	**2.736**	**2.721**	**3.152**	**2.751**	**2.729**	**2.425**	**2.167**	**1.369**	**1.134**	**955**	**689**
Land and buildings	2.834	2.949	3.013	2.859	4.142	3.806	1.979	1.656	1.490	1.505	1.501
Production assets	43.487	40.646	50.827	57.502	65.438	70.671	67.758	65.517	61.107	53.708	60.603
Exploration assets	2.103	2.784	2.997	975	1.611	1.401	1.192	388	14		
Fixtures and fittings. tools and equipment	321	216	267	205	282	266	296	291	474	438	413
Property. plant and equipment under construction	5.185	7.400	13.026	19.144	23.037	20.163	20.297	18.054	17.144	14.531	13.328
Property plant and equipment	**53.930**	**53.995**	**70.130**	**80.685**	**94.510**	**96.307**	**91.522**	**85.906**	**80.229**	**70.182**	**75.845**
Investments in associates	3.912	3.306	3.605	2.919	3.226	3.055	2.013	1.315	1.421	1.060	339
Other Equity Investments	29	85	1.374	374	418	382	261	242	191	158	130
Deferred tax	31	13	281	404	181	294	130	632	274	88	2.865
Receivables from associates	439	428	527	542	874	1.471	933	1.018	832	626	48
Other receivables	212	355	1.306	2.320	2.440	2.306	278	513	751	515	1.955
Construction contracts		1.197	1.763								
Other non-current Assets	**4.623**	**5.384**	**8.856**	**6.559**	**7.139**	**7.508**	**3.615**	**3.720**	**3.469**	**2.447**	**5.337**
Non-current Assets	**61.289**	**62.100**	**82.138**	**89.995**	**104.378**	**106.240**	**97.304**	**90.995**	**84.832**	**73.584**	**81.871**

Inventories	2.785	3.918	3.064	2.861	4.244	3.794	3.560	2.938	3.567	3.451	3.853
Trade receivables	8.845	10.985	8.164	9.681	7.634	7.888	8.875	8.346	7.739	7.286	9.170
Receivables from associates	238	183	27	2	553	667	253	50	56	49	
Receivables in respect of sale of activities	101	111	111	131	1.261	267	253	50			
Derivatives	8.032	21.709	15.282	14.461	16.060	12.622	9.147	11.193	15.642	8.689	4.870
Deposits	123	111	153	102	0	0	0	0	0	0	0
Other receivables	2.257	2.922	3.979	7.406	6.943	4.231	4.929	3.357	2.657	1.710	3.519
Construction contracts	53	52	67	61	41	853	1.890	1.811	3.864	6.453	10.817
Income Tax	753	11	422	27	19	189	169	192	329	430	296
Securities	134	753	2.570	7.620	9.914	14.914	16.118	24.948	21.221	16.533	25.280
Cash and Cash equivalents	2.562	3.043	4.499	4.147	2.342	3.586	2.894	6.034	4.965	2.931	4.203
Assets classified as held for sale	2.538	187	76	845	684	4.343	280	0	2.585	15.373	2.642
Current Assets	**28.421**	**43.985**	**38.414**	**47.344**	**49.695**	**53.354**	**48.368**	**58.919**	**62.625**	**62.905**	**64.650**
Assets	**89.710**	**106.085**	**120.552**	**137.339**	**154.073**	**159.594**	**145.672**	**149.914**	**147.457**	**136.489**	**146.521**
Equity and liabilities											
Share capital	2.937	2.937	2.937	2.937	2.937	2.937	2.937	4.177	4.177	4.204	4.204
Reserves	-293	702	9.256	8.287	7.913	7.892	8.431	20.428	20.855	20.218	-1.524
Retained earnings	29.964	32.490	23.944	26.278	29.400	22.592	20.231	17.131	7.058	14.684	52.111
Proposed dividends	1.469	1.926	481	2.203	0	0	0	0	0	0	0
Equity attributable to shareholders in Ørsted A/S	**34.077**	**38.055**	**36.618**	**39.705**	**40.250**	**33.421**	**31.599**	**41.736**	**32.090**	**39.106**	**54.791**
Hybrid capital	8.088	8.088	8.088	8.088	9.538	9.538	13.236	13.236	13.248	13.248	13.239
Minority interests (Non-controlling interests)	46	47	102	3.515	7.952	7.057	6.708	6.561	6.398	5.146	3.807
Equity	**42.211**	**46.190**	**44.808**	**51.308**	**57.740**	**50.016**	**51.543**	**61.533**	**51.736**	**57.500**	**71.837**
Deferred tax	5.038	5.461	6.666	8.188	9.336	6.975	5.496	4.281	1.646	2.185	2.128
Pension obligations	41	38	21	22	15	13	0	0	0	0	0
Provisions	5.715	5.466	7.260	9.418	11.936	12.496	12.891	15.397	17.754	8.337	10.840
Bank loans and issued bonds	14.703	17.011	33.408	33.506	34.715	48.563	36.767	35.849	31.775	22.164	25.715
Other payables	1.020	1.624	1.970	1.688	2.329	3.337	3.958	4.599	5.913	6.622	5.714
Non-current liabilities	**26.517**	**29.600**	**49.325**	**52.822**	**58.331**	**71.384**	**59.112**	**60.126**	**57.088**	**39.308**	**44.397**

Provisions	69	229	212	444	517	597	719	537	1.434	702	680
Bank loans and issued bonds	2.512	2.112	1.798	4.397	5.512	5.632	9.389	208	4.626	2.019	3.921
Trade payables	5.488	8.155	4.997	6.148	9.377	9.581	7.329	9.031	10.673	10.024	11.499
Payables to associates	36	24	58	43							
Derivatives	6.933	14.644	12.380	13.350	13.095	12.523	8.519	8.323	9.531	6.930	4.374
Other liabilities	5.319	4.624	6.935	8.043	8.353	7.821	7.658	5.905	7.908	6.277	6.368
Construction contracts							415	1.667	671	171	1.317
Income tax	39	420	39	621	763	1.859	986	2.584	2.657	54	1.498
Liabilities relating to assets classified as held for sale	586	87	0	163	385	181	2	0	1.133	13.504	630
Current liabilities without assets held for sale	**20.396**	**30.208**	**26.419**	**33.046**	**37.617**	**38.013**	**35.015**	**28.255**	**37.500**	**26.177**	**29.657**
Current liabilities	**20.982**	**30.295**	**26.419**	**33.209**	**38.002**	**38.194**	**35.017**	**28.255**	**38.633**	**39.681**	**30.287**
Liabilities	**47.499**	**59.895**	**75.744**	**86.031**	**96.333**	**109.578**	**94.129**	**88.381**	**95.721**	**78.989**	**74.684**
Equity and liabilities	**89.710**	**106.085**	**120.552**	**137.339**	**154.073**	**159.594**	**145.672**	**149.914**	**147.457**	**136.489**	**146.521**

Appendix 3: Cash flow statement

Cash Flow Statement (DKK million)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash flows from operations (operating activities)	9.971	13.001	9.145	15.411	15.595	7.159	16.087	16.626	8.306	16.610	11.254
Change in Net Working Capital				1.716	918	335	-2.054	3.023	587	-1.512	-7.904
Other items					-1.413	3.695	1.424	209	-8	217	297
Interest income and similar items	1.824	2.800	2.523	3.743	5.979	3.347	3.304	4.569	7.686	5.177	3.508
Interest expense and similar items	-2.870	-3.663	-3.361	-4.864	-6.808	-4.192	-6.176	-5.634	-7.935	-6.038	-3.472
Income tax paid	-83	-1.759	-778	-106	-1.647	-2.643	-2.856	-3.835	-1.115	-3.182	-2.660
Cash flows from operating activities	**8.842**	**10.379**	**7.529**	**14.184**	**12.624**	**7.701**	**9.729**	**14.958**	**7.521**	**11.272**	**1.023**
Sale of intangible assets and property, plant and equipment	579	92	199	939	1.936	1.389	3.981	7.495	1.753	7.105	16.333
Purchase of intangible assets and property, plant and equipment (CAPEX)	-10.989	-9.685	-15.859	-15.209	-17.851	-17.831	-21.039	-14.631	-12.749	-14.980	-17.592
Net	-10.410	-9.593	-15.660	-14.270	-15.915	-16.442	-17.058	-7.136	-10.996	-7.875	-1.259
Acquisition of subsidiaries	-6.683	-136	-1.304	-33	-22	-422		-429		-16	-83
Disposal of subsidiaries	4.934	2.374	376	2.279	45	2.922	9.184	3.133	261	1.999	588
Disposal of other equity investments						49	1.991		48	32	28
Acquisition of associates	-105	-3	0	-57	-133						
Acquisition of other equity investments and securities	-29	-60	-168	-248	-63	-11	-8				
Purchase of Securities	0	0	-3.742	-3.680	-8.124	-10.184	-13.569	-22.983	-8.119	-8.278	-21.162
Sale/maturation of securities	0	0	0	1.303	6.061	5.184	12.365	12.653	11.356	12.842	11.965
Change in other non-current assets	349	-1.341	-605	99	-166	-102	41	-179	-8	3	-5
Financial transactions with associates	-47	79	-195	-245	-1.081	-1.046	532	130	33	211	-139
Dividends received	188	51	99	59	60	30	39	15	20	22	13
Investments in other non-current assets	**-1.393**	**964**	**-5.539**	**-523**	**-3.423**	**-3.580**	**10.575**	**-7.660**	**3.591**	**6.815**	**-8.795**
Cash flows from investing activities	**-11.803**	**-8.629**	**-21.199**	**-14.793**	**-19.338**	**-20.022**	**-6.483**	**-14.796**	**-7.405**	**-1.060**	**-10.054**

Proceeds from the raising of loans	6.540	3.214	18.881	5.226	9.371	21.042	4.722	520	406		5.468
Proceeds from capital increase								13.007			
Instalments on loans	-9.899	-1.836	-4.946	-2.928	-7.121	-8.334	-11.157	-9.338	-848	-11.097	-4.069
Dividends paid	-1.967	-1.469	-1.926	-481	-2.203	-1.457					-2.521
Acquisition of minority interests	-20	-1	-32	-138							
Disposal of minority interests	0	13	86	119							
Coupon payments on hybrid capital	-451	-451	-451	-451	-515	-648	-675	-754	-822	-640	-640
Repurchase of hybrid capital					-3.802		-695		-4.476		3.668
Proceeds from issuing of hybrid capital					5.127		4.094		4.424		
Purchase of treasury shares										-53	
Dividends paid to minority shareholders	-2	-2	-31	0							
Other capital transactions with non-controlling interests	0	0	38	349	3.945	2.503	-474	-621	-621	-527	-431
Change in other non-current payables	747	-794	610	-574	116	-80	353	89	23	28	-11
Cash flows from financing activities	**-5.052**	**-1.326**	**12.229**	**1.122**	**4.918**	**13.026**	**-3.832**	**2.903**	**-1.914**	**-12.289**	**1.464**
Cash and cash equivalents at 1 January	9.106	1.780	2.369	2.915	3.625	1.440	1.952	1.431	4.770	3.677	2.628
Net increase (decrease) in cash and cash equivalents	-8.013	424	498	543	-1.796	723	-586	3.065	-1.123	-611	1.458
Cash classified as held for sale, etc.	695	-27	63	0	-352	23	93	29	-115	-433	-140
Foreign exchange adjustments of cash and cash equivalents	-8	192	-15	167	-37	26	-28	245	145	-5	-55
Cash and cash equivalents at 31 December	**1.780**	**2.369**	**2.915**	**3.625**	**1.440**	**2.212**	**1.431**	**4.770**	**3.677**	**2.628**	**3.891**

Appendix 4: Analytical Income Statement

Reformulated - Analytical income statement Business performance (DKK million)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Revenue	41.280	60.486	49.454	54.523	56.842	67.243	73.105	67.048	70.843	61.201	59.504
Cost of Sales	-23.328	-36.593	-30.191	-31.385	-31.605	-47.403	-47.224	-42.226	-44.966	-39.260	-40.544
Gross Profit	**17.952**	**23.893**	**19.263**	**23.138**	**25.237**	**19.840**	**25.881**	**24.822**	**25.877**	**21.941**	**18.960**
Gross margins	43%	40%	39%	42%	44%	30%	35%	37%	37%	36%	32%
Other External Expenses	-6.596	-8.066	-7.176	-6.334	-7.884	-8.177	-6.955	-7.147	-6.237	-4.078	-4.241
Employee Costs	-2.352	-2.539	-3.023	-2.945	-3.593	-3.639	-3.491	-3.336	-3.804	-3.088	-3.197
Share of Profit (Loss) in Associates and JV	-5	-48	74	77	36	-553	-768	-577	104	17	-129
Other Operating Income	395	82	241	295	280	852	705	2.466	2.933	4.867	11.665
Other Operating Expenses	-77	-33	-43	-57	-270	-244	-425	-323	-397	-558	-549
EBITDA	**9.317**	**13.289**	**9.336**	**14.174**	**13.806**	**8.079**	**14.947**	**15.905**	**18.476**	**19.101**	**22.509**
EBITDA margins	*23%*	*22%*	*19%*	*26%*	*24%*	*12%*	*20%*	*24%*	*26%*	*31%*	*38%*
Depreciation	-3097	-3645	-4813	-5526	-6754	-9172	-7.955	-9242	-8701	-5232	-5739
EBITA	**6.220**	**9.644**	**4.523**	**8.648**	**7.052**	**-1.093**	**6.992**	**6.663**	**9.775**	**13.869**	**16.770**
EBITA margins	*15%*	*16%*	*9%*	*16%*	*12%*	*-2%*	*10%*	*10%*	*14%*	*23%*	*28%*
Lease Adjustment	31	307	191	150	145	128	153	217	219	194	234
Adjusted EBITA	**6.251**	**9.951**	**4.714**	**8.798**	**7.197**	**-965**	**7.145**	**6.880**	**9.994**	**14.063**	**17.004**
Operating Cash Taxes	468	2.818	406	1.859	2.143	3.996	3.571	4.810	5.868	1.863	2.103
NOPLAT derived from EBITA	**5.784**	**7.133**	**4.309**	**6.939**	**5.054**	**-4.961**	**3.574**	**2.070**	**4.126**	**12.200**	**14.901**
NOPLAT margin	14%	12%	9%	13%	9%	-7%	5%	3%	6%	20%	25%

Operating Taxes	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Reported Tax	808	2924	1269	2997	3197	1309	1222	3171	2717	2191	1765
Corporate Tax rate	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
Taxes on Interest Income	325	604	586	750	1.278	812	720	1.157	2.041	1.868	936
Tax Shield on Interest Expenses	488	854	885	1.100	1.340	1.110	1.556	1.534	2.508	2.036	1.165
Tax Shield on Operating Lease Interest Expense	7	68	42	33	32	28	34	48	48	43	51
Operating Taxes on EBITA	**978**	**3.241**	**1.611**	**3.381**	**3.291**	**1.635**	**2.092**	**3.595**	**3.233**	**2.402**	**2.046**
Change in Deferred Tax Liabilities	-510	-423	-1.205	-1.522	-1.148	2.361	1.479	1.215	2.635	-539	57
Operating Cash Taxes on EBITA	**468**	**2.818**	**406**	**1.859**	**2.143**	**3.996**	**3.571**	**4.810**	**5.868**	**1.863**	**2.103**
Deferred Tax Liabilities	5.038	5.461	6.666	8.188	9.336	6.975	5.496	4.281	1.646	2.185	2.128
Amortisation and Impairment Losses	-1.442	-1.688	-692	-497	-916	-2.941	-5.008	-8.324	-17.033	0	-545
Adjusted EBIT	**4.809**	**8.263**	**4.022**	**8.301**	**6.281**	**-3.906**	**2.137**	**-1.444**	**-7.039**	**14.063**	**16.459**
Operating Cash Taxes	468	2.818	406	1.859	2.143	3.996	3.571	4.810	5.868	1.863	2.103
NOPAT derived from EBIT	4.342	5.445	3.617	6.442	4.138	-7.902	-1.434	-6.254	-12.907	12.200	14.356
NOPLAT margin	11%	9%	7%	12%	7%	-12%	-2%	-9%	-18%	20%	24%

Appendix 5: Analytical Balance sheet

Analytical Balance Sheet (DKK million) Total Funds Invested (Uses)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Current Operating Assets											
Working Cash (1% of Revenue)	413	605	495	545	568	672	731	670	708	612	595
Inventories	2.785	3.918	3.064	2.861	4.244	3.794	3.560	2.938	3.567	3.451	3.853
Trade receivables	8.845	10.985	8.164	9.681	7.634	7.888	8.875	8.346	7.739	7.286	9.170
Receivables from associates	238	183	27	2	553	667	253	50	56	49	0
Receivables in respect of sale of activities	101	111	111	131	1.261	267	253	50	0	0	0
Derivatives	8.032	21.709	15.282	14.461	16.060	12.622	9.147	11.193	15.642	8.689	4.870
Deposits	123	111	153	102	0	0	0	0	0	0	0
Other receivables	2.257	2.922	3.979	7.406	6.943	4.231	4.929	3.357	2.657	1.710	3.519
Construction contracts	53	52	67	61	41	853	1.890	1.811	3.864	6.453	10.817
Income Tax	753	11	422	27	19	189	169	192	329	430	296
Operating Current Assets	**23.600**	**40.607**	**31.764**	**35.277**	**37.323**	**31.183**	**29.807**	**28.607**	**34.562**	**28.680**	**33.120**
Current Operating Liabilities											
Provisions	69	229	212	444	517	597	719	537	1.434	702	680
Trade payables	5.488	8.155	4.997	6.148	9.377	9.581	7.329	9.031	10.673	10.024	11.499
Payables to associates	36	24	58	43	0	0	0	0	0	0	0
Derivatives	6.933	14.644	12.380	13.350	13.095	12.523	8.519	8.323	9.531	6.930	4.374
Other liabilities	5.319	4.624	6.935	8.043	8.353	7.821	7.658	5.905	7.908	6.277	6.368
Construction contracts	0	0	0	0	0	0	415	1.667	671	171	1.317
Income tax	39	420	39	621	763	1.859	986	2.584	2.657	54	1.498
Operating Current Liabilities	**17.884**	**28.096**	**24.621**	**28.649**	**32.105**	**32.381**	**25.626**	**28.047**	**32.874**	**24.158**	**25.736**
Non-current Operating Assets											
Investments in associates	3.912	3.306	3.605	2.919	3.226	3.055	2.013	1.315	1.421	1.060	339
Other Equity Investments	29	85	1.374	374	418	382	261	242	191	158	130
Deferred tax	31	13	281	404	181	294	130	632	274	88	2.865
Other receivables	439	468	1.731	2.309	3.223	3.672	0	541	839	636	1.508
Construction contracts	0	1.197	1.763	0	0	0	0	0	0	0	0
Operating Non-Current Assets	**4.411**	**5.069**	**8.754**	**6.006**	**7.048**	**7.403**	**2.404**	**2.730**	**2.725**	**1.942**	**4.842**

Non-current Operating Liabilities											
Provisions	5.715	5.466	7.260	9.418	11.936	12.496	12.891	15.397	17.754	8.337	10.840
Other payables	1.020	1.624	1.970	1.688	2.329	3.337	3.958	4.599	5.913	6.622	5.714
Operating Non-Current Liabilities	**6.735**	**7.090**	**9.230**	**11.106**	**14.265**	**15.833**	**16.849**	**19.996**	**23.667**	**14.959**	**16.554**
Operating Working Capital	5.716	12.511	7.143	6.628	5.218	-1.198	4.181	560	1.688	4.522	7.384
Net Other Operating Assets	-2.324	-2.021	-476	-5.100	-7.217	-8.430	-14.445	-17.266	-20.942	-13.017	-11.712
Net Property plant and equipment	53.930	53.995	70.130	80.685	94.510	96.307	91.522	85.906	80.229	70.182	75.845
Capitalized Operating Leases	699	6.828	4.249	3.326	3.221	2.844	3.933	4.495	4.248	3.986	6.095
Intangible Assets excl. Goodwill	2.414	2.274	2.489	2.100	2.356	1.935	1.676	1.088	1.009	830	564
Invested Capital excl. Goodwill	**60.435**	**73.587**	**83.535**	**87.639**	**98.089**	**91.458**	**86.867**	**74.783**	**66.232**	**66.503**	**78.176**
Goodwill	322	447	663	651	373	490	491	281	125	125	125
Invested Capital incl. Goodwill	**60.757**	**74.034**	**84.198**	**88.290**	**98.462**	**91.948**	**87.358**	**75.064**	**66.357**	**66.628**	**78.301**
Interest Bearing Assets											
Securities	134	753	2.570	7.620	9.914	14.914	16.118	24.948	21.221	16.533	25.280
Excess Cash	2.149	2.438	4.004	3.602	1.774	2.914	2.163	5.364	4.257	2.319	3.608
Net Assets classified as held for sale	1.952	100	76	682	299	4.162	278	0	1.452	1.869	2.012
Receivables related to Gain on Divestments of Enterprises	212	315	102	553	91	105	1.211	990	744	505	495
Total funds invested	**65.204**	**77.640**	**90.950**	**100.747**	**110.539**	**114.043**	**107.128**	**106.366**	**94.031**	**87.854**	**109.696**

Total Funds Invested (Sources)											
Pension obligations	41	38	21	22	15	13	0	0	0	0	0
Short-Term Bank Loans and Issued Bonds	2.512	2.112	1.798	4.397	5.512	5.632	9.389	208	4.626	2.019	3.921
Long-Term Bank Loans and Issued Bonds	14.703	17.011	33.408	33.506	34.715	48.563	36.767	35.849	31.775	22.164	25.715
Hybrid Capital (50%)	4.044	4.044	4.044	4.044	4.769	4.769	6.618	6.618	6.624	6.624	6.620
Capitalized Operating Leases	699	6.828	4.249	3.326	3.221	2.844	3.933	4.495	4.248	3.986	6.095
Debt and Debt Equivalents	**21.999**	**30.033**	**43.520**	**45.295**	**48.232**	**61.821**	**56.707**	**47.170**	**47.273**	**34.793**	**42.351**
Deferred tax	5.038	5.461	6.666	8.188	9.336	6.975	5.496	4.281	1.646	2.185	2.128
Share capital	2.937	2.937	2.937	2.937	2.937	2.937	2.937	4.177	4.177	4.204	4.204
Reserves	-293	702	9.256	8.287	7.913	7.892	8.431	20.428	20.855	20.218	-1.524
Retained Earnings	29.964	32.490	23.944	26.278	29.400	22.592	20.231	17.131	7.058	14.684	52.111
Proposed dividends	1.469	1.926	481	2.203	0	0	0	0	0	0	0
Hybrid Capital (50%)	4.044	4.044	4.044	4.044	4.769	4.769	6.618	6.618	6.624	6.624	6.620
Non-controlling interest	46	47	102	3.515	7.952	7.057	6.708	6.561	6.398	5.146	3.807
Equity and Equity Equivalents	**43.205**	**47.607**	**47.430**	**55.452**	**62.307**	**52.222**	**50.421**	**59.196**	**46.758**	**53.061**	**67.346**
Total funds invested	**65.204**	**77.640**	**90.950**	**100.747**	**110.539**	**114.043**	**107.128**	**106.366**	**94.031**	**87.854**	**109.696**
Net Interest Bearing Debt (NIBD)	**17.552**	**26.427**	**36.768**	**32.838**	**36.155**	**39.726**	**36.937**	**15.868**	**19.599**	**13.567**	**10.956**
Debt-to-Equity	0,41	0,56	0,78	0,59	0,58	0,76	0,73	0,27	0,42	0,26	0,16
Weight of Debt	34%	39%	48%	45%	44%	54%	53%	44%	50%	40%	39%
Weight of Equity	66%	61%	52%	55%	56%	46%	47%	56%	50%	60%	61%

Appendix 6: Summarized Analytical Balance sheet

Analytical Balance Sheet (DKK million) Total Funds Invested (Uses)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Operating Current Assets	23.600	40.607	31.764	35.277	37.323	31.183	29.807	28.607	34.562	28.680	33.120
Operating Current Liabilities	17.884	28.096	24.621	28.649	32.105	32.381	25.626	28.047	32.874	24.158	25.736
Operating Working Capital	**5.716**	**12.511**	**7.143**	**6.628**	**5.218**	**-1.198**	**4.181**	**560**	**1.688**	**4.522**	**7.384**
Operating Non-Current Assets	4.411	5.069	8.754	6.006	7.048	7.403	2.404	2.730	2.725	1.942	4.842
Operating Non-Current Liabilities	6.735	7.090	9.230	11.106	14.265	15.833	16.849	19.996	23.667	14.959	16.554
Net Other Operating Assets	**-2.324**	**-2.021**	**-476**	**-5.100**	**-7.217**	**-8.430**	**-14.445**	**-17.266**	**-20.942**	**-13.017**	**-11.712**
Net Property plant and equipment	53.930	53.995	70.130	80.685	94.510	96.307	91.522	85.906	80.229	70.182	75.845
Capitalized Operating Leases	699	6.828	4.249	3.326	3.221	2.844	3.933	4.495	4.248	3.986	6.095
Intangible Assets excl. Goodwill	2.414	2.274	2.489	2.100	2.356	1.935	1.676	1.088	1.009	830	564
Invested Capital excl. Goodwill	**60.435**	**73.587**	**83.535**	**87.639**	**98.089**	**91.458**	**86.867**	**74.783**	**66.232**	**66.503**	**78.176**
Goodwill	322	447	663	651	373	490	491	281	125	125	125
Invested Capital incl. Goodwill	**60.757**	**74.034**	**84.198**	**88.290**	**98.462**	**91.948**	**87.358**	**75.064**	**66.357**	**66.628**	**78.301**
Interest Bearing Assets	4.447	3.606	6.752	12.457	12.078	22.095	19.770	31.302	27.674	21.226	31.395
Total Funds Invested	**65.204**	**77.640**	**90.950**	**100.747**	**110.539**	**114.043**	**107.128**	**106.366**	**94.031**	**87.854**	**109.696**
Total Funds Invested (Sources)											
Debt (Short & Long Term)	17.256	19.161	35.227	37.925	40.242	54.208	46.156	36.057	36.401	24.183	29.636
Hybrid Capital (50%)	4.044	4.044	4.044	4.044	4.769	4.769	6.618	6.618	6.624	6.624	6.620
Capitalized Operating Leases	699	6.828	4.249	3.326	3.221	2.844	3.933	4.495	4.248	3.986	6.095
Debt and Debt Equivalents	**21.999**	**30.033**	**43.520**	**45.295**	**48.232**	**61.821**	**56.707**	**47.170**	**47.273**	**34.793**	**42.351**
Net Interest Bearing Debt (NIBD)	**17.552**	**26.427**	**36.768**	**32.838**	**36.155**	**39.726**	**36.937**	**15.868**	**19.599**	**13.567**	**10.956**
Deferred tax	5.038	5.461	6.666	8.188	9.336	6.975	5.496	4.281	1.646	2.185	2.128
Share capital	2.937	2.937	2.937	2.937	2.937	2.937	2.937	4.177	4.177	4.204	4.204
Reserves	-293	702	9.256	8.287	7.913	7.892	8.431	20.428	20.855	20.218	-1.524
Retained Earnings	29.964	32.490	23.944	26.278	29.400	22.592	20.231	17.131	7.058	14.684	52.111
Proposed dividends	1.469	1.926	481	2.203	0	0	0	0	0	0	0
Hybrid Capital (50%)	4.044	4.044	4.044	4.044	4.769	4.769	6.618	6.618	6.624	6.624	6.620
Non-controlling interest	46	47	102	3.515	7.952	7.057	6.708	6.561	6.398	5.146	3.807
Equity and Equity Equivalents	**43.205**	**47.607**	**47.430**	**55.452**	**62.307**	**52.222**	**50.421**	**59.196**	**46.758**	**53.061**	**67.346**
Total funds invested	**65.204**	**77.640**	**90.950**	**100.747**	**110.539**	**114.043**	**107.128**	**106.366**	**94.031**	**87.854**	**109.696**
Check	0	0	0	0	0	0	0	0	0	0	0

Appendix 7: Common size income statement

Common size income Statement	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Revenue	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cost of Sales	-57%	-60%	-61%	-58%	-56%	-70%	-65%	-63%	-63%	-64%	-68%
Gross Profit	43%	40%	39%	42%	44%	30%	35%	37%	37%	36%	32%
Other External Expenses	-16%	-13%	-15%	-12%	-14%	-12%	-10%	-11%	-9%	-7%	-7%
Employee Costs	-6%	-4%	-6%	-5%	-6%	-5%	-5%	-5%	-5%	-5%	-5%
Share of Profit (Loss) in Associates and JV	0%	0%	0%	0%	0%	-1%	-1%	-1%	0%	0%	0%
Other Operating Income	1%	0%	0%	1%	0%	1%	1%	4%	4%	8%	20%
Other Operating Expenses	0%	0%	0%	0%	0%	0%	-1%	0%	-1%	-1%	-1%
EBITDA	**23%**	**22%**	**19%**	**26%**	**24%**	**12%**	**20%**	**24%**	**26%**	**31%**	**38%**
Depreciation	-8%	-6%	-10%	-10%	-12%	-14%	-11%	-14%	-12%	-9%	-10%
EBITA	**15%**	**16%**	**9%**	**16%**	**12%**	**-2%**	**10%**	**10%**	**14%**	**23%**	**28%**
Lease Adjustment	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adjusted EBITA	**15%**	**16%**	**10%**	**16%**	**13%**	**-1%**	**10%**	**10%**	**14%**	**23%**	**29%**
Operating Cash Taxes	1%	5%	1%	3%	4%	6%	5%	7%	8%	3%	4%
NOPLAT derived from EBITA	**14%**	**12%**	**9%**	**13%**	**9%**	**-7%**	**5%**	**3%**	**6%**	**20%**	**25%**

Common size income Statement	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Revenue	41%	60%	49%	55%	57%	67%	73%	67%	71%	61%	60%
Cost of Sales	57%	60%	61%	58%	56%	70%	65%	63%	63%	64%	68%
Other External Expenses	16%	13%	15%	12%	14%	12%	10%	11%	9%	7%	7%
Employee Costs	6%	4%	6%	5%	6%	5%	5%	5%	5%	5%	5%
Other Operating Income	1%	0%	0%	1%	0%	1%	1%	4%	4%	8%	20%
Depreciation	8%	6%	10%	10%	12%	14%	11%	14%	12%	9%	10%
EBITDA	23%	22%	19%	26%	24%	12%	20%	24%	26%	31%	38%

Appendix 8: Days-on-hand analysis of the balance sheet

Analytical Balance Sheet (DKK million) Days on hand analysis	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Current Operating Assets											
Working Cash (1% of Revenue)	4	4	4	4	4	4	4	4	4	4	4
Inventories	24	23	22	19	27	20	18	16	18	20	23
Trade receivables	77	65	59	64	48	42	44	45	39	43	55
Receivables from associates	2	1	0	0	4	4	1	0	0	0	0
Receivables in respect of sale of activities	1	1	1	1	8	1	1	0	0	0	0
Derivatives	70	129	111	95	102	68	45	60	79	51	29
Deposits	1	1	1	1	0	0	0	0	0	0	0
Other receivables	20	17	29	49	44	23	24	18	14	10	21
Construction contracts	0	0	0	0	0	5	9	10	20	38	65
Income Tax	7	0	3	0	0	1	1	1	2	3	2
Operating Current Assets	**206**	**242**	**231**	**233**	**236**	**167**	**147**	**154**	**176**	**169**	**200**
Current Operating Liabilities											
Provisions	1	1	2	3	3	3	4	3	7	4	4
Trade payables	48	49	36	41	59	51	36	48	54	59	70
Payables to associates	0	0	0	0	0	0	0	0	0	0	0
Derivatives	60	87	90	88	83	67	42	45	48	41	26
Other liabilities	46	28	50	53	53	42	38	32	40	37	39
Construction contracts	0	0	0	0	0	0	2	9	3	1	8
Income tax	0	2	0	4	5	10	5	14	14	0	9
Operating Current Liabilities	**156**	**167**	**179**	**189**	**203**	**173**	**126**	**151**	**167**	**142**	**156**

Non-current Operating Assets											
Investments in associates	34	20	26	19	20	16	10	7	7	6	2
Other Equity Investments	0	1	10	2	3	2	1	1	1	1	1
Deferred tax	0	0	2	3	1	2	1	3	1	1	17
Other receivables	4	3	13	15	20	20	0	3	4	4	9
Construction contracts	0	7	13	0	0	0	0	0	0	0	0
Operating Non-Current Assets	**38**	**30**	**64**	**40**	**45**	**40**	**12**	**15**	**14**	**11**	**29**
Non-current Operating Liabilities											
Provisions	50	33	53	62	76	67	63	83	90	49	66
Other payables	9	10	14	11	15	18	19	25	30	39	35
Operating Non-Current Liabilities	**59**	**42**	**67**	**73**	**90**	**85**	**83**	**107**	**120**	**88**	**100**
Operating Working Capital	50	74	52	44	33	-6	21	3	9	27	45
Net Other Operating Assets	-20	-12	-3	-34	-46	-45	-71	-93	-106	-77	-71
Net Property plant and equipment	470	321	511	533	599	516	451	461	408	413	459
Capitalized Operating Leases	6	41	31	22	20	15	19	24	22	23	37
Intangible Assets excl. Goodwill	21	14	18	14	15	10	8	6	5	5	3
Invested Capital excl. Goodwill	**527**	**438**	**608**	**579**	**621**	**490**	**428**	**402**	**337**	**391**	**473**
Turnover rate of capital		35%	24%	27%	27%	21%	29%	31%	37%	33%	26%

Appendix 9: Historical FCF

Pro Forma Cash Flows	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
NOPLAT	5.784	7.133	4.309	6.939	5.054	-4.961	3.574	2.070	4.126	12.200	14.901
Depreciation	3.097	3.645	4.813	5.526	6.754	9.172	7.955	9.242	8.701	5.232	5.739
Gross Cash Flow	**8.881**	**10.778**	**9.122**	**12.465**	**11.808**	**4.211**	**11.529**	**11.312**	**12.827**	**17.432**	**20.640**
Less: Increase in Net Working Capital		6.795	-5.368	-514	-1.410	-6.416	5.379	-3.621	1.128	2.834	2.862
Less: Increase in CAPEX		3.570	21.163	15.692	20.835	10.548	2.911	3.038	2.945	-4.994	11.136
Less: Increase in Capatitalized Operating Leases		6.129	-2.578	-924	-104	-378	1.089	562	-247	-262	2.109
Less: Increase in Net long-term Operating Assets		303	1.545	-4.624	-2.117	-1.213	-6.015	-2.821	-3.676	7.925	1.305
Gross Investment		**16.797**	**14.761**	**9.630**	**17.204**	**2.541**	**3.364**	**-2.842**	**150**	**5.503**	**17.412**
Reinvestment		*23.366*	*-18.635*	*8.148*	*4.002*	*14.147*	*6.966*	*-6.756*	*3.548*	*-10.477*	*-2.230*
FCF		**-6.019**	**-5.640**	**2.835**	**-5.396**	**1.670**	**8.165**	**14.154**	**12.677**	**11.929**	**3.228**

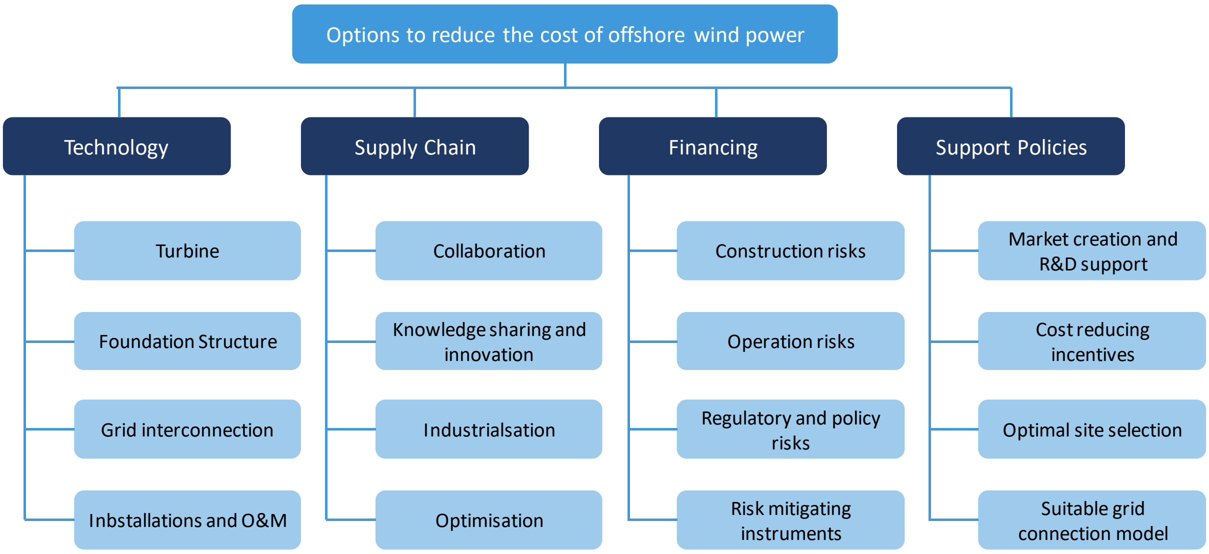
Source: Authors' own creation from Ørsted's annual reports 2007-2017

Appendix 10: Pro Forma values

Historical values	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Revenue Growth		47%	-18%	10%	4%	18%	9%	-8%	6%	-14%	-3%
Revenue	41,280	60,486	49,454	54,523	56,842	67,243	73,105	67,048	70,843	61,201	59,504
EBITDA margin		22%	19%	26%	24%	12%	20%	24%	26%	31%	38%
Depreciation/CAPEX		102%	23%	35%	32%	87%	273%	304%	295%	-105%	52%
CAPEX/Revenue		6%	43%	29%	37%	16%	4%	5%	4%	-8%	19%
Change in NWC/Revenue		11%	-11%	-1%	-2%	-10%	7%	-5%	2%	5%	5%
Invested Capital excl. Goodwill	60435	73587	83535	87639	98089	91458	86867	74783	66232	66503	78176
Wind Power EBITDA	605	677	609	1730	1799	2479	4252	6057	6151	11867	20595
Ørsted EBITDA	9,317	13,289	9,336	14,174	13,806	8,079	14,947	15,905	18,476	19,101	22,509
Pro forma values	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**
Revenue Growth	2.00%	2.00%	2.00%	2.00%	2.00%	1.80%	1.60%	1.40%	1.20%	1.00%	1.00%
Revenue	60694	61908	63146	64409	65697	66880	67950	68901	69728	70425	71129
EBITDA margin	37.83%	37.83%	37.83%	35.71%	35.71%	33.17%	30.63%	28.08%	25.54%	24.27%	23.00%
Depreciation/CAPEX	47%	44%	40%	37%	39%	45%	52%	62%	77%	99%	100%
CAPEX/Revenue	20%	22%	24%	26%	25%	22%	19%	15%	13%	10%	10%
Change in NWC/Revenue	0.24%	0.24%	0.24%	0.24%	0.24%	0.21%	0.19%	0.17%	0.14%	0.12%	0.12%
Invested Capital excl. Goodwill	84909	92890	102265	113198	123490	131744	137968	142173	144370	144570	144704
Wind Power EBITDA	22959	23418	23887	23000	23460	22182	20810	19350	17810	17093	16360
Ørsted EBITDA	22959	23418	23887	23000	23460	22182	20810	19350	17810	17093	16360

Source: Authors' own creation

Appendix 11: LCoE details



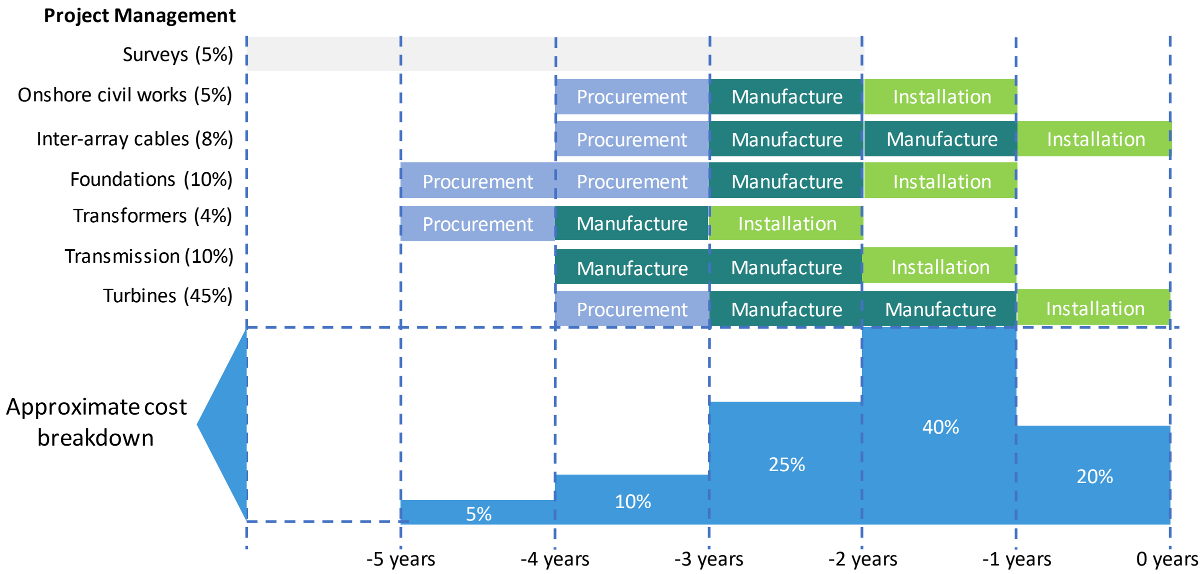
Source: Authors' own creation from (Poudineh et al. 2017)

Appendix 12: Entry barriers

	Netherlands	Denmark	Germany	UK	US
Type of subsidy allocation:	Tender	Tender	Auction	Auction	Auction
Pre-development:					
Site lease	Government	Government	Developer	Developer	Developer
Environmental Study	Government	Government	Developer	Developer	Developer
Seabed study	Government	Government	Developer	Developer	Developer
Consent (permit)	Government	Government	Developer	Developer	Developer
Grid connection	Government	Government	Developer	Developer	Developer
Installation:					
Onshore substation	TSO	TSO	TSO	Developer	Developer
Export cable	TSO	TSO	TSO	Developer	Developer
Offshore substation	TSO	TSO	Developer	Developer	Developer
Array Cables	Developer	Developer	Developer	Developer	Developer
Foundation	Developer	Developer	Developer	Developer	Developer
Wind Turbines	Developer	Developer	Developer	Developer	Developer
Operations:					
Compensation for transmission disruptions	Yes	Yes	Yes	No	No
Development risk	Low	Low	High	High	High
Entry Barriers	Low	Low	High	High	High

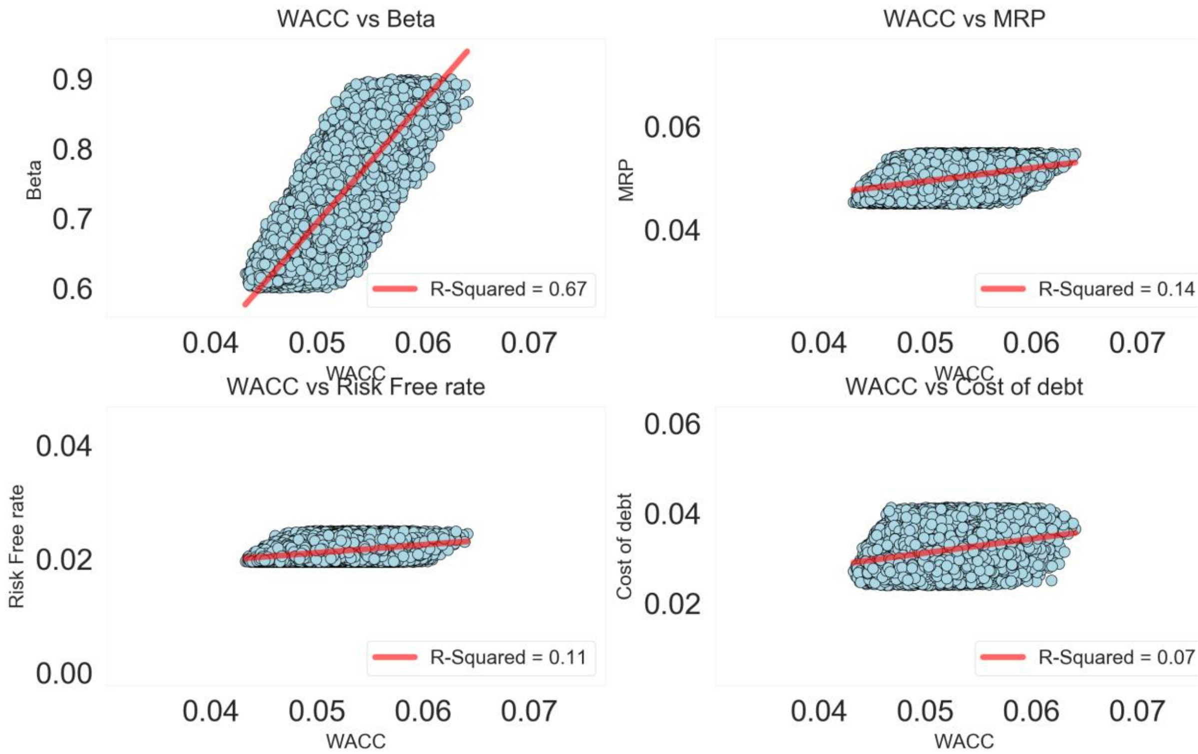
Source: Authors' own creation from (ISLES, 2015)

Appendix 13: Typical supply chain in offshore wind



Source: Authors' own creation from (Freshney, et al., 2017).

Appendix 14: WACC regression analysis



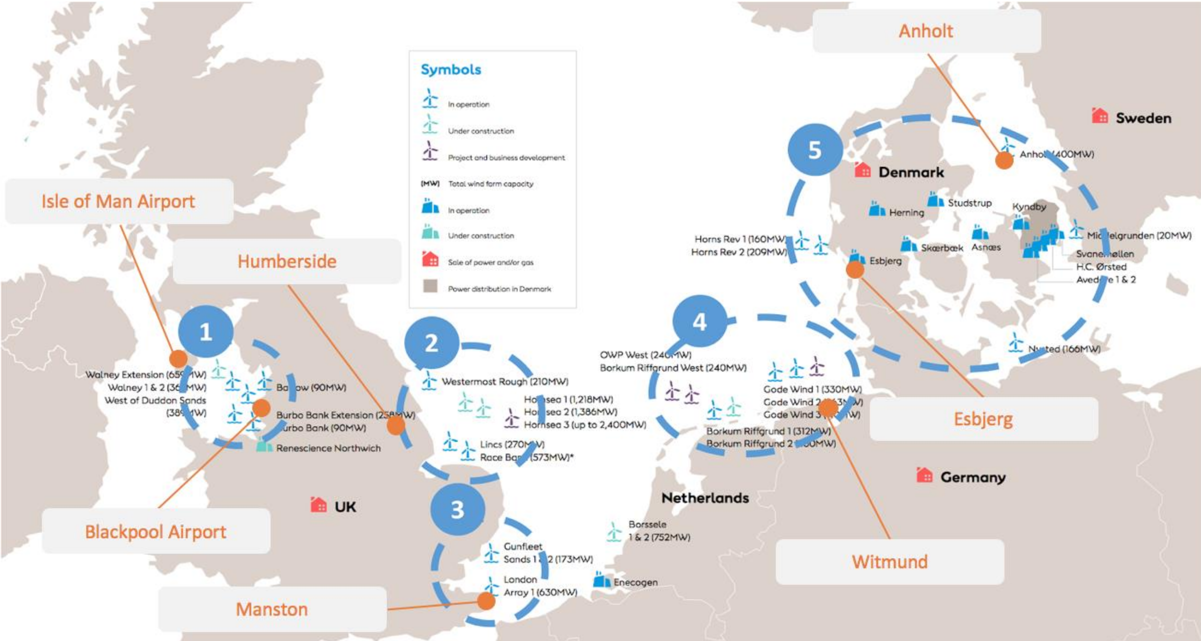
Source: Authors' own creation with use of Python

Appendix 15: Historical WACC

Business EBITDA	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Exploration & Production	2.290	4.261	3.264	5.051	5.684	6.552	7.324	8.591	9.754	6.507	6.436
Wind Power	605	677	609	1.730	1.799	2.479	4.252	6.057	6.151	11.867	20.595
Thermal Power	3.164	2.388	388	2.228	2.255	1.067	744	422	283	100	152
Sales & Distribution	3.543	6.179	4.964	5.100	4.383	-1.455	2.348	1.404	2.173	7.108	2.082
Total	**9.602**	**13.505**	**9.225**	**14.109**	**14.121**	**8.643**	**14.668**	**16.474**	**18.361**	**25.582**	**29.265**
Breakdown of Business EBITDA	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Exploration & Production	24%	32%	35%	36%	40%	76%	50%	52%	53%	25%	22%
Wind Power	6%	5%	7%	12%	13%	29%	29%	37%	34%	46%	70%
Thermal Power	33%	18%	4%	16%	16%	12%	5%	3%	2%	0%	1%
Sales & Distribution	37%	46%	54%	36%	31%	-17%	16%	9%	12%	28%	7%
Unlevered Beta corrected for Cash	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Oil (Production and Exploration)	1,01	1,05	1,27	1,27	1,36	1,11	1,19	1,29	0,98	0,85	0,81
Power	2,08	1,74	0,9	0,69	0,74	0,44	0,52	0,23	0,61	0,56	0,43
Natural Gas Distribution	0,52	0,53	0,42	0,58	0,61	0,47	0,66	0,57	1,01	0,92	0,9
Market Value of Equity	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Oil/Gas (Production and Exploration)	90%	90%	70%	62%	84%	81%	78%	71%	51%	36%	45%
Power	85%	88%	45%	49%	47%	40%	38%	52%	52%	52%	51%
Natural Gas Distribution	62%	72%	55%	62%	57%	63%	65%	57%	55%	48%	47%
WACC	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Risk Free rate	4,8%	4,6%	4,5%	4,4%	4,1%	3,9%	3,5%	3,2%	3,0%	2,7%	2,3%
Weighted Unlevered Beta	1,25	0,97	0,77	0,86	0,95	0,94	0,88	0,81	0,85	0,73	0,55
Relevered Beta	1,52	1,14	1,17	1,32	1,33	1,28	1,27	1,18	1,47	0,95	0,67
Implied Market Risk Premium	4,4%	6,4%	4,4%	5,2%	6,0%	5,8%	5,0%	5,8%	6,1%	5,7%	5,1%
Cost of Equity	**11,4%**	**11,9%**	**9,6%**	**11,2%**	**12,1%**	**11,3%**	**9,8%**	**10,1%**	**12,0%**	**8,1%**	**5,7%**
Pre-tax Cost of Debt	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	4,5%	3,8%
Corporate Tax Rate	25%	25%	25%	25%	25%	25%	25%	25%	22%	22%	22%
Cost of Debt	**3,4%**	**3,4%**	**3,4%**	**3,4%**	**3,4%**	**3,4%**	**3,4%**	**3,4%**	**3,5%**	**3,5%**	**3,0%**
Market Value of Equity	78%	81%	59%	58%	65%	68%	62%	62%	52%	73%	78%
Market Value of Debt	22%	19%	41%	42%	35%	32%	38%	38%	48%	27%	22%
Implied D/E	29%	23%	69%	71%	54%	48%	60%	61%	93%	37%	29%
Historical WACC	**9,60%**	**10,28%**	**7,07%**	**7,95%**	**9,05%**	**8,71%**	**7,40%**	**7,56%**	**7,89%**	**6,84%**	**5,12%**

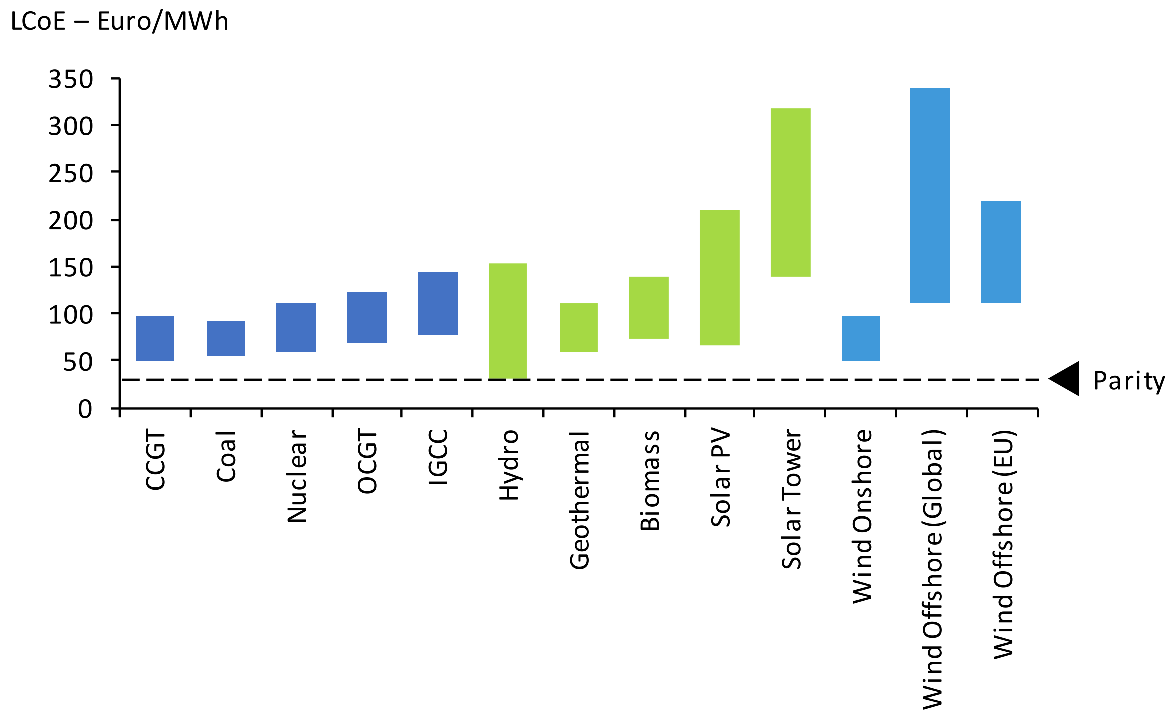
Source: Authors' own creation from Ørsted's annual reports 2007-2017

Appendix 16: Wind model data



Source: Authors' own creation from (Ørsted, 2017d)

Appendix 17: LCoE level for energy sources



Source: Authors' own creation from (BNEF, 2017)

Appendix 18: Ørsted's Competitors

Centrica is an English company that provides electricity, natural gas and home services.

EDF is a French energy company involved in the generation, distribution and transmission of electric energy and sales of natural gas.

EDPR is a Spanish renewable energy company developing, building and operating wind farms and solar plants.

Enel is an Italian company involved in the generation, distribution, transmission and supply of electricity.

Engie is a French company operating in the generation and distribution of electricity, as well as natural gas, nuclear power and renewable energy.

E.ON is an supplier of energy headquartered in Germany. It is involved in the generation and distribution of electricity, natural gas and exploration and production of oil and gas.

Fortum is a Finnish state-owned energy company involved in the generation, distribution and sale of electricity and heat.

Iberdrola is a Spanish company engaged in the production of electricity from renewable and conventional sources.

RWE is headquartered in Germany and is involved in the distribution and generation of electricity and natural gas.

SSE is a Scottish company involved in the generation and supply of electricity and gas. The company operates throughout the United Kingdom.

Source: Authors' own creation from Bloomberg

Appendix 19: Regression output

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.51711691
R Square	0.267409898
Adjusted R Square	0.225547607
Standard Error	3.980845413
Observations	38

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	202.4580746	101.2290373	6.387846636	0.00431587
Residual	35	554.6495569	15.8471302		
Total	37	757.1076316			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	5.846146284	0.92701511	6.306419625	3.05456E-07	3.964205559	7.728087009	3.964205559	7.728087009
Reinvestment	5.455439057	2.589367477	2.106861658	0.0423677	0.198743612	10.7121345	0.198743612	10.7121345
Sales Growth 2017	0.177413691	0.059687313	2.972385306	0.005316817	0.056242004	0.298585377	0.056242004	0.298585377

Source: Authors' own creation