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An opportunity gone with the wind?

An inquiry into Equinor's opportunity to achieve a similar success as Ørsted's transformation from black to green

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Abstract

This paper examines if Equinor can achieve a similar success as Ørsted did when it became the world's first energy company to transform its energy output from fossil-based to renewables-based. This assessment is done through identifying the critical factors that enabled Ørsted's success and discussing whether these same critical factors still carry the characteristics demonstrated throughout Ørsted's transformation in Equinor's impending transformation. The disclosing of the critical factors that enabled Ørsted's success is conducted through a project-by-project analysis of the company's offshore-wind projects relevant to its transformation. Here, we calculate the weighted average lifecycle IRR (LCIRR) of Ørsted's entire offshore-wind portfolio to use as a foundation to seek out the drivers behind all aspects of IRR, i.e., revenue, costs, and investments, that contributed to the company's success. Our analysis reveals that the root cause of Ørsted's success was its first-mover advantage in offshore wind, as this permitted it to leverage the critical factors of strong governmental support to secure high and stable revenues, early-on know-how to reduce costs and an effective funding strategy to accelerate the growth of the company's offshore-wind portfolio. By calculating the LCIRR of Equinor's offshore-wind portfolio and analysing the characteristics of each critical success factor, we reveal that Equinor's transformation will not achieve a similar success to Ørsted's. A key finding is that the LCIRR of the relevant projects to Equinor's transformation will be lower than that achieved by Ørsted. Consequently, in suggesting what Equinor may do to exploit the full potential of the company's expansion in offshore wind, we look to the required returns. In this context, we find that Equinor currently does not benefit from the ESG investor sentiment and suggest that the company should do a spin-off to fully capitalise on its transformation from black to green.

Preface

This thesis is written as a part of our Master of Science in Financial Economics at the Norwegian School of Economics (NHH) and marks the end of our time at NHH.

Our time at NHH, combined with professional work experience through internships in both equity research and investment banking, has provided us with a solid foundation to write this thesis. Furthermore, witnessing the increased attention on the topic of energy transitions and offshore wind specifically, even during the writing of this thesis, has been a motivating factor. Despite being challenging at times, our combined interest in company analysis and financial valuations has made developing our thesis an enriching and instructive experience.

Throughout writing this thesis, we have received considerable help and support from people who deserve our grateful acknowledgements. First, we would like to thank our supervisor, Thore Johnsen, for motivating, constructive feedback, and support throughout the process. Your sincere and candid guidance has been truly appreciated. Moreover, we would like to thank John Olaisen and Casper Blom from ABG Sundal Collier for interesting discussions about both Equinor and Ørsted. We would also like to thank Teodor Sveen-Nilsen in SpareBank 1 Markets for valuable contributions to our analysis, and Magnus Solheim in Fearnley Securities in discussing where to retrieve data. Without these contributions, our thesis would be completely different. We also extend our appreciation to Mette Bjørndal for giving us valuable insight into the mechanics behind the electricity market.

Lastly, we would like to thank lecturers and fellow students, being the ones who have truly given us knowledge, motivation, and good memories, and for making the years at NHH unforgettable.

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1. Introduction

Climate change, energy transitions and a small Danish energy company

The global collective commitment to combat the threat of climate change was embodied in the Paris Agreement signed in 2016. Here, 189 nations across the world pledged, under the aegis of the UN, to keep the rise in global average temperatures below 1.5-2 degrees Celsius above pre-industrial levels. Hence, the energy transition is high on the global agenda, manifesting a path towards transforming the global energy sector from fossil-based to zero-emissions by 2050. The vast extent of the policies put the EU on track to reduce emissions by 60% from 1990 levels by the second half of this century (The Economist, 2019a). Furthermore, the commission estimates the need for an abundance of capital to combat climate change, in which an additional EUR 175-290 billion of investments will be needed every year, with significant contributions from private investors (European Union, 2019).

Incidentally, the information presented above has become common knowledge. What is perhaps less known is the very company that has already executed a successful energy transition, starting its transformation almost a decade before the Paris Agreement was signed. The Danish energy company Ørsted (then DONG Energy) announced its major strategic shift in 2009 whereby the company sought to transform its energy generation from 85% fossil-fuel based to 85% renewables-based by 2040. To turn its business around, Ørsted invested aggressively in offshore wind and phased out oil and gas, and by 2019, the company had become the world's largest producer of clean offshore-wind energy. The company also raised its renewable energy generation share to 86%, hitting its target 21 years ahead of schedule (Tryggestad, 2020). Since its Initial Public Offering (IPO) in 2016, Ørsted's market capitalisation has more than quadrupled and outperformed its old oil and gas rivals.

A global issue requires collective effort, which accordingly has put the oil and gas industry under increasing pressure from both governments and the public to participate in the energy transition. The response is sincere, and Rystad Energy (2020), an energy-consultancy company, predicts that the world's oil majors are collectively poised to spend just over USD 18 billion on specific renewable energy projects by 2025. Rystad Energy further predicts that Equinor, the Norwegian oil major, will contribute with 55% of the spending, underpinning the company's commitment to its strategy to achieve carbon neutral operations by 2030, and to reduce greenhouse gas emissions in Norway to near zero by 2050. As Equinor states, this will be achieved by increasing the company's renewable energy capacity tenfold by 2026 from today's levels and developing as a global offshore-wind major, while strengthening its industry-leading position on carbon-efficient production over the next 30 years (Rystad Energy, 2020).

In this paper, we seek to understand the contributing factors to a company's successful energy transition by assessing the transformation of Ørsted. As a natural extension to the emerging trends among oil majors, we then try to assess whether Equinor's impending transformation can achieve a success similar to Ørsted's. Our approach is therefore to uncover the factors that made Ørsted's transformation a success and assess whether these same factors will enable a similarly successful transformation for Equinor. Lastly, we discuss measures Equinor can take to fully exploit the potential of the company's impending energy transition. The particular emphasis of our thesis is the offshore-wind industry, which is the industry representing the replacement of traditional fossil-fuels for both Ørsted and Equinor.

Research topic

In this section, we briefly explain the motivation behind our choice of topic and the problem statement of our thesis.

Motivation behind the choice of our topic

Most reports from industry-players regarding the energy transition concern estimates about the future developments in the energy output. To mention some, BP, IEA, BNEF, Wood MacKenzie and DNV GL[1] all provide an outlook on how the energy output will be over the coming years, and decades, where the consensus seems to be a shift towards more renewable energy sources. We, however, wish to add to this forward-looking perspective by directing the attention to a successful energy transition that has already happened. We argue that assessing an energy transition at a company-level provides insights into the aspects that allow for such a company transformation to be successful.

[1] BP Energy Outlook 2020, IEA Energy Outlook 2020, BNEF New Energy Outlook 2020, Wood MacKenzie Energy Transition Outlook 2020, DNV GL Energy Transition Outlook 2020.

Furthermore, we believe research on energy transitions is highly relevant, as evident from its position on the global agenda. Narrowed down to the impending transformation of oil majors, there seems to be no clear answer to how, and if, they will succeed. Of course, this depends on how one defines success, where we believe inspiration for such a definition could be found in previously successful transformations such as Ørsted's. In this context, this thesis considers the financial success Ørsted achieved whilst transforming the company's energy output from fossil-based to renewables-based.

In addition, several political parties in Norway have suggested rapidly discontinuing all oil and gas operations on the Norwegian continental shelf, ascertaining a swift response to reach the climate goals. On the other hand, Equinor's former CEO, Eldar Sætre, argued that such actions are unnatural and would be (economically) unwise as opposed to letting the reserves dwindle naturally (Sølhusvik et al., 2019). As implicit from this disagreement, alignment between financial success and success in terms of rapidly reducing emissions is not necessarily present in all suggestions about resolving the issue. In this context, we believe contributions seeking to identify potential for financial success in energy transitions assist by providing a more exhaustive understanding of the solutions to combat climate change. Without implying that we provide such an exhaustive understanding through this thesis, we believe a discussion of Equinor's current tactic to reduce emissions at least contributes to the conversation.

Problem statement

With the motivations presented above, we have developed the following problem statement: *Does Equinor's commitment to renewable energy sources have the potential to achieve a similar success as Ørsted did when becoming the world's first energy company to execute a transformation from black to green?* In this context, we define Ørsted's success as the ability to transform the company's energy output from fossil-based to renewables-based, whilst creating shareholder value through a successful expansion in the offshore-wind market.

2. Ørsted's journey from black to green

In this section we describe the story of how Ørsted made the transformation from a fossil fuel-based company to becoming a world leader in green energy and sustainable practices.

Defining the period of Ørsted's transformation

Ørsted communicates that its transformation started in 2009, when management announced a major strategic shift pertaining to changing the company's energy output from 85% fossil fuels to 85% renewable energy sources by 2040 (O'Sullivan, 2020). Although DONG,[2] the predecessor of Ørsted, constructed its first offshore-wind farm in 1991, and as such pioneered the offshore-wind industry, 2009 ultimately marks the year of the strategic decision to transform the company from black to green. Furthermore, we consider 2019 to be the end of Ørsted's transformation as this represents the year when Ørsted reached its goal of achieving 85% renewable energy output.

Pre-transformation: The company that needed to change

In this section we provide a description of Ørsted's business prior to its transformation, in order to understand the basis from which the company transformed. To illustrate the company prior to its transformation, we chose to assess the period spanning from the creation of DONG Energy in 2006 until 2008 which represents the final year before its aggressive transformational strategy was laid out.

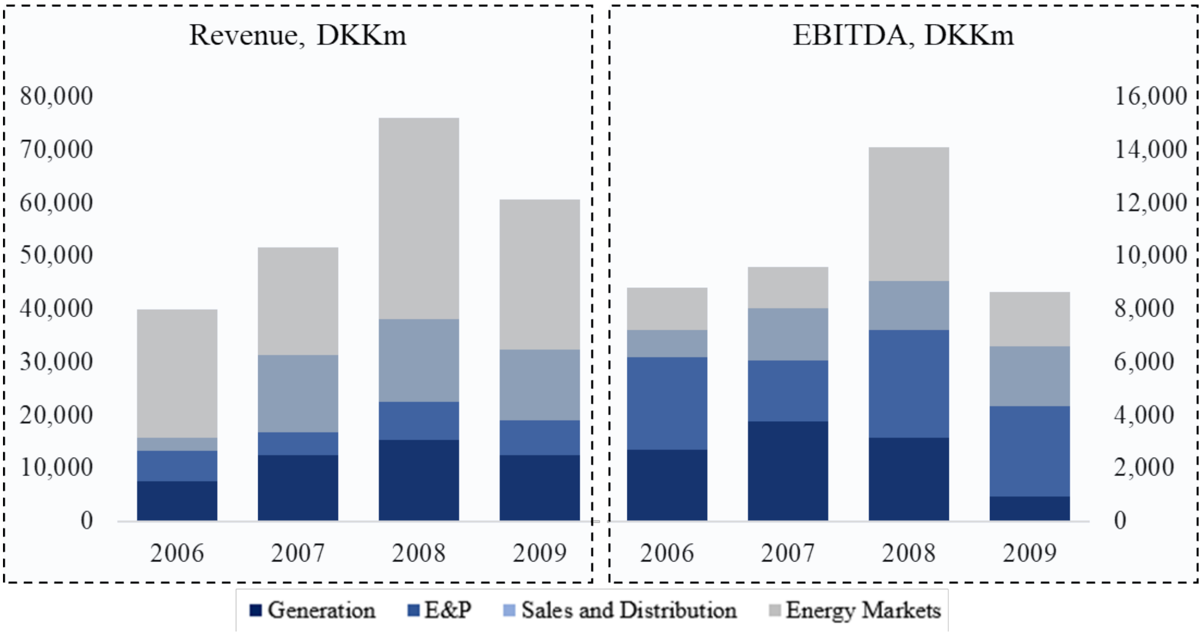
The company was originally called Danske Olie og Naturgas (DONG Energy) and was Denmark's largest energy company at the time. DONG Energy was the result of a merger in 2006 between the state-owned oil and gas company DONG and five companies within the energy generation and electricity sectors namely, Elsam, Energi E2, Nesa, Københavns Energi and Fredriksberg Forsyning. The merger was a consequence of the liberalisation of the Danish electricity and natural gas markets in 2004 which, as communicated by the company, "led to a break-up in the market with several large companies being put up for sale" (Ørsted, 2005).

[2] Throughout this section, we refer to Ørsted as DONG Energy when referencing the company before 2016.

As such, the merger created the new state-owned DONG Energy, marking a change from an exclusive oil and gas company to an integrated energy company.

As a result of the merger, DONG Energy had bolted on operations within generation of power and heat in addition to distribution and sale of electricity and natural gas to the company's existing oil and gas exploration and production (E&P) segment. As stated in the company's annual report from 2006, its core segments had become: Generation, E&P, Sales and Distribution and Energy Markets. Exhibit 1 below highlights the revenue and profitability by each segment in the period extending from the creation of DONG Energy (2006) until the year when the transformation was initiated (2009).

Exhibit 1: Breakdown of revenue and Earnings Before Interests Taxes Depreciation and Amortisation (EBITDA) by segment, DONG Energy



Sources: Company reports

As evident from the financial figures, total revenues increased steadily from 2006 to 2008, with EBITDA following the same development. Furthermore, Sales and Distribution accounted for the largest share of revenues, while Exploration and Production accounted for the largest share of EBITDA.

Generation

According to DONG Energy's annual reports from the selected period, Generation produced energy from coal- and gas-fired power stations and renewable energy sources. In this timeframe, DONG Energy was the largest energy producer in Denmark and the fifth largest producer on the Nordic power exchange, Nord Pool, in 2007 (Ørsted, 2007). Furthermore, the largest part of the company's energy production came from its power stations, comprising between 86-89% of its total power production between 2006 and 2008. The power stations involved thermal power generation, which in essence entailed the burning of fossil fuels. To illustrate DONG Energy's position as the leader in the Danish thermal power generation market, it is highlighted in the company's annual report from 2008 that it accounted for 57% of the total thermal generating capacity that year. Notably, DONG Energy had increased its share of the total capacity from 45% in 2007. This production came from ten central power stations, nine small-scale combined heat and power (CHP) plants and six waste-to-energy plants. The company also explored opportunities for developing a major coal-fired plant near Greifswald in Germany, which would be able to supply 1.5 million households equivalent to 2% of German consumption at the time.

The remaining share of DONG Energy's power production came from renewable sources, therein off- and onshore-wind turbines as well as hydropower. The renewable power production comprised between 11-14% of the power generation between 2006 and 2008. Of this, offshore wind comprised the largest portion of the renewable energy portfolio, indicating DONG Energy's early presence in the market. As a merit to its increasing focus on renewables, DONG Energy began communicating details of its renewable assets in the annual report of 2007. In this context, the company shares a breakdown of the capital expenditures within power generation for the year, showing that 71% was channelled to renewables. The following year (2008), this figure had decreased to 61%, but it is worth noting DONG Energy's early expression of a growing focus in renewables to its shareholders.

Exploration and production (E&P)

DONG was a pure-play E&P company before the creation of DONG Energy in 2006, where no additions to this business segment were made in relation to the merger. The E&P segment explored for and produced oil and gas in Danish, Norwegian, UK, Faroese, and Greenland waters (Ørsted, 2006).

DONG Energy conducted exploratory activities in all the aforementioned geographical areas, with the purpose of discovering new oil fields. Oil and gas production was solely situated on the Danish and Norwegian continental shelves between 2006 and 2008. The largest part of

DONG Energy's production was tied to Danish waters in 2006 and 2007, before the production ramp-up at Ormen Lange in 2008 shifted the majority of the production to Norway. As revealed in the company's annual report of 2008, Ormen Lange also represented a shift in the composition of DONG Energy's oil and gas production. At the time, the field accounted for 78% of the company's reserves and upon reaching full production in 2010, DONG Energy's gas production was expected to exceed the oil production solely due to the large gas volumes from this field. As such, the addition of Ormen Lange resulted in a significant uplift in DONG Energy's production, in addition to representing a shift in the composition of its oil and gas production.

Sales and Distribution

As DONG Energy stated in its annual report of 2008, the business area Sales and Distribution was Denmark's largest energy distributor at that time, holding a market share of 23% and 28% for the sale of power and gas, respectively. The energy was sold and distributed to end users such as private customers, companies, and public institutions.

Gas and power sales were influenced by public regulation aimed to promote renewable energy sources. In this context, it was required that a share of the customers' purchased gas or power came from renewable energy sources, so called "prioritised sources". Furthermore, the system was designed in such a way that all electricity was sold on the free market to corresponding market-prices, except for the prioritised energy sources. These prices included a premium (Public Service Obligation) tied to the price, representing a special tariff (Danish Energy Agency, 2019). As such, DONG Energy's sales within gas and power sales were divided between sales made at free market-prices and sales made at publicly regulated prices. Green energy volumes sold at the publicly regulated prices in 2008 were 15% and 52% within gas and power, respectively (Ørsted, 2008).

The businesses of distributing power and gas were natural monopolies and were monitored by the Danish Energy Regulatory Authority (DERA). Moreover, the price per kWh for the distribution of energy reflected the cost of efficient operations plus a specified return on invested capital. As such, the earnings for this segment varied with the volume distributed but were independent of the developments in the power prices in the market. The same scheme existed for gas distribution, in addition to the operating costs being subject to mandatory annual reduction targets (Ørsted, 2008).

Energy Markets

Energy Markets was DONG Energy's hub for trading in the energy markets, focused on purchase and sale of gas and power in Northern Europe. As such, this division optimised the physical delivery of gas and power through combining diversified and flexible access to procuring energy with the opportunity to sell this energy via various sales channels.

In terms of gas, the process for the intermediation of 108.394 GWh of gas is shown in Exhibit 2 with figures from 2008, highlighting the sources the company used for supply and the users to whom it resold the gas to.

Exhibit 2: Illustration of the sourcing and sale of gas for DONG Energy in 2008

Sources: Company reports

As seen from the illustration, DONG Energy used third parties for most of its sourcing in 2008. As such, DONG Energy was highly dependent on third parties to ensure delivery to end customers. Furthermore, the sourced gas was primarily re-allocated to Sales and Distribution before it was later sold to end customers. A smaller portion was used for consumption in the company's own power stations.

Power sales were a significantly smaller portion of the sales made by Energy Markets, totalling 10.482 GWh. In turn, most of this was sold internally to Sales and Distribution, and the rest to regional distribution and trading companies in Germany (Ørsted, 2008).

The transformation begins

"Much More Green Power" read the heading of the segment related to energy generation in DONG Energy's annual report of 2009. Coupled with deteriorating markets in its core segments due to the financial crisis, this year represented the time for vital strategic decision making that would set in motion the company's journey from black to green.

DONG Energy envisioned that ensuring long-term value creation would depend on a transition to cleaner energy sources while securing adequate supply. This vision materialised in a strategy to focus on three key areas: More green power generation, growth in the natural gas portfolio, and optimisation of sales and distribution.

More green power generation

At the time, 15% of DONG Energy's power and heat generation was based on renewable or CO2 neutral energy sources, while 85% was based on fossil fuels. Under the caption 85/15, the company pledged to flip the current ratio between fossil- and renewables-based generation around over a 30-year horizon. Achieving this would entail making major investments in its renewable energy capacity, and thus convert the power and heat generation from being predominantly coal-based to green and low-carbon based. Steps to achieving this had already been taken, where DONG Energy had increased its renewable energy capacity by 82% in 2009 and decommissioned two coal-fired stations in 2008. The company also announced further decommissions of coal-based plants in 2010, which would result in an overall 25% reduction in coal-based station capacity. Furthermore, DONG Energy decided to abandon the exploration of building the major coal-fired plant in Greifswald and guided a strong wind farm pipeline with 700 MW under construction and 2,000 MW tied to projects under development compared to its existing portfolio of 811 MW (Ørsted, 2009; Ørsted, 2010).

Growth of natural gas portfolio

DONG Energy expected dwindling reserves of natural gas in the Danish sector of the North Sea, a region in which the company had traditionally sourced most of its natural gas supply. This, in addition to desiring independence from individual third-party suppliers, led the company to take several strategic measures related to cementing its position in the European natural gas markets. The company's primary goal was expanding natural gas production from its own fields in Denmark, Norway and the UK. For instance, DONG Energy wanted to add new projects within equity production of natural gas to its existing Ormen Lange field by participating in more development projects in Norway. Moreover, the strategy was also based on securing long-term purchase contracts with international suppliers as well as taking co-ownership in a terminal in Rotterdam for reception of liquefied natural gas (LNG). Lastly, the company communicated that purchases on European energy hubs would also be an important element in solidifying its position (Ørsted, 2009; Ørsted, 2010).

Optimisation of sales and distribution

The last part of the strategy recognised the growing demand among end customers to use clean, cost-efficient and efficiently distributed energy. As a result, several steps were taken towards helping the end customers save energy and developing more efficient power grids. In particular, DONG Energy entered alliances with cleantech companies to provide solutions for more efficient energy use for homeowners as well as intelligent power grids allowing for monitoring power supply and consumption. In essence, the company wished to become as eco-friendly as possible through the entire energy value chain (Ørsted, 2009; Ørsted, 2010).

Tackling financial meltdown and accelerating growth in renewables

In the years following the 85/15 strategy, DONG Energy continued to expand its renewables portfolio underlining a capacity of 1,025 MW in 2011, compared to 811 MW in 2009. Moreover, the segmentation related to DONG Energy's core areas of business had been divided into E&P, Wind Power, Thermal Power, Energy Markets and Sales and Distribution as of its annual report for 2011. As such, dividing the previous segment of Generation into Wind Power and Thermal Power, symbolically represented the divergence between its two operations within energy generation.

In 2012, DONG Energy faced considerable financial challenges, partly due to a number of structural changes and losses in the gas market, a market in which the company had previously strategised for the growth of its business. Due to plummeting gas prices in the United States, DONG Energy recognised substantial losses on its long-term gas storage contracts, LNG capacity and gas-fired power stations. This had material adverse impacts in the E&P department of DONG Energy's business. As the company had already made significant investments in Wind Power in addition to E&P, this led to the deterioration of the earnings-to-debt ratio. Moreover, the low earnings-to-debt ratio made it difficult to pay for the offshore-wind expansion, and when Standard & Poor's downgraded DONG Energy's debt, the company went into crisis mode (Reguly, 2019). Consequently, the company's basis had to be restored if it was to continue the transformation. Thus, the company decided to get rid of eight businesses over the next years, including all the gas businesses, hydro, and the waste-fired power plants. DONG Energy decided to concentrate on offshore wind, oil and gas, and biomass conversions of CHP plants, in addition to continuing investing in the Group's Danish electricity and gas distribution networks (Ørsted, 2019a).

Simultaneously, the so-called Danish buildout policy had created a dedicated offshore-wind energy industry during the past years, where developers were becoming more efficient, evidenced by their ability to complete projects with fewer delays and on budget. Due to the emerging political demand for climate action and new EU targets, DONG Energy and other wind developers were receiving governmental support through favourable subsidies. However, the whole industry came under financial pressure from the UK government in 2012 to reduce costs for offshore-wind energy to ensure continued political support. The average levelised cost of electricity,[3] a comprehensive measure reflecting the electricity price that justifies the cost of capital, of offshore wind had been EUR ~90-167 per MWh during the period from 2002 to 2011. Nevertheless, DONG Energy was the first to propose a cost reduction target of driving the levelised costs of offshore-wind energy to EUR 100 per MWh by 2020. Similarly, the UK government set a target of GBP 100 per MWh, which was later adopted as an industry-wide target in the UK. The offshore-wind developers were therefore receiving renewed governmental support, and the support was indeed a key to developing the renewable energy industry further. For offshore-wind energy alone, the cost in Europe dropped by 63% in the period from 2012 to 2018, thus making offshore-wind energy cheaper than coal, gas and nuclear-based power generation (Ørsted, 2019a).

Furthermore, the company formulated a financial action plan, including a comprehensive program of divestment of non-core assets and a reduction of the ownership interest in core activities. The latter followed a so-called farm-down model, whereby the company entered partnerships by divesting ownership in existing projects to institutional investors to secure capital and share risk. DONG Energy's CEO of Offshore Wind, Martin Neubert, told McKinsey in an interview that the multiple ongoing projects in the UK needed funding, though raising debt for each project was not preferable considering the company's group-level funding strategy. Besides, Neubert argued that partnering with electric utilities was too complicated as these companies had their own asset portfolios and strategies. DONG Energy needed financial partners that could deliver capital and manage their investments while relying upon the company's experience in constructing and operating offshore-wind projects. As such, the company's experience coupled with the predictable and stable returns from tariff-based

[3] The formula for levelised cost of electricity is provided in Appendix C, and we will cover this concept in more detail in Section 3.

revenue streams ensured high demand from institutional investors. The funding model was revolutionary for the offshore wind industry, and the structure DONG Energy innovated became widely adopted among other participants (Tryggestad, 2020).

Another key element of the action plan was the decision made in 2013 to inject DKK 11 billion in additional equity from Goldman Sachs, the Danish pension funds Arbejdsmarkedets Tillægspension (ATP) and PFA Pension Forsikringsaktieselskab (PFA). The equity injection gave the investment bank an approximately 17.9% stake in DONG Energy, while ATP and PFA acquired 4.8% and 1.8% respectively (Ørsted, 2013). According to the former CEO of DONG Energy Henrik Poulsen, the action plan was designed to restore the company's financial platform, and stated "with the injection of new equity, we have almost fully delivered on our financial action plan and have thus secured the necessary platform for pursuing our ambitions for the coming years" (Ørsted, 2013). The deal was heavily criticised and caused a split of the ruling coalition in Denmark (Levring & Wienberg, 2014). Moreover, the equity injection reduced the Danish State's ownership in DONG Energy from 81.1% to 58.8% (Bøss, 2019).

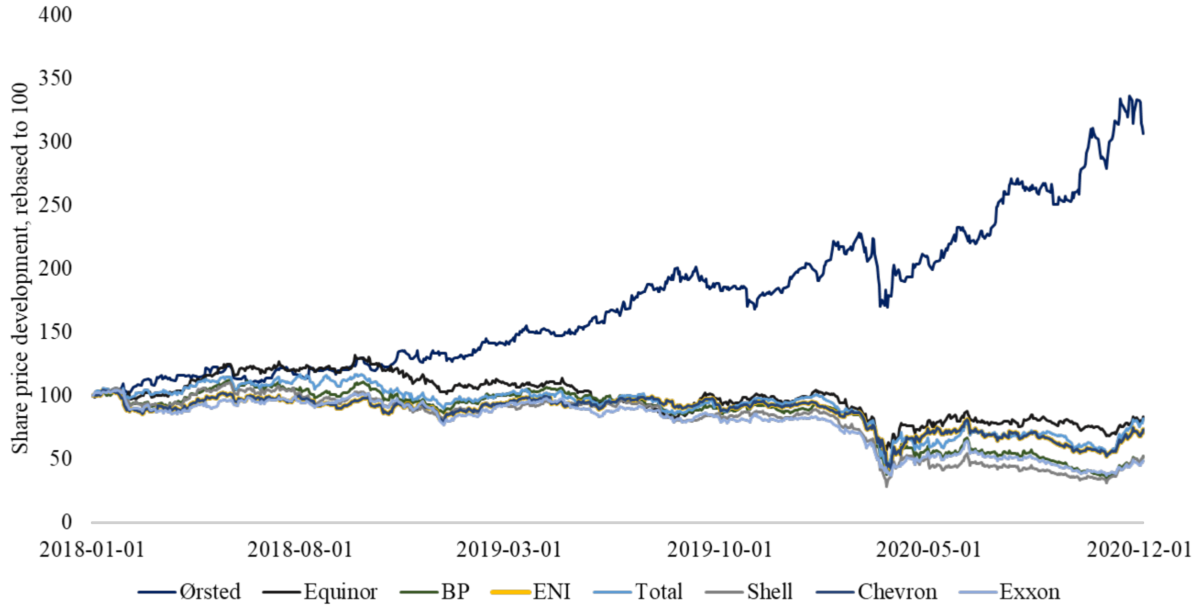
In 2014, 15% of Europe's electricity generation was based on renewable energy, compared to only 2% of total generation in 2000. For DONG Energy, renewable energy contributed with 46% to the Group's total electricity and heat generation. Moreover, the year marked a breakthrough with respect to securing the pipeline which would lead to realising the target of a total installed offshore-wind capacity of 6.5 GW in 2020. As DONG Energy states in its annual report of 2014, the deciding factor was the award of subsidies for the three UK offshore-wind projects, Burbo Bank Extension, Walney Extension and Hornsea. Moreover, the company highlights that in previous years, exploration results had been disappointing. This, together with lower oil and gas prices, delayed development projects and changes to the national tax rules, resulted in a downward adjustment of the return on capital employed (ROCE) target for the E&P business from 20% to 12% on average for the period from 2015 to 2020. Consequently, as communicated in the Ørsted's annual report of 2014, the company accelerated the growth in renewables by investing a total of DKK 7.8 billion in expanding its wind activities in 2014 and was guiding further investments of DKK 35-40 billion over the next two years.

Continuing to transform the company

DONG Energy's strategic direction to transform the company from one of the most coal-intensive oil and gas companies in Europe to a global leader in renewable energy finally received confirmation when the world leaders in Paris signed the first global agreement ever to limit the emission of greenhouse gases in 2016. Therefore, the company announced an IPO before the end of first quarter in 2016, and the Danish State decided to maintain a majority shareholding in the company of 50.1% (The Economist, 2019b). Goldman Sachs retained a 13.4% stake in the IPO and gradually sold all its shares during 2017 (Environmental Finance, 2017). Furthermore, DONG Energy decided to keep the oil and gas as part of the planned IPO and use parts of the cash flows to fund investments in renewable energy. The IPO was planned to provide the company with the flexibility and access to equity to fund growth, as well as providing institutional and retail investors the opportunity to take part in the company's green transition (Ørsted, 2016a).

In 2016, DONG Energy doubled its earnings from Wind Power to DKK 11.9 billion, which for the first time exceeded earnings from oil and gas production. Additionally, the company sought to become more international by constructing and operating offshore-wind farms in Denmark, the UK, Germany, and the Netherlands, while also exploring new projects in the US and Taiwan (Ørsted, 2016). The IPO was completed in June 2016 at a price of DKK 235 per share, leading to a market capitalisation of DKK 98.2 billion, and consequently became the largest IPO in Danish history (Bøss, 2019). Following the IPO, the company decided to divest its oil and gas production activities, in addition to phasing out the coal business by 2023. Investing in the conversion of its domestic heat and power plants enabled the company to move away from coal toward biomass (Ørsted, 2016). To emphasise the metamorphosis, the company decided to change its name to Ørsted in 2016 after the world-renowned Danish scientist H.C. Ørsted (Ørsted, 2017). When Ørsted reached its goal of achieving above 85% renewable energy generation in 2019, it marked the completion, and success, of the company's strategy to transform the company from black to green. Astonishingly, this achievement took the company 10 years, as opposed to the planned horizon of 30 years. Ørsted's new target was now to increase the green share of power and heat generation to at least 95% in 2023, in addition to creating a carbon neutral power generation in 2025 (Ørsted, 2019a).

Exhibit 3: Share price development for Ørsted and selected oil majors



Source: Yahoo Finance

Since 2018, Ørsted's stock price has more than tripled and has outperformed all the oil majors, and thus previous rivals, included in Exhibit 3 above, ultimately giving the company a valuation of EUR 58.4 billion as of 4th December 2020. That is more than Equinor, which on the same date had a market capitalisation of EUR 44.5 billion. Ørsted's 10 GW of wind and solar make its operational renewable energy portfolio the fifth largest in the world (Storrow, 2020).

3. The critical factors to Ørsted's successful transformation

In this part we will assess the critical factors in Ørsted's success. We will first address the developments in Ørsted's renewable assets to illustrate that offshore wind was the renewable segment that contributed to its successful transformation. Subsequently, we will address the critical factors in Ørsted's success in this segment and analyse how these have developed from when Ørsted decided to transform (2009) until the completion of its transformation in 2019.

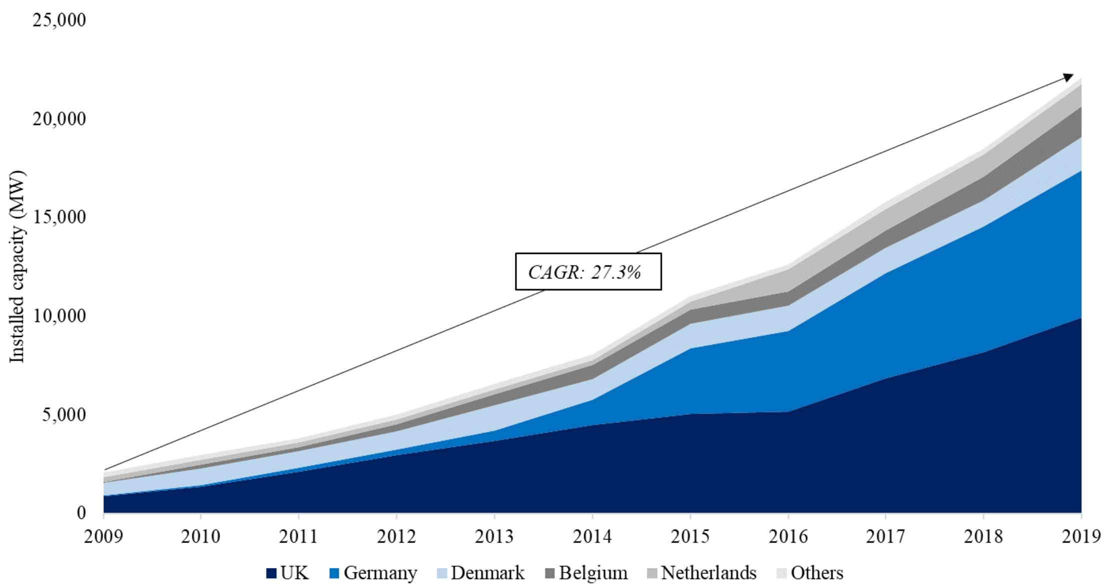
The renewable energy segment that transformed the company

A crucial part of Ørsted's transformation was the significant expansion of its renewable portfolio. As emphasised in its 85/15 strategy, this would allow the company to reach its goal of securing energy supply, whilst reducing its CO2 emissions (Ørsted, 2009). Furthermore, Ørsted's renewables portfolio as of 2020 consisted of approximately 90% offshore-wind assets, clearly indicating where the company chose to direct its focus in terms of renewable energy generation. Moreover, we note that commercial onshore instalments, either wind or solar, did not occur until July 2017 in the US, with Amazon Wind Farm Texas. This confirms that offshore wind was the renewable energy segment that contributed to the company's transformation. Consequently, a brief discussion of why Ørsted chose to expand in this segment, and a detailed description of how this market has developed, will be provided in the following paragraphs.

In broad terms, we believe that the planned interplay between governments as financial supporters to the industry and Ørsted, as well as the company's position as the global leader in offshore wind, were the most important factors in relation to choosing the strategic direction of offshore wind in 2009. The importance of the interplay is confirmed by Ørsted itself in its report *Making green energy affordable* from 2019, where the company emphasises that political support, funding of public research and dedicated offshore-wind policies created long-term market outlook, enabling industrial developers to take the leap and commit to developing offshore-wind parks on an unprecedented scale. Furthermore, the key reasons the policymakers presented in relation to expanding offshore over onshore wind, can be found in the Danish Energy Agency's report *Danish Experiences from Offshore Wind Development* from 2017. The agency suggested that moving offshore, despite the higher costs compared to onshore, would facilitate far better wind conditions and circumvent the problem of scarcity of available land (Danish Energy Agency, 2017). These advantages were also identified in academic research by Esteban et al. (2010, pp. 447-449), where the authors present both factors as reasons for why offshore-wind energy could be more beneficial than onshore. In addition, Ørsted had the largest share of installed global offshore-wind capacity in 2009 and reaffirmed its position as the global market leader in the annual report of that year (Fichaux et al., 2009). The company stated that pioneering the offshore-wind industry with Vindeby in 1991 had provided unique and extensive knowledge both in the construction and operation of wind farms, unmatched by any other company in the world (Ørsted, 2009).

Throughout Ørsted's transformation, Europe was at the forefront of the offshore-wind industry in terms of installed capacity (Wilson, 2020). As we show in Exhibit 4 below, the European market grew tenfold between 2009 and 2019, and was dominated by the UK in terms of installed capacity. As The Economist (2019c) states, the boom in the UK was due in part to geography, with high winds and shallow seas, and in part due to policy.

Exhibit 4: Total installed capacity in Europe by country

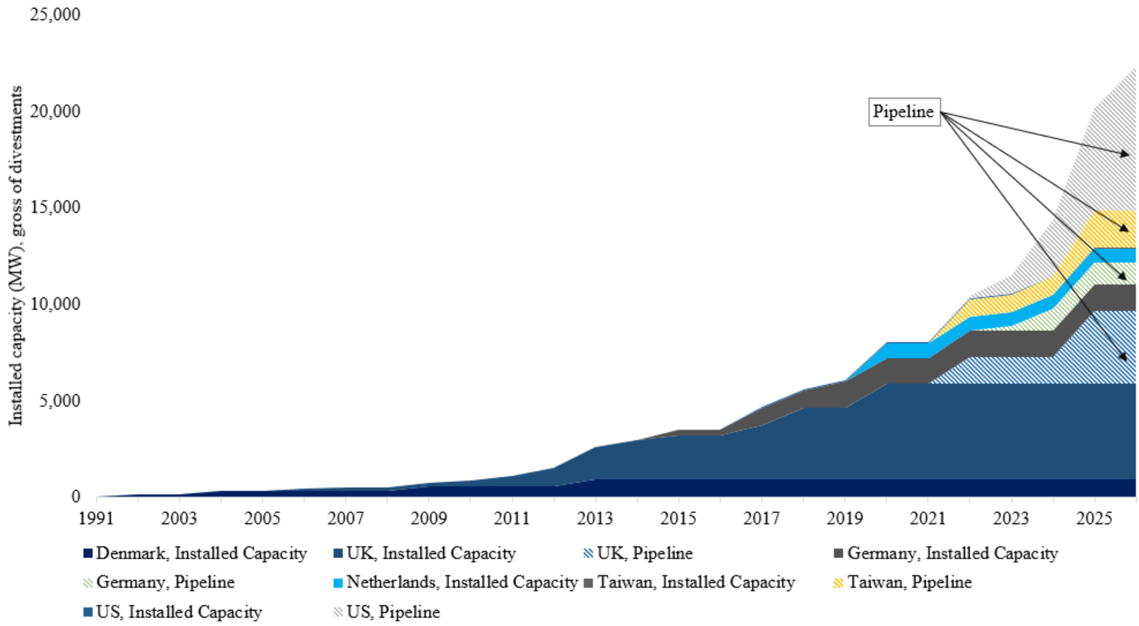


Source: WindEurope

Upon breaking the European market down further, we see that Ørsted had the largest market share in terms of installed capacity, albeit declining as the market developed, as shown in Figures A.1 and A.2 in Appendix A. Furthermore, we note that the stiffer competition over the most recent years not only includes other pure-play renewable companies, but also energy giants such as BP, Equinor and Royal Dutch Shell (The Economist, 2019b). The number of new entrants over the years, combined with the decreasing share of the largest five[4] offshore-wind farm owners, serves as an indication of the increased competitiveness in the industry.

In assessing Ørsted's portfolio, it is evident that the company had the largest share of installed capacity in the UK throughout its transformation, followed by Germany, representing the same geographical footprint as for the European market as a whole, as shown in Exhibit 5 below. We note that the pipeline of Ørsted, however, is globally oriented with additions planned in Taiwan and especially the US. In Europe, Ørsted will continue to add significant capacity in the UK and Germany.

Exhibit 5: Ørsted's offshore-wind portfolio divided by country



Source: Ørsted's Asset Book

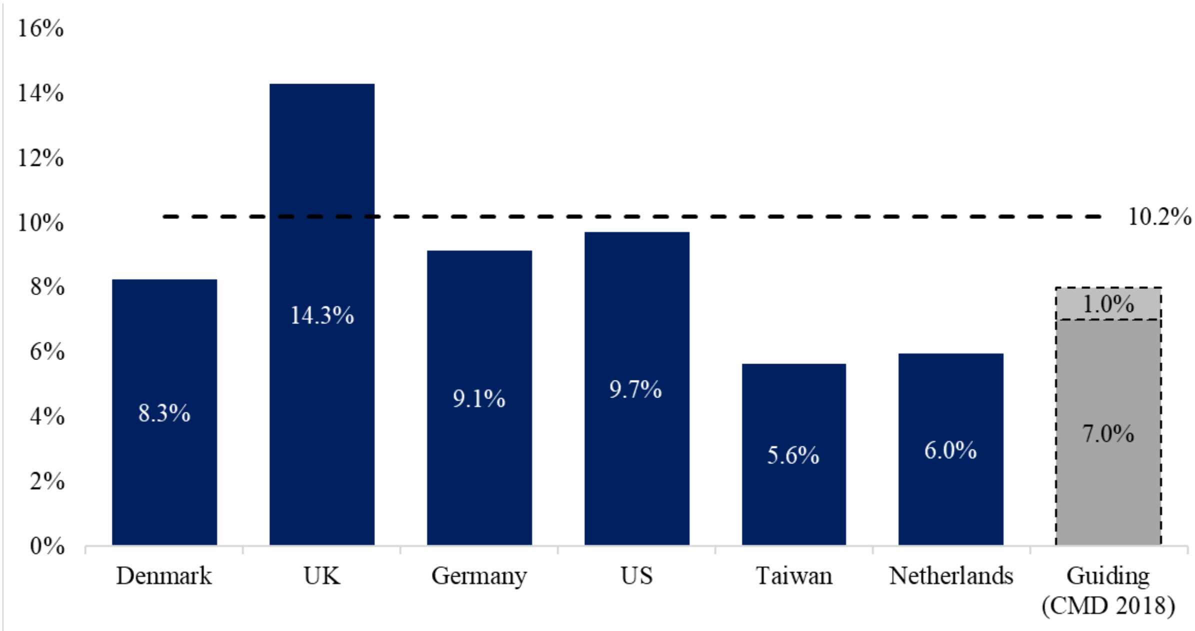
From this part of our analysis, it is clear that Ørsted chose to focus on an expansion in the offshore-wind market to transform the company, broadly due to the governmental interplay and the unique expertise of the company. Moreover, we have provided some preliminary insights to the developments in the markets where Ørsted participated, where the analysis so far reveals tendencies to maturation during the company's transformation.

[4] This is shown in Figure A.2 in Appendix A. The largest five offshore-wind farm owners in 2019 were: Ørsted, Vattenfall, RWE (before acquisition of E.ON's assets), E.ON (before sale of assets to RWE) and Macquarie Capital.

Identifying the critical factors to Ørsted's successful transformation

To provide a comprehensive view on the historical profitability of Ørsted's offshore-wind projects, we have calculated the capacity weighted Life Cycle Internal Rate of Return (LCIRR)[5] for Ørsted's projects, shown in Exhibit 6 below. A detailed description of the assumptions related to the financial model we have developed to calculate this figure is provided in Appendix D. As our project-by-project analysis reveals, the historical LCIRR (1991-2020) has been approximately 10.2%. By comparison, Ørsted guides an LCIRR of 7-8% for future projects (Ørsted, 2019b). Split by country, we see that especially projects in the UK have historically seen the best offshore-wind economics, with above 14% LCIRRs on average. In order to uncover the critical factors that contributed to Ørsted's success, we provide a thorough analysis of the developments in the drivers behind each of the key financial items related to IRR, i.e., revenue, costs, and investments, in the following paragraphs.

Exhibit 6: Ørsted's capacity weighted lifecycle IRR (LCIRR) by country (1991-2020)



Sources: Own calculations, company reports and Ørsted's Asset Book

[5] As for any portfolio, weighing the assets with respect to their lifetime would give an even more comprehensive indication of the aggregated returns one can expect the portfolio to generate. However, because we assume that every project has the expected lifetime of 25 years, it would not provide any additional insight in this particular case.

Revenue

In the countries of Ørsted’s offshore-wind projects, governments have traditionally offered backing to renewable energy generation through promotion schemes that materialises as higher and long-lasting revenue for the projects. This is due to the fact that the support mechanisms have been aimed at combining high demand for renewable energy with favourable prices through tariffs (Held et al., 2014). As such, the revenue, and thus the financial performance of Ørsted’s wind farms, has been highly reliant on achieving favourable prices on long contracts and demand through governmental support. This fact is described through Ørsted repeatedly attributing much of the growth in the offshore-wind industry to the governmental support mechanisms, adequately expressed thus: “The development of offshore wind power over the past three decades was made possible by the constructive interplay between visionary policymakers[6] and industry” (Ørsted, 2019a). To that extent, we will analyse whether the government support schemes represent a critical factor in Ørsted’s successful transformation in the following paragraphs. This is approached through categorically analysing the developments in the support schemes of each country in which Ørsted had offshore-wind projects throughout its transformation.

Before we describe the developments in the governmental support schemes, we provide a summary description of the subsidy schemes in Exhibit 7. In addition, we also provide an overview of the average tariff-prices related to, and average duration of, Ørsted’s subsidy agreements separated by country in Exhibit 8. In Europe, where Ørsted predominantly established offshore-wind farms during its transformation, the company achieved the highest tariff-prices in Germany, followed by the UK. However, the duration of Ørsted's tariff-agreements was the lowest in Germany, and the highest in the UK. Moreover, Ørsted has achieved higher tariffs, on average, in both Taiwan and the US compared to Europe, with the US marking the longest tariff-duration of 20 years.

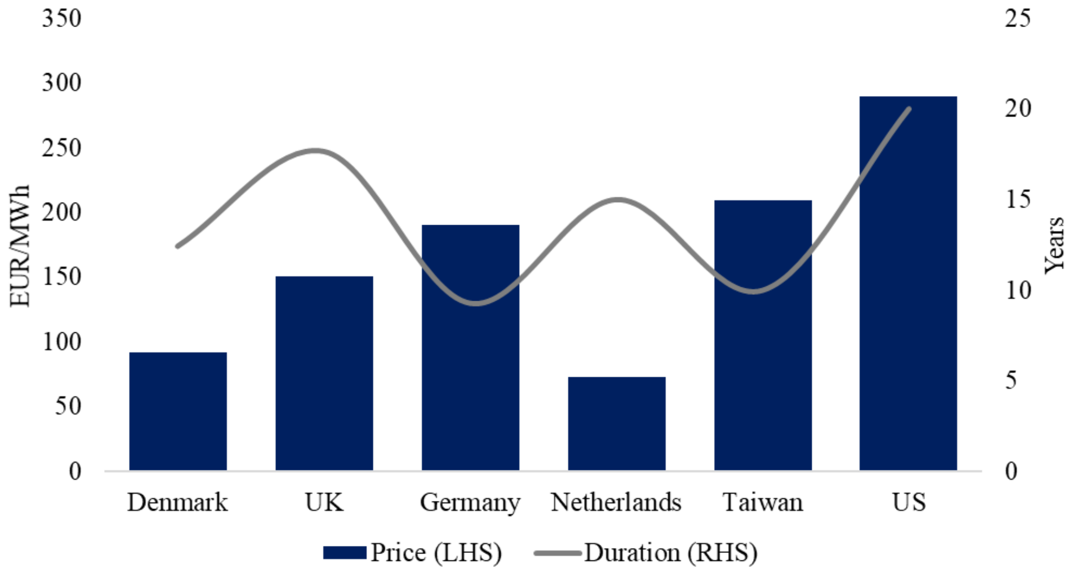
[6] Governmental policymakers.

Exhibit 7: Overview of the subsidy schemes relevant to Ørsted's transformation

Subsidy scheme	Applicable countries	Description	Tariff-formation	Tariff-development
Contracts-for-difference (CfD)	United Kingdom	Contract holder receives a guaranteed minimum price (strike price) for the energy they produce.	Tariff-price (strike price) represents the equilibrium price reached in competitive auction rounds.	Gradually lower tariff-prices as auctions become more competitive.
Feed-in-Tariff (FiT)	Denmark, Germany, Netherlands, Taiwan	Provides a guaranteed price per MWh of power produced.	Previously set by the government. Currently determined by the lowest price offered by the winning tenderer in auctions.	Gradually lower tariff-prices with shift towards more competitive allocation through auctions.
Feed-in-Premium (FiP)	Denmark	Renewable energy generator is awarded a premium on top of the market-price.	Previously set by the government. Currently determined by the lowest premium offered by the winning tenderer in auctions.	Gradually lower premiums with shift towards more competitive allocation through auctions.
Offtake-agreements	United States	Negotiated contracts, often PPAs[1] or ORECs[2], for the delivery of electricity by an offshore-wind project's electricity generation.	Determined by competitive bidding procedures.	Gradually lower tariff-prices as auctions become more competitive.
Investment tax credits (ITCs)	United States	Eligible energy producers receive a tax credit in the form of a percentage tax deductible of the total capital expenditures of a project.	Determined by the government.	Stable level for percentage tax deductible.
Renewable Obligation Certificates (ROCs)	United Kingdom	Energy generators using certain specified renewable energy technologies receive a predetermined number of certificates (ROCs) for every MWh of energy they produce. All energy producers are obliged to source a pre-specified proportion of their energy supply from renewable energy sources.	The tariff-prices are determined by the UK government each year. Energy producers not possessing enough ROCs must pay a "buyout" price to a "buyout" fund for each of their insufficient ROCs. The "buyout" price effectively sets the minimum price at which a renewable energy generator can sell electricity.	Consistently high tariff-prices throughout the lifetime of scheme. Discontinued for all new generating capacity after 2017.

Notes: 1) Purchasing Power Agreement (PPA): Legal contract whereby a developer sells a project's power to a buyer for a prespecified price. 2) Offshore Renewable Energy Credits (ORECs): Each credit represents 1 MWh of energy and other attributes generated from an offshore- wind energy project (Musial et al., 2019).

Exhibit 8: Capacity weighted average tariff-prices and duration of Ørsted's subsidies

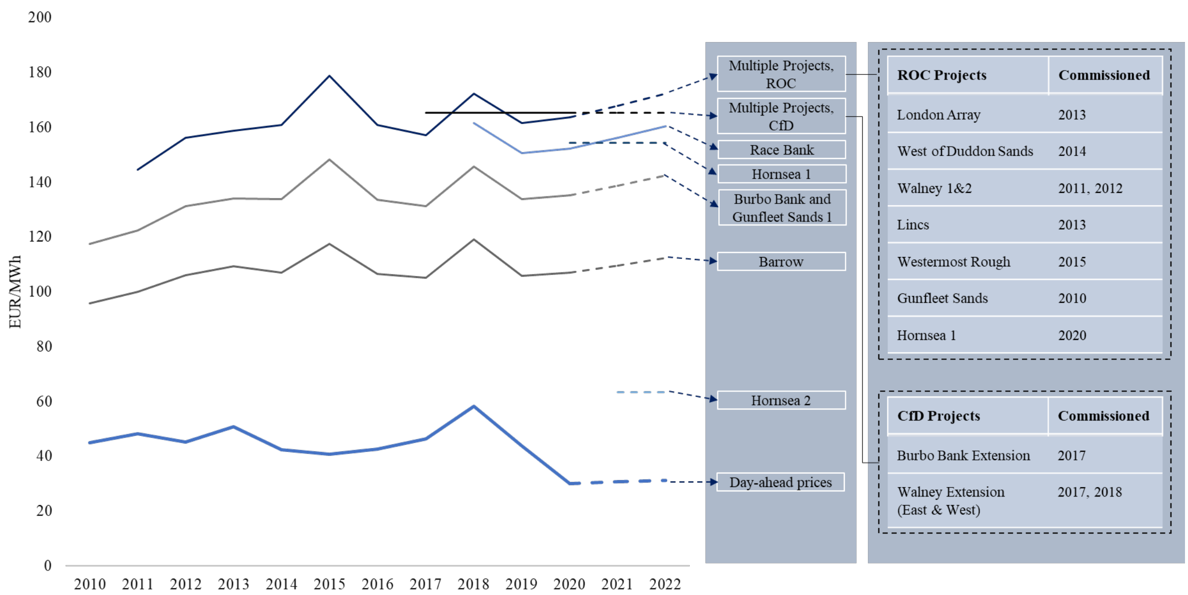


Source: Ørsted's Asset Book

United Kingdom

Before describing the specific governmental support schemes employed in the UK throughout Ørsted's transformation, we present a comparison between the UK day-ahead electricity prices[7] and Ørsted's achieved tariff-prices in Exhibit 9 below. In our view, the extensively higher tariff-prices relative to the market-prices, emphasise their importance in relation to Ørsted's revenue in the UK, and indicate their importance as contributors to the high LCIRRs Ørsted's UK-projects achieved.

Exhibit 9: Market-prices for electricity (day-ahead prices) and Ørsted's achieved tariff-prices in the UK



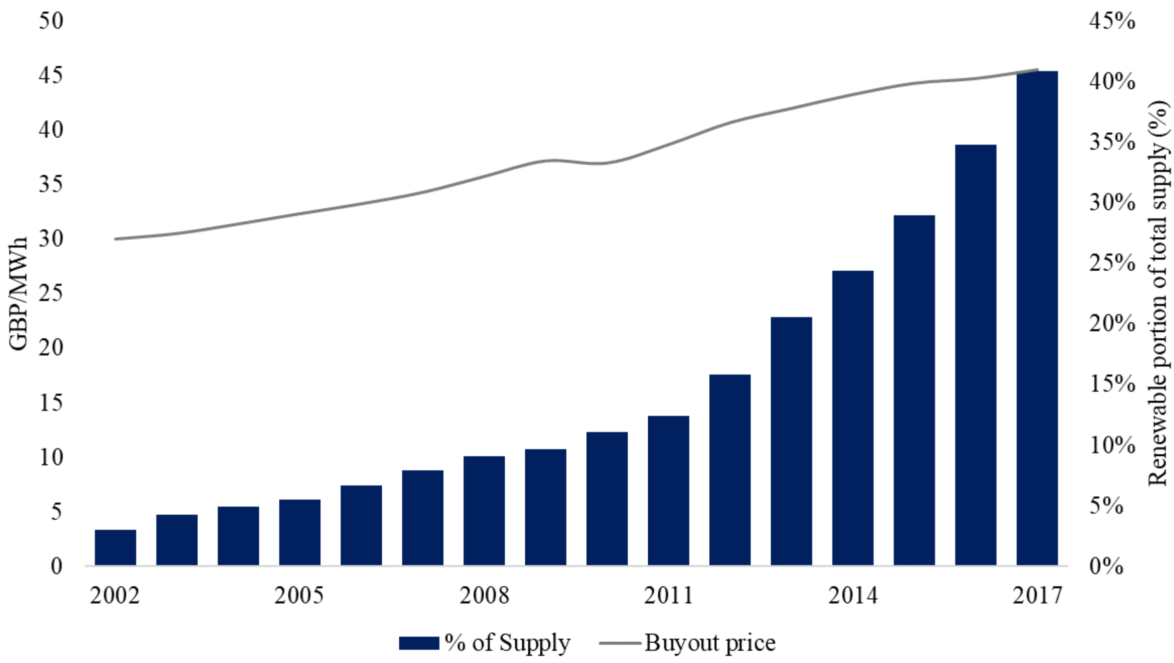
Sources: Own calculations, NordPool and Ørsted's Asset Book

The UK has historically relied on Renewable Obligations Certificates (ROCs) as the main support mechanism for promoting generation of renewable energy (OFGEM, n.d. a). In turn, offshore wind has obtained the largest support among renewable energy sources, as this was the most capital-intensive industry compared to solar and onshore wind (The Economist, 2019c). Exhibit 10 illustrates the developments in the ROCs from 2002 until today. This shows that the required proportion of green energy supplied has increased together with the buyout

[7] Day-ahead electricity prices are the comparable market-prices to Ørsted's tariffs, as they represent the alternative prices at which Ørsted would have sold electricity without tariffs (M. Bjørndal, personal communication, 27th October 2020). In this analysis, the prices used in Europe are gathered from NordPool. Further details about the day-ahead electricity prices are provided in Appendix B.

price to the buyout fund. As a consequence, projects commissioned under the ROC scheme continuously received higher tariff-prices for the energy generated.

Exhibit 10: Developments in ROC buyout price and required proportion of supply from renewables in the UK

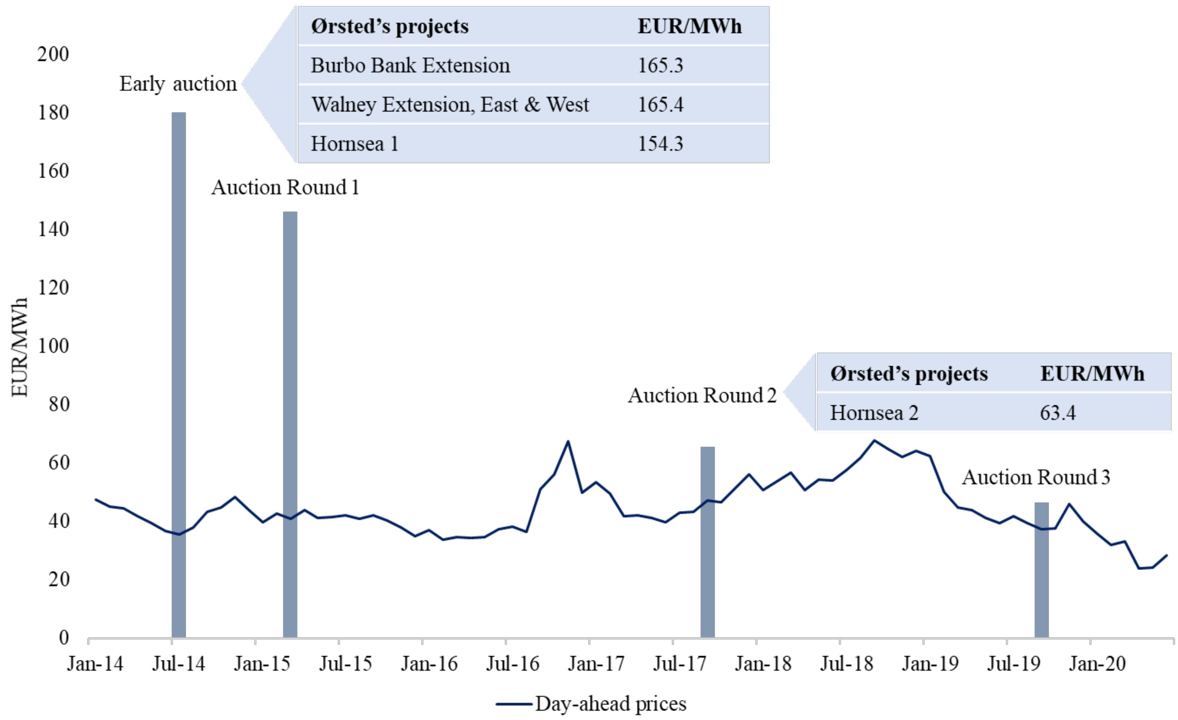


Source: Office of Gas and Electricity Markets (OFGEM)

Since 2013, the UK has progressively replaced the ROC scheme with the Contracts for Difference (CfD) scheme. This change represents a transition from government-directed allocation of subsidies (ROCs) to an auction-based system in which the participants with the lowest bid win the subsidy (CfD) (Ørsted, 2016b). In essence, the intended effect of fixed revenue streams provided by a fixed strike-price was to lower the cost of capital for the investors and minimise electricity costs for the consumers (Department for Business, Energy & Industrial Strategy, 2017a).

The competitiveness related to the CfD scheme has resulted in a drastic reduction in the strike-price that energy generators can obtain, as shown in Exhibit 11. Thus, the development of more competitive schemes may have marked a shift in the UK offshore-wind market, where renewable energy generators no longer could rely on subsidies to attain high and stable revenues. This notion, however, was challenged by the CEO of offshore wind in Ørsted, Martin Neubert, in an interview with BNEF in 2017. His response to how the absence of a stable revenue stream from the zero-subsidy bids won by DONG Energy in Germany's offshore-wind auction would impact the company's farm-down model (funding strategy) was that investors were still willing to take on board a certain amount of merchant price risk as "The revenue of U.K. projects built using ROC certificates have a significant merchant price element already" and that a shift to zero-subsidies was "[...] not like we have a complete paradigm shift here" (Collins, 2017). We, on the other hand, argue that there is a substantial difference between zero-subsidies and the ROC scheme, due to the fact that the latter involves an additional revenue stream from selling ROCs to non-renewable energy suppliers. This rests on the fact that the buyout price for an ROC in 2017 was GBP 45.58 per ROC, which, when multiplied by the 8.5 million ROCs Ørsted generated that year, leaves a total ROC-value to Ørsted of approximately GBP 387 million.

Exhibit 11: Market-prices for electricity (day-ahead prices), average strike-prices and Ørsted's achieved strike-prices of CfD auctions in the UK



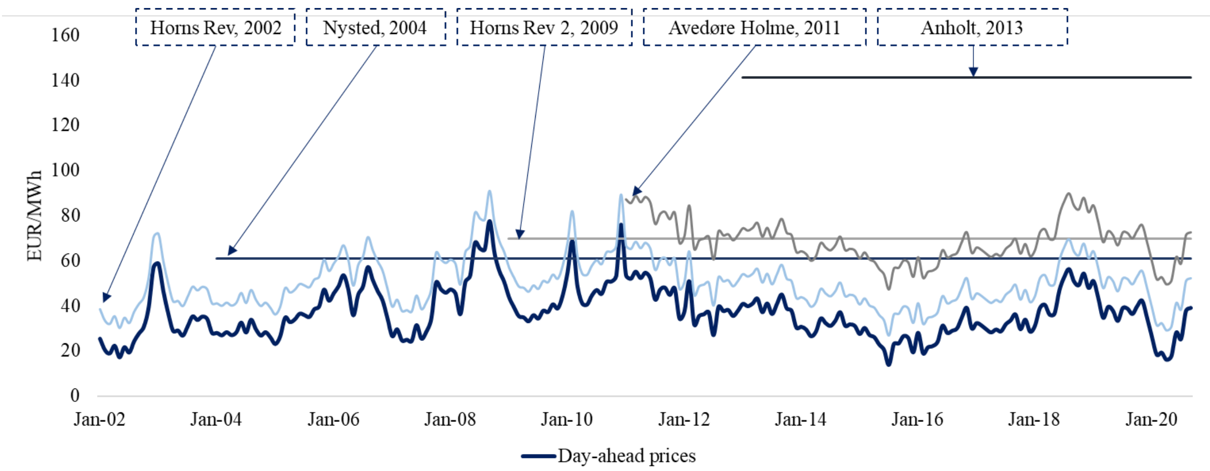
Sources: NordPool, National Audit Office, Department for Business, Energy & Industrial Strategy

As previously shown in Exhibit 5, the largest share of Ørsted's offshore-wind projects was located in the UK. Of these, 11 projects were commissioned under the ROC scheme, while the remaining four were under the CfD scheme. In capacity terms, this translates to a 60% share subsidised through ROCs, while the remaining 40% was subsidised through CfDs. Ørsted's capacity subsidised through ROCs received consistently high revenue, due to high and stable tariff-prices relative to the market-price. Conversely, assessing the strike-price developments throughout the CfD auction rounds in Exhibit 11, indicates that the competitiveness has started to materialise as convergence between the strike- and market-prices. It is worth noting, however, that the first CfD auction round resulted in strike-prices that were relatively high compared to the subsequent rounds due to far less competition. As such, tariff-prices achieved through competitive bids in earlier CfD rounds were similar to the tariff-prices allocated through ROCs. This is shown in Exhibit 11, which also highlights that the sample of Ørsted's projects that participated in the so-called early auctions in 2014, that is, before the official auction rounds were initiated, achieved far higher strike-prices than the one participating in auction round 2 in 2017. In fact, the tariff Ørsted achieved for Hornsea 2 in 2017 matched the level of the market-prices.

Denmark

As for the UK, Exhibit 12 below illustrates that Ørsted received tariff-prices that exceeded the market-prices in Denmark, highlighting the importance of government support for Ørsted's revenue in Denmark as well.

Exhibit 12: Market-prices for electricity (day-ahead prices) versus Ørsted's achieved tariff-prices in Denmark



Sources: Own calculations, NordPool and Ørsted's Asset Book

In Denmark, the type and size of financial support provided to offshore-wind farms depend on when the permit for the construction and operation of the wind farm was granted. For offshore-wind farms constructed both prior to, and through the government tender procedure in 2004, financial support was typically provided in the form of a fixed Feed-in-Tariff (FiT) (Ørsted, 2016b). The FiT varies from project to project as it is based on the lowest price offered by the winning tenderer. The size of the price supplement is calculated as the difference between the FiT and the market-price. Moreover, the cost of the price difference has primarily been borne by consumers through a PSO (Public Service Obligation) tariff on their energy bills (Ørsted, 2016b). However, the Danish government announced in 2016 its intention to abandon the PSO tariff, as the tariff violated EU rules because foreign producers did not receive the same PSO-funded support as Danish producers (The Local, 2016).

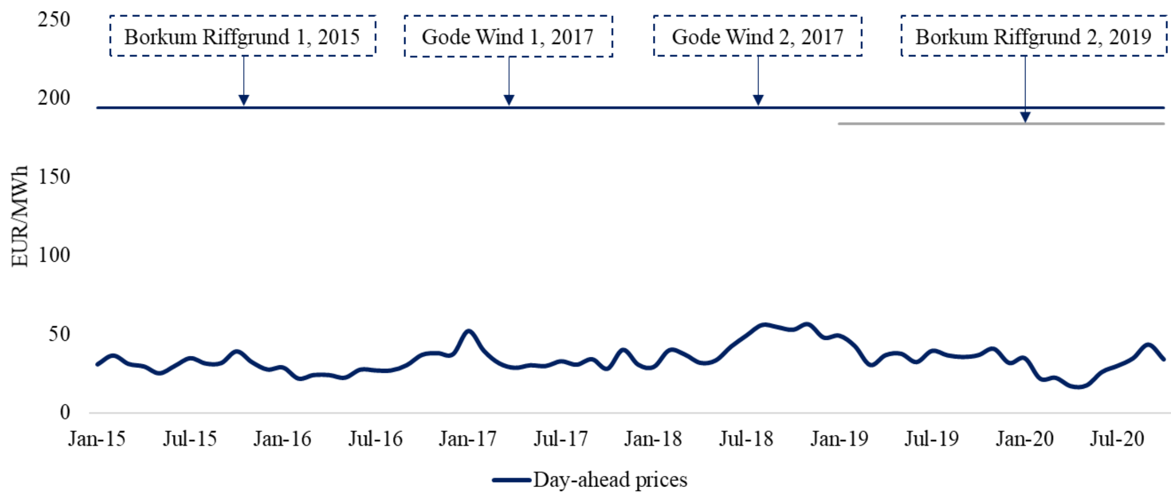
Furthermore, Ørsted operates three wind farms under the FiT subsidy scheme, Nysted 2, Horns Rev 2 and Anholt, illustrated in Exhibit 12. The FiTs achieved by Ørsted are well above the average market-prices for electricity, where Anholt stands out with an FiT of EUR 141 per MWh on the 400 MW wind farm. This marks the highest fixed price received on a Danish wind farm and was a result of only one developer ending up bidding. The reasons behind the modest competition include a lack of publication of the leasing round, a high number of opportunities elsewhere (in the UK), tight delivery timescales and a perception that non-Danish utilities would not be able to compete with Ørsted. As the second bidder was required to take over the tender with unchanged time planning, this entailed a considerable risk to investors (Shukla et al., 2014). When excluding the Anholt project, the remaining offshore-wind farms awarded to Ørsted receive relatively modest tariff-prices compared with the UK. Part of the reason behind this was that the Danish government undertook substantial development work in advance of sites being leased, including geotechnical studies, wind resource assessment and environmental surveys. Upon completion of the substantial development work, the government then auctioned of the areas to the lowest bidder. In turn, this approach effectively de-risked the projects to the developer, which eventually led to lower tender prices (Shukla et al., 2014).

Nevertheless, Ørsted has two wind farms established on the basis of the Feed-in-Premium (FiP) scheme, Horns Rev and Avedøre Holme. As the FiP is directly tied to the electricity market-price, Ørsted is rewarded when market-prices increase, and penalised when the prices drop.

Germany

Repeating the comparison of tariff- versus market-prices in Germany illustrates the same importance for Ørsted's revenue in Germany as for the UK and Denmark, shown in Exhibit 13 below.

Exhibit 13: Market-prices for electricity (day-ahead prices) versus Ørsted's achieved tariff-prices in Germany



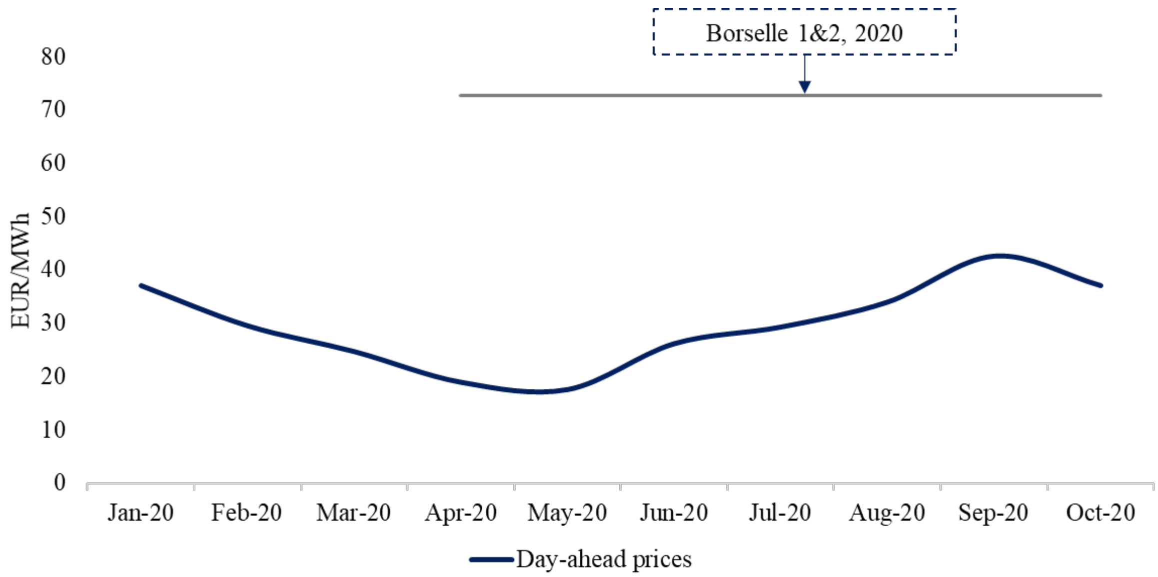
Sources: Own calculations, NordPool, Ørsted's Asset Book

In 2000, Germany introduced the so-called Renewable Energy Sources Act (EEG) in order to facilitate the growth of renewable energy generation. However, since 2000, the EEG has changed substantially and has moved from a traditional FiT regime, where governments allocate the subsidies, to a regime where the price is set by the lowest bid in the auction (Ørsted, 2016b). Moreover, Ørsted entered the German offshore-wind market in 2015, and currently operates four offshore-wind farms awarded under the traditional FiT subsidy scheme. These projects receive one price for an initial eight-year period, and another price for a subsequent two-year period. Additionally, the government provides a "price floor" of EUR 39 per MWh for up to 20 years after the subsequent period expires (Ørsted, 2016b). Furthermore, offshore-wind farms have the option of choosing between two financial support schemes, the "standard model" and the "acceleration model", which is only available for offshore-wind farms commissioned prior to 1st January 2020 (Ørsted, 2016b). For instance, Ørsted's Borkum Riffgrund 2 is using the acceleration model, where the applicable rate during the initial eight-year period is EUR 184 per MWh, and the subsequent two-year period EUR 149 per MWh. To illustrate the effect of competitive auctions, Ørsted's two latest projects were awarded as competitive bids, whereby Borkum Riffgrund 3 became the first zero-subsidy bid in its offshore-wind portfolio (Ørsted, 2020).

The Netherlands

Ørsted only has one project in the Netherlands, Borselle 1&2 commissioned in April 2020, which, as for every other country assessed so far, achieves a beneficial tariff-price compared to the market-prices. This is shown in Exhibit 14 below.

Exhibit 14: Market-prices for electricity (day-ahead prices) versus Ørsted's achieved tariff-prices in the Netherlands



Sources: Own calculations, NordPool and Ørsted's Asset Book

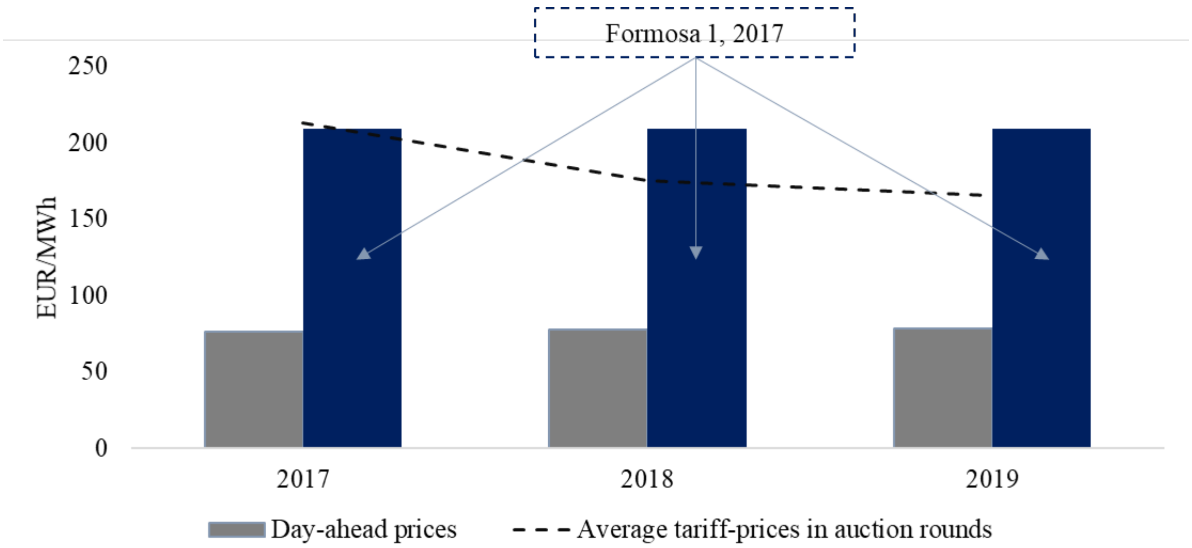
The main financial support instrument for renewable energy in the Netherlands is the so-called SDE+ premium feed-in scheme, which offers a premium for 15 years plus one year from the first SDE subsidised kWh production. Pursuant to this scheme, an estimate of the cost price (divided per technology) is made, and generators are compensated for the difference between this cost price and the actual market-price, representing the premium. In addition to the SDE+ scheme, investments in renewable energy technologies are supported via loans and certain tax benefits (Ørsted, 2016b).

Moreover, Borssele 1&2 were the first two tenders that took place in 2016, which received an FiT of EUR ~73 per MWh for 15 years. Due to the centralised and competitive auction format, the Dutch government's 40% cost reduction requirement for the entire period of 2015 to 2019 was achieved in the first tender (Weijden, 2016). Therefore, the Dutch government decided to allow submission of subsidy-free bids in the third tender. One reason for the success of subsidy-free offshore-wind projects in the Netherlands was the government-funded development of sites and transmission structure. Additionally, strong competition among offshore-wind developers encouraged innovation and new technology, which eventually facilitated further cost reductions (Brun et al., 2019).

Taiwan

As Exhibit 15 below highlights, Ørsted's only Taiwanese project also receives a tariff-price that surpasses the market-prices. We emphasise that even though we only highlight the annual electricity prices[8] in Taiwan, the high price-differential illustrates the impact of subsidies on Ørsted's revenue in this location as well (Taiwan Power Company, 2020).

Exhibit 15: Market-prices for electricity (day-ahead prices) versus Ørsted's achieved tariff-prices in Taiwan



Sources: Own calculations, Taiwan Power Company, Ørsted's Asset Book, GWEC

Taiwan is in the early phases in terms of renewable energy developments, whereby Ørsted established the first commercial scale demonstration project, Formosa 1, back in 2017. Taiwan operates with an FiT scheme, where generators are awarded a fixed price for a 20-year period

[8] The electricity price used for Taiwan is provided by the Taiwan Power Company (Taipower), which only distributes annual figures for the lighting and power electricity prices. More details regarding this are provided in Appendix B.

(or two consecutive 10-year periods) through a PPA with the Taiwan Power Company (KPMG, 2018).

Since commission of Formosa 1, the FiTs in Taiwan have continuously been reduced, as shown in Exhibit 15, although remaining substantially higher than the market-price. In addition, Taiwan also introduced a production cap for renewable energy in 2019, effectively reducing the load factor, i.e., how much the wind farm generates relative to its total capacity, at the producing offshore-wind farms. In relation to Ørsted, this created complications in terms of reaching a final investment decision on the giant Changua project. As Ørsted stated at the time: "We will now collaborate closely with the supply chain to mitigate the adverse impacts from the production cap and the reduced feed-in-tariff with the objective of making the projects investable" (Ørsted, 2019c).

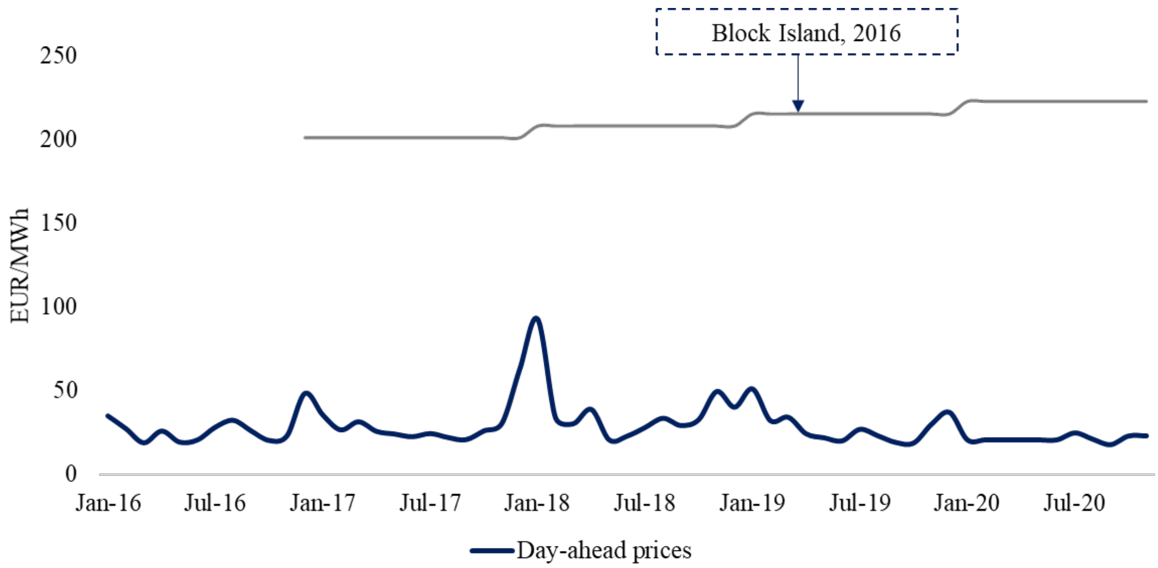
Due to the mature wind market in Europe, including zero-subsidy bids in Germany and the Netherlands, Ørsted entered the Taiwanese market as a response (Jacobsen, 2017). Taiwan is viewed as a key growth opportunity for European companies, such as Ørsted, as the country has a growing industrial sector that uses enormous amounts of electricity (White & Hook, 2019).

United States

It is worth mentioning that onshore-wind assets constitute the significant portion of Ørsted's involvements in the US, where six of seven operational wind farms are onshore. Every onshore project is under the so-called production tax credit (PTC) scheme, working as a tax-write-off for eligible wind power producers. As Ørsted does not pay tax in the US, the company enters "tax equity" partnerships with US-based investors to utilise the benefits (Ørsted, 2018a). However, this scheme does not apply for Ørsted's offshore-wind projects, leaving a more thorough assessment beyond the scope of this analysis. A more detailed description of this scheme is, however, provided in Appendix G as it is relevant to the valuation of Ørsted's total renewables portfolio.

In Exhibit 16 below, we show the price-differential between the tariff-price of Ørsted's only project in the US, Block Island, and the average market-prices[9] in the state of Rhode Island. Evidently, Ørsted benefits from a high price-differential in the US as well.

Exhibit 16: Market-prices for electricity (day-ahead prices) versus Ørsted's achieved tariff-prices on Rhode Island in the US



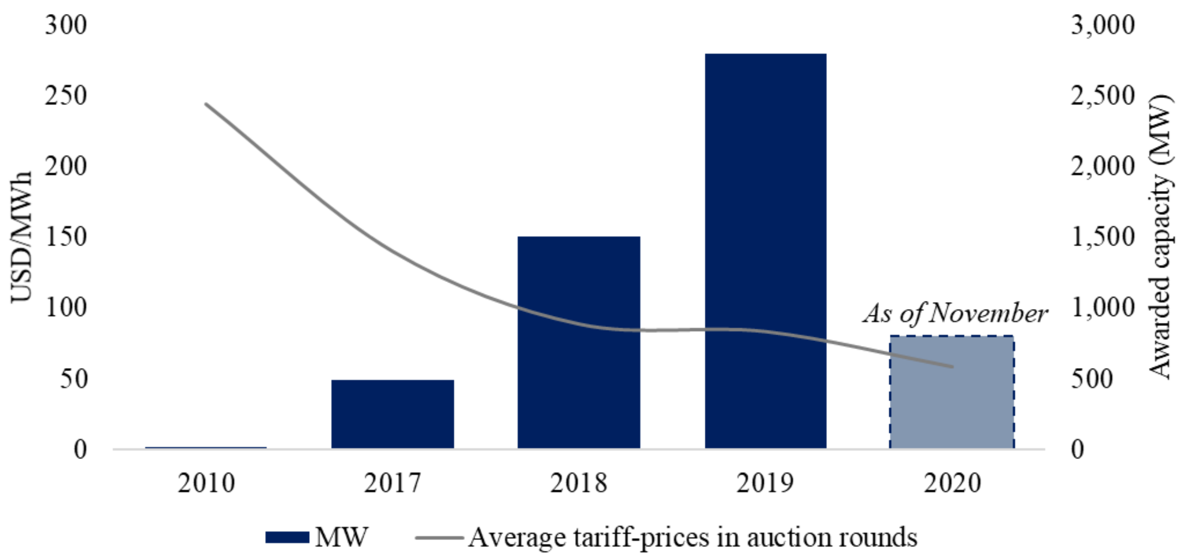
Sources: Own calculations, ISO New England (ISO-NE)

For offshore wind, the US has traditionally employed support schemes to lower the initial investments for offshore-wind facilities through investment tax credits (ITCs), in addition to securing high and stable revenue through offtake agreements. The investment tax credit allows offshore-wind facilities to receive a 30% of capital expenditure investments tax credit (U.S. Department of Energy, 2018). According to the US Department of Energy, the tax credit is crucial for offshore-wind projects as the investment cost of starting a project is especially capital-intensive compared to other renewable energy sources (U.S. Department of Energy, 2018). Furthermore, the offtake agreements are negotiated contracts for the delivery of electricity to individual states in the US by an individual offshore-wind project's electrical generation. These agreements are awarded to US energy generators through competitive bidding procedures (Beiter et al., 2020).

[9] The market-prices in Rhode Island are comparable to Block Island's tariff-prices, as Ørsted's offtake agreement (PPA) is with the state of Rhode Island. As for Europe, we use the day-ahead prices as the market-price for electricity. See Appendix B for further details.

The only offshore-wind asset Ørsted has in the US is the Block Island wind park, located 6.1 km off the coast of Rhode Island, commissioned in 2016. Block Island was originally constructed by the US offshore-wind developer Deepwater Wind, and became part of Ørsted's portfolio when the company acquired 100% of Deepwater Wind in 2018 (Ørsted, 2018b). This project was the first ever commercial offshore-wind farm in the US and received support through both a 30% ITC and a PPA-structured offtake agreement with the state of Rhode Island. Thus far, Block Island is the only operational wind farm in the US. However, the increase in awards in offtake agreements since 2010 indicates a rapid growth in installed US offshore-wind capacity for the coming years. This is shown in Exhibit 17 below, together with the price development in awarded offtake agreements. It is also evident from the exhibit that the awarded offtake-prices have declined since Block Island received its offtake agreement in 2010. This indicates that the US market has become more mature since 2010, but as we will argue later when we discuss cost developments, not as mature as the European market.

Exhibit 17: Developments in offtake-prices and total capacity awarded agreements



Source: National Renewable Energy Laboratory (NREL)

Sub-conclusion to revenue

In conclusion, the analysis of Ørsted's revenue tied to its offshore-wind projects suggests that governmental support through tariff-prices was a critical factor to the company's successful transformation. This is evident when comparing the market-prices for electricity with the tariff-prices Ørsted achieved. In addition, Ørsted has repeatedly stated that its transformation would not have been possible without governmental support of the sort we have identified throughout this analysis, substantiating the role of governmental support as a critical factor to the company's success. Furthermore, we reveal that the tariff-prices wind farm operators could achieve have fallen, as the markets have become more mature and competitive. This holds especially true for the mature markets of Europe, where we highlight evidence of reduced tariff-prices in each country Ørsted has been involved in throughout its transformation (except Denmark). Moreover, this aspect is strengthened by the EU requiring subsidies to be allocated through competitive auctions in 2015/16, representing an important driver towards the zero-subsidy bids seen in both Germany and the Netherlands.

Moreover, we argue that our analysis of Ørsted's revenues indicates that the government support schemes materialised both through high tariff-price levels and long duration of the tariff-agreements. The former relates to the price-differential between tariff - and market-prices we illustrated for each country, which had a positive impact on Ørsted's revenues. As such, a higher price-differential constitutes a larger benefit for Ørsted. The latter, however, relates to the assumption that Ørsted's revenue stream from a project becomes reliant on the far less favourable market-prices when its subsidy expires. Consequently, a longer subsidy duration entails a longer period of time where Ørsted could reap the benefits of the aforementioned price-differential. Referring back to Exhibit 8, where we illustrated the tariff-price levels and duration separated by location, it is therefore now more understandable that Ørsted achieved higher LCIRRs in the UK than in Germany, even though Germany had the higher average tariff-price level. We do however note that Ørsted's project in the US (Block Island) has a significantly higher tariff-price and a longer duration than the average European project, but in turn a lower LCIRR than the UK. This is due to the fact that the returns of a project depend on more than merely revenue, which is an aspect we will cover thoroughly later in our thesis.

We also argue that Ørsted has a repeated pattern of chasing government support in immature markets, thus moving away from mature markets as competition intensifies and tariff-prices become less favourable. Historically, this is indicated by Ørsted commissioning its last offshore-wind farm in Europe's most mature market of Denmark in 2013, in favour of the UK, which was less mature and had more favourable tariff-prices back then. Now, we see the same behaviour whereby Ørsted currently expands out of Europe to Taiwan and the US, which are both, by comparison, less mature markets. In turn, we believe that this pattern substantiates the importance of governmental support to Ørsted's financial performance, and once again its role as a critical factor in the company's success.

Costs

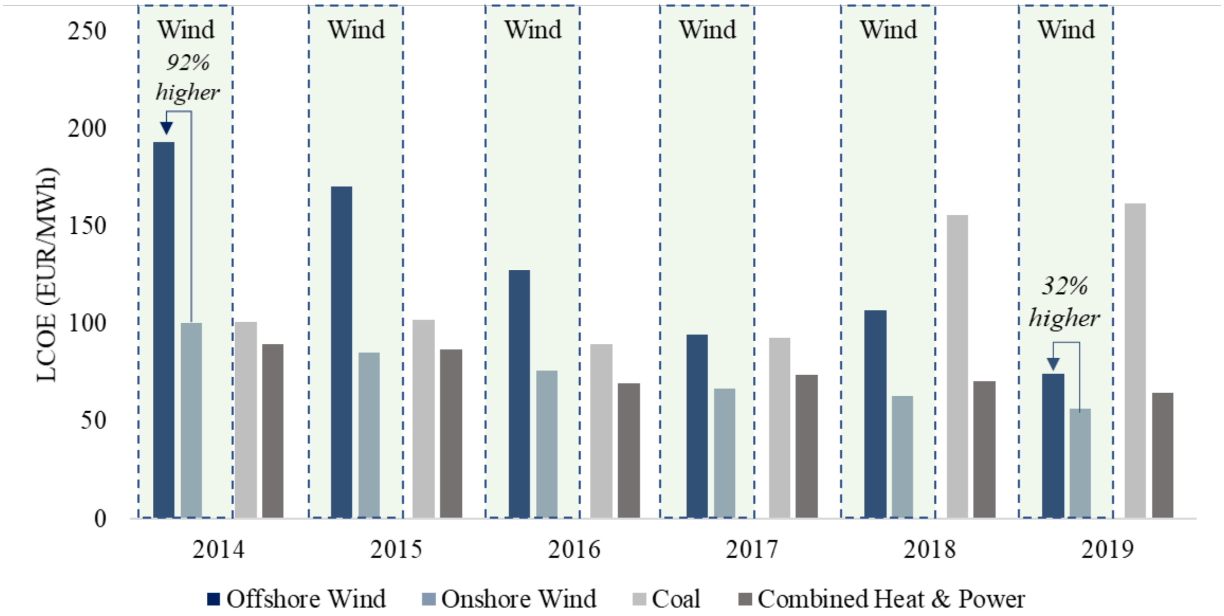
In its infancy, offshore wind received governmental support due to the fact that projects needed revenue support to be financially viable. In turn, policymakers envisioned that offshore wind would replace traditional energy sources and were motivated to support the industry due to its green attributes. To be a worthy replacement, however, required that offshore-wind projects eventually had the ability to become financially viable on their own, as governmental support cannot be sustained in perpetuity. As such, a central part of the success in Ørsted's transformation, and the future of the industry as a whole, were the severe cost reductions required to make offshore-wind projects financially viable (Brun et al., 2019). This part of the analysis will therefore address the developments in Ørsted's costs, to uncover which drivers resulted in lower costs, and thus contributed to Ørsted's successful transformation. We assess this by analysing how the levelised cost of electricity has developed for offshore wind in general, before we consider the developments in Ørsted's load factors, operating expenditures and capital expenditures tied to the company's projects.

Driving down the levelised cost of electricity (LCOE) throughout the transformation

The LCOE is a summary measure of the overall competitiveness of a generating technology and reflects the minimum constant price electricity must be sold at in order for a project to break even over its lifetime. As such, the LCOE includes the total lifetime costs of a project, therein development, construction, operation, and decommissioning costs. As the formula in Appendix C shows, the LCOE depends on the annual electrical energy generated, which in turn is a function of a wind farm's load factor. The load factor is the ratio of the amount of electricity produced by a wind farm, relative to its total potential over a given period (DNV GL, 2019).

Since the wind energy industry with an established home market emerged following the oil crisis in the seventies, the LCOE has decreased substantially until today. The developments in the LCOE from 2014 to its current level are shown in Exhibit 18. Evidently, LCOE for offshore wind reached a competitive level in 2017 compared with other renewable sources, as well as coal and gas power, in the UK and Germany. LCOE is driven by the combination of load factors and lifetime costs of technologies, where improving load factors, rising competition among developers, and the prospect of expanding electrification have contributed to falling offshore-wind costs (DNV GL, 2019).

Exhibit 18: LCOE development for selected energy sources in the UK and Germany



Source: Bloomberg LP

The UK and Germany are the only locations for which Bloomberg New Energy Finance (BNEF) provides historical data for each energy source. The data shown in the exhibit are consistent with the estimates of the French Investment Bank, Lazard (2018), as well.

Ørsted commissioned only one project, Vindeby, during the 1990s which was considered a pilot project, and the political focus was therefore on technical feasibility rather than on costs (Ørsted, 2019a). Moreover, the typical projects commissioned during this period were primarily onshore turbines based on concrete foundations in shallow waters and were mostly ordered by governments and constructed by utilities (Ørsted, 2019a). The offshore-wind industry was immature with no specialised production chain and small turbines (0.5 MW to 2.3 MW), as well as limited availability of other demonstration projects. However, Vindeby provided Ørsted with know-how in offshore wind, which we believe was a premise behind the company's strategic decision in transforming the company from black to green.

In 2000, a transition in offshore wind was ongoing as The Crown Estate[10] launched the first leasing round in the UK, which allowed for competition in scoping and pre-development among developers (Ørsted, 2019a). This resulted in the first large-scale offshore-wind farm,

[10] The Crown Estate is the collection of lands and holdings within the territories of the UK belonging to the British monarch (The Crown Estate, n.d.).

Horns Rev 1 belonging to Ørsted, commissioned in 2002. The wind farm consists of 80 Vestas 2.0 MW wind turbines with a total capacity of 160 MW and was the first to have its own designated offshore substation (Ørsted, 2019a). During the period from 2000 to 2008, the cumulatively awarded offshore-wind capacity in the UK went from 1,100 MW to 32,000 MW, motivating several turbine manufacturers to enter the offshore-wind market. Moreover, the increased project scale demanded new production lines and installation methods, and manufacturers were pushed to construct turbines, foundations, and electrical systems to be specifically designed for large-scale offshore-wind farms (Ørsted, 2019a).

Furthermore, the increased project scale made the offshore-wind industry more complex, and as there was no firm supply chain in place, the LCOE increased. On the other hand, wind turbines had grown in size from 2.3 MW to 3.6 MW during the period from 2002 to 2011, which resulted in an overall lower number of turbines. The lower number of turbines led to fewer foundations and cables, and lower numbers of sites for the Operations and Maintenance (O&M) crew, and in turn reduced costs. However, mass production and economies of scale could not offset the increase in LCOE, which indeed increased from around EUR 90 per MWh to EUR 167 per MWh (some projects higher) during this period (Ørsted, 2019a). According to the CEO of Ørsted's offshore-wind business, Martin Neubert, the installation process was challenging as installation companies were small, which entailed considerable risk that they could go bankrupt during a project (Tryggestad, 2020). In order to mitigate the supply-chain risk, in 2009, Ørsted decided to acquire A2SEA, which was the market leader in transportation and installation of offshore-wind farms, at a cost of DKK 700 million (Ørsted, 2009a).

In the same year as the acquisition of A2SEA, Ørsted entered into a framework agreement with Siemens for the purchase of up to 500 of its newly developed 3.6 MW turbines (Ørsted, 2009a). The agreement was the first step in Ørsted's efforts to industrialise the market for offshore-wind projects, and at that time, the partnership with Siemens was one of the largest energy agreements Siemens had ever made (Tryggestad, 2020). Moreover, the partnership resulted in procurement synergies and gained a competitive edge compared with smaller renewable energy companies and oil majors entering the offshore-wind market. Ørsted was now able to make procurements on a portfolio of projects instead on an asset-by-asset basis, which we believe was important for reducing costs and contributing to the company's successful transformation. Additionally, the agreement provided Siemens with the opportunity to further optimise its production of wind turbines for offshore-wind projects, and to retain its position as market leader in the supply of wind turbines for the offshore sector (Ørsted, 2009b).

Load factors

In a study from 2019 commissioned by the UK government and carried out by DNV GL, it is argued that higher load factors impact LCOE "immensely". As such, we recognize higher load factors as a crucial contributor to reducing the LCOE. Throughout Ørsted's transformation, higher load factors were essentially achieved by larger turbines and a relocation of these to areas further away from shore to benefit from stronger winds. According to the study, larger turbines are tied to a higher degree of wind capture, as this depends on the turbine capacity and rotor diameter, and thus leads to higher load factors. Moreover, the general technological advancements made in relation to developing larger offshore-wind turbines, lead to more advanced wind farm design and system efficiency. This, in turn, contributed to increased energy production and consequently higher load factors (DNV GL, 2019). As evident, the globally weighted average[11] load factor of offshore-wind farms was 43% in 2018, compared to the 2010 average of 38% (Prakash & Anuta, 2019).

Operating expenditures

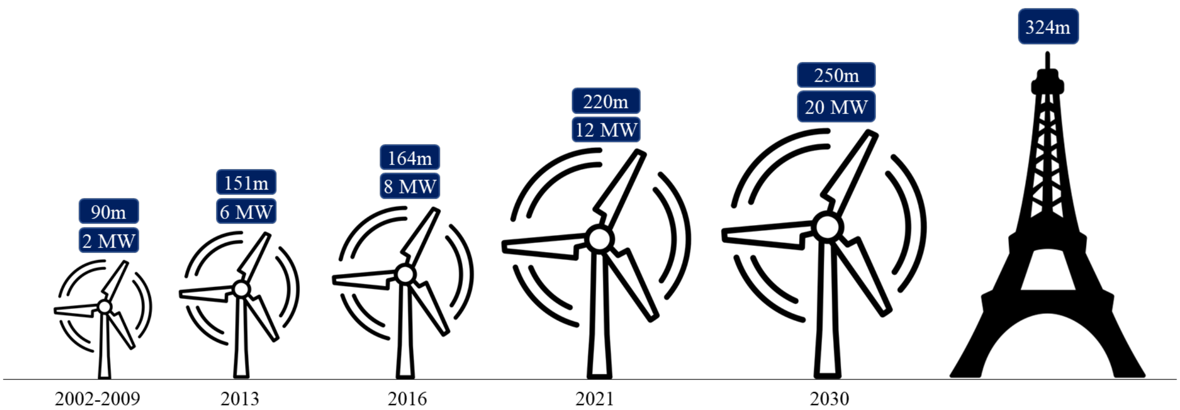
The second aspect to driving down LCOE was lower operating expenditures. Reducing these were in part related to offshore-wind developers being pressured by governments to increase the cost-efficiency of operations within offshore wind. This was for instance evident in the UK in 2012, where offshore-wind developers were required to reduce costs to ensure continued political support. In this context, the UK government's commitment to support the segment had until this point created a dedicated offshore-wind industry, and the market volume had increased substantially over the past years. In turn, the increasing market volumes tied to new offshore-wind deployments had been a major contributor to reducing the costs. This is substantiated by the fact that each time installed capacity in offshore wind has doubled, the LCOE has declined by approximately 18% (Ørsted, 2019a). The increased market volume attracted new suppliers of turbines and other components to the market, and the increased competition in the original equipment manufacturers (OEM) market became an important driver of further cost improvement and importantly larger turbines (Ørsted, 2019a). Moreover,

[11] Weighted by installed capacity in MW.

we argue that as manufacturers became confident to invest due to higher scale, Ørsted improved its bargaining power when negotiating new contracts.

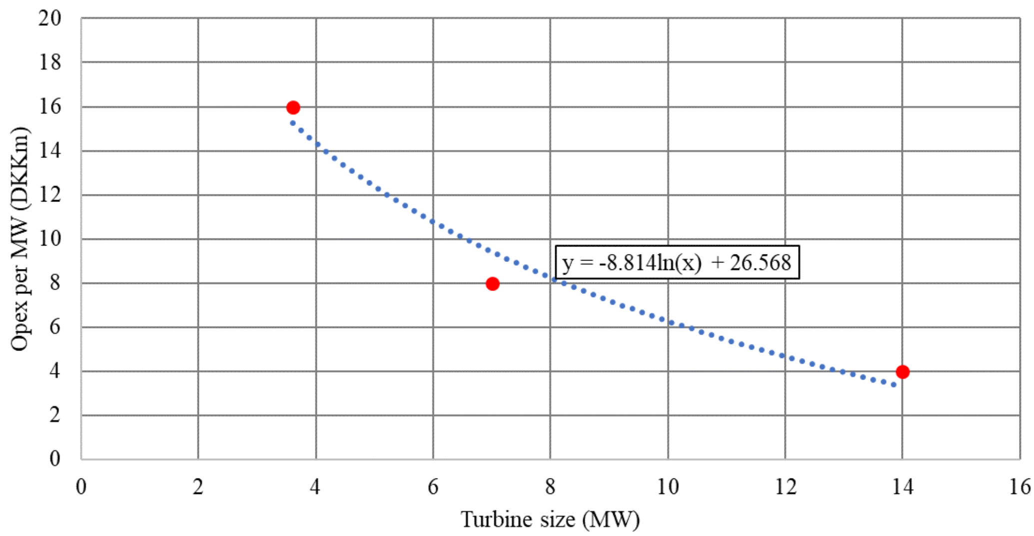
Furthermore, Ørsted and other offshore-wind developers worked consistently to optimise energy production and reduce the costs of operations. Turbine manufacturers developed larger turbines with longer blades, which meant fewer installations, foundations, and units to serve, eventually leading to lower LCOE (Ørsted, 2019a). As highlighted in Exhibit 19, the turbine sizes quadrupled from when Horns Rev 1 was commissioned in 2002, compared to those constructed in 2016. Moreover, Ørsted provided three datapoints regarding the relationship between operating expenditures per MW and larger turbine sizes in the company's capital markets day report of 2018. This relationship is shown in Exhibit 20, where operating expenditures are almost constant per turbine position on a portfolio level, highlighting the economies of scale related to the technological improvement of larger turbines. As such, we argue that increasing the average size of turbines has been the key component in reducing operating expenditures, as larger turbines require less maintenance and less downtime, as well as cheaper installation.

Exhibit 19: Development in turbine sizes



Sources: Company reports, DNV GL

Exhibit 20: Ørsted's operating expenditures (opex) per farm capacity (MW) versus turbine size



Sources: Company reports

From this exhibit, the size of wind turbines will probably continue to represent the key component in reducing operational expenditures, even though the reduction may not be at the same pace as in the beginning.[12] On the other hand, clusters of wind farms have been established due to the growing number of offshore-wind parks, resulting in cheaper installations as well as O&M. The impact of this is already evident in Europe, with several clusters in the North Sea, which has reduced operating expenditures, and thus LCOE for Ørsted significantly (Ørsted, 2019a). We argue that there is further potential for reductions in operating expenditures, should these developments continue.

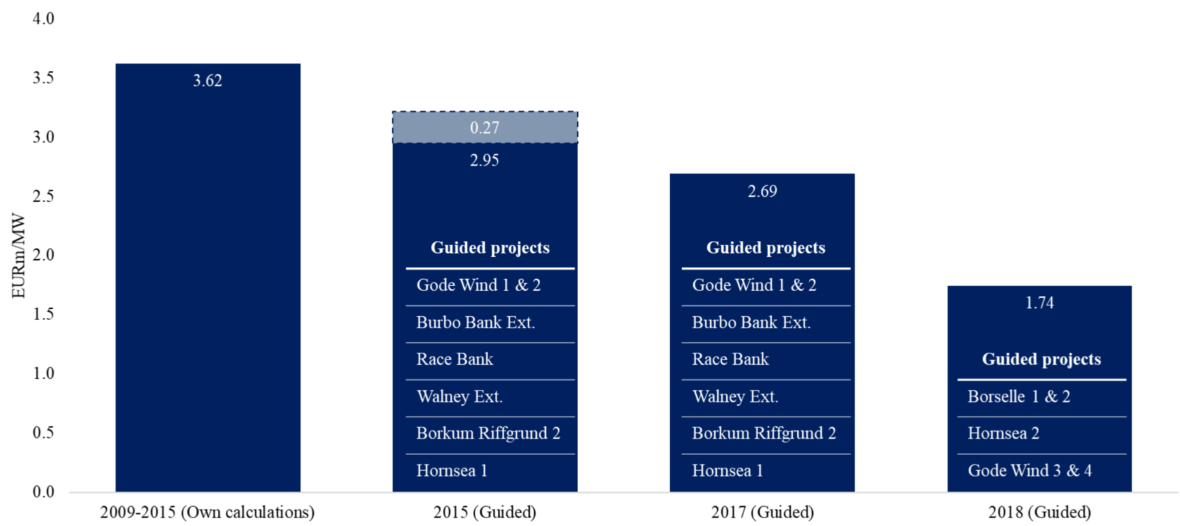
Capital expenditures

The third aspect to driving down LCOE was lower capital expenditures. We provide an illustration of the developments in Ørsted's capital expenditures through comparing our calculated capacity weighted average capital expenditures per MW (Capex/MW) between 2009 and 2015 with the company's subsequent own guidance for selected projects. Exhibit 21 shows that Ørsted's Capex/MW has decreased throughout its transformation. In turn, Ørsted explains that reductions in capital expenditures were a crucial contributor to reducing the

[12] This is reflected by the asymptotic property of the cost-curve presented in Exhibit 20.

LCOE (Ørsted, 2016b). Moreover, this view is supported by Rennesund et al. (2020) in a report carried out for Export Credit Norway, emphasizing that capital expenditures constitute the largest portion of the LCOE for an offshore-wind farm. In our view, the reductions in capital expenditures made by Ørsted can essentially be attributed to the cost improvement initiatives that the company has extensively employed, embodied explicitly by the development of standard modules adaptable to project-specific site conditions. An example is the standardised offshore export cable module utilised in four of the projects[13] mentioned in Exhibit 21, where a key benefit is the increased specific export capacity (Ørsted, 2016b). In less abstruse terms, this entails the re-use of modules over several projects, which allows Ørsted to achieve procurement savings, remove supplier bottlenecks, optimise interfaces across the modules, and identify and reduce risks (Ørsted, 2016b). Other examples include utilising larger turbines and reducing weight, as well as increasing the application depth for the company's monopile (fixed) foundations.

Exhibit 21: Development in Ørsted's capital expenditures per farm capacity (MW)



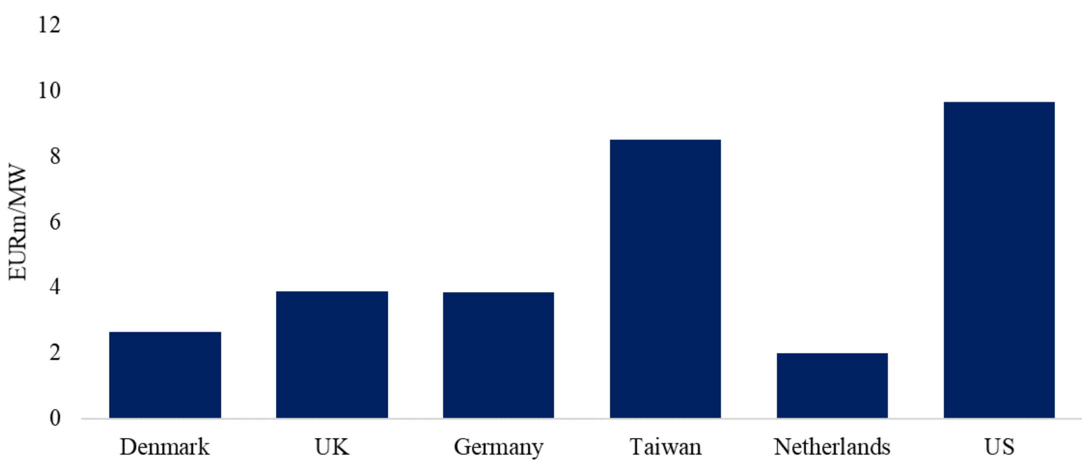
Sources: Own calculations, company reports

Note: This shows unsubsidised capital expenditures, meaning no governmental support to initial investments. Moreover, the guidance from 2017 is an update from the guidance provided in 2015, therefore highlighting the same projects.

[13] Burbo Bank Extension, Race Bank, Walney Extension and Hornsea 1.

Furthermore, assessing the Capex/MW in each country in Exhibit 22, we see that the initial investments are higher in the immature markets Ørsted has entered over the past years compared to the mature markets of Europe. This could be a matter of immature supply chains in immature markets, which lack the necessary infrastructure, entailing a larger share of content requirements and thus increasing the initial investment for a developer. In relation to the LCIRR, we deem that the high Capex/MW in Taiwan and the US contribute substantially to the lower returns observed in these countries compared to Europe.

Exhibit 22: Ørsted's initial investment per farm capacity (MW) by country



Sources: Own calculations, company reports

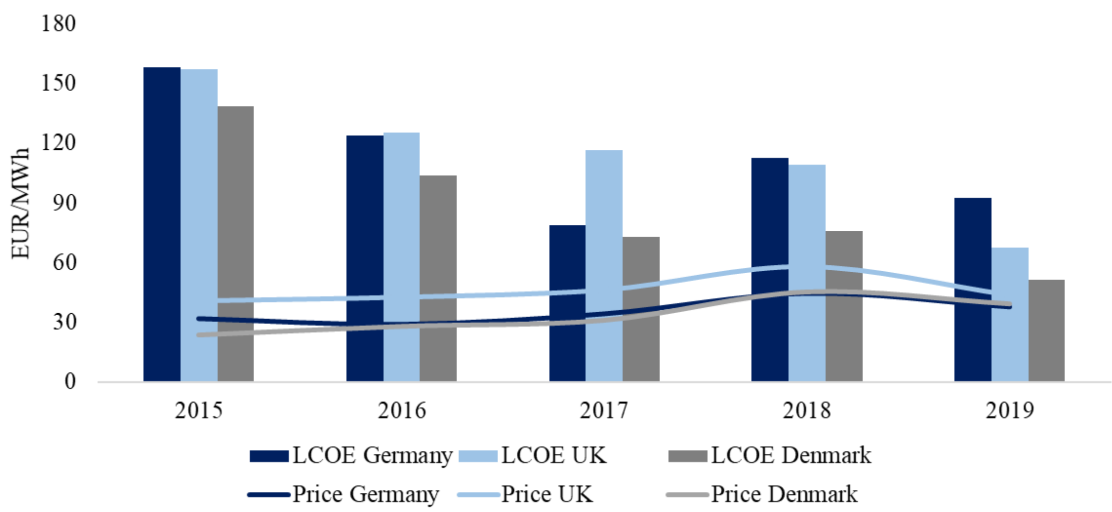
Note: This shows unsubsidised capital expenditures, meaning no governmental support to initial investments.

Sub-conclusion to costs

In conclusion, this analysis reveals that the critical factors that enabled Ørsted to achieve the cost reductions, and thus a successful transformation, have been the technological improvements and evolution of the offshore-wind supply chain. The technological improvements, such as larger turbine sizes, have raised load factors, as well as reducing the operating and capital expenditures. The supply chain developments increased manufacturing capability and improved construction practices, which in turn reduced the initial investments, and as such capital expenditures further. The cost improvements are evidenced by the fact that the globally weighted average LCOE for offshore wind in 2018 was more than 20% lower than in 2010. This makes offshore wind a particularly attractive proposition given its scalability and the fact that at these cost-levels it would compete directly with fuel-fired electricity without major financial support (Prakash & Anuta, 2019). To that extent, the LCOE of offshore wind is already showing signs of becoming competitive in certain European markets such as Germany and the Netherlands, where zero-subsidy contracts have been awarded for future projects.

In terms of the developments in the LCOE, we note that on an aggregate level, the industry is closing in on the ability to break even without governmental support. We do however consider the aggregate figures in Exhibit 23 to lack sufficient granularity to provide insight to those projects that might already be cost-efficient enough to break even. In any case, the developments in LCOE over the past five years indicate that offshore wind is becoming an adolescent industry, and should, in our view, be able to break even without the support of governments should the same developments continue.

Exhibit 23: Electricity prices versus LCOE by country



Sources: NordPool, Bloomberg LP

Funding strategy to fuel investments

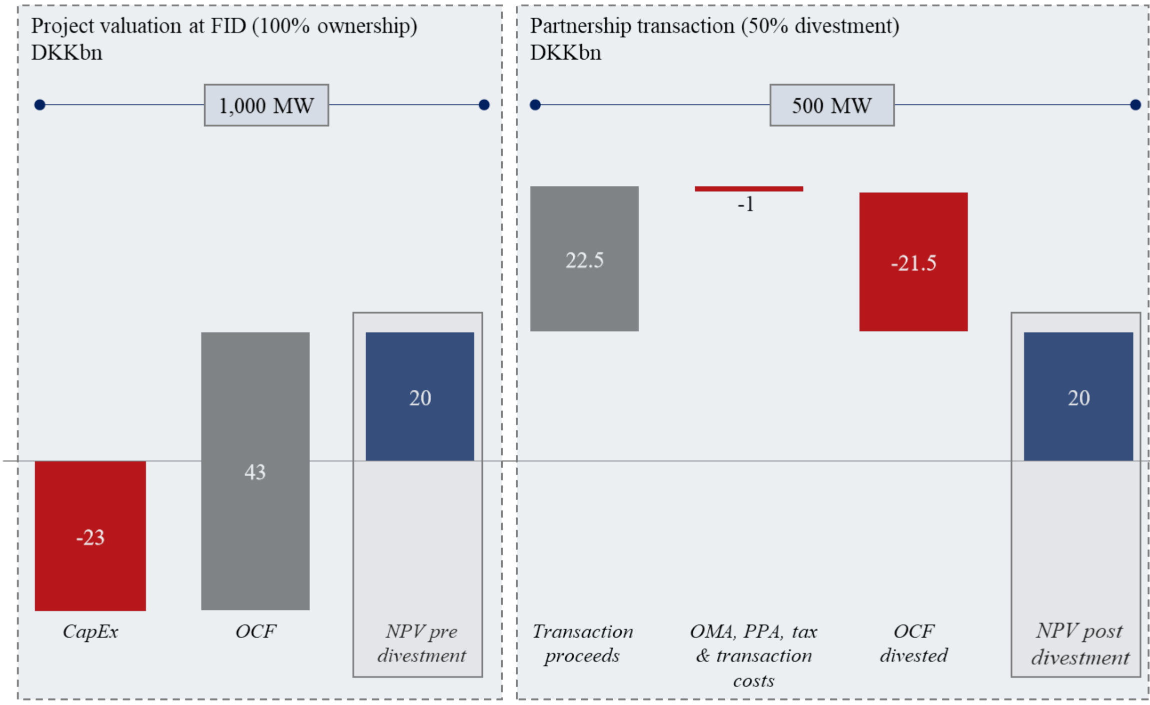
When we described Ørsted's transformation in Section 2, we highlighted that the farm-down model was crucial in relation to Ørsted's ability to raise capital for its offshore-wind farms. In order to explain the motivations for this funding strategy, and why it became successful to Ørsted, we will first provide a description of how the financing activity and equity-mix among investors in European offshore-wind projects evolved throughout Ørsted's transformation. Second, we give a comprehensive description of how the farm-down process works. Lastly, we will cover how Ørsted utilised farm-downs as a funding strategy to accelerate the growth in its offshore-wind portfolio.

In 2010, the majority of the investments made in offshore-wind projects came from the large power producers that operated the wind farms. The same year, however, WindEurope (2010) noted that the offshore-wind market in Europe saw the emergence of a new major trend on the acquisition-side of projects in which long-term financial investors had arrived in the equity-mix of the sector. The financial investors can be broadly defined as institutional investors. What marked the arrival was when PensionDanmark purchased 50% of Ørsted's offshore-wind asset Nysted (Wilkes et al., 2011). The trend of new investors arriving continued over the subsequent years, on the back of the increasing project size, costs and stable income returns offered through the offshore-wind projects.

Moreover, in 2017, WindEurope recognised the emergence of another pattern in which transactions happened at later stages of the projects. Their distinction split the phases between development, construction and operational, noting that over the last three years, transactions at the construction and operational phases had increased significantly. According to them, this was largely due to the increased presence of institutional investors in the equity-mix, who preferred to join projects at late construction or operational phases (Remy et al., 2018). Their rationale was that these investors were less accustomed to the risks associated with development and construction of wind farms, which in turn left them more comfortable with investments in operational projects (Selot et al., 2019). The statistics of the acquisition activity from 2019 underline this notion, revealing that the largest share of the equity-mix was held by institutional investors, and that the largest share of investments was made in the operational phase of the projects acquired, as shown in Figure I.1 in Appendix I.

WindEurope (2015) states that the increasing size, and thereby investment costs and distance to shore, for the offshore-wind projects in Europe all contributed to the high volumes of divestments as part of recycling capital to fund new projects (Corbetta et al., 2015). What it describes is, in essence, the idea of the farm-down strategy. The farm-down approach involves recycling of capital in the sense that the wind farm owner uses the proceeds from divestment of an existing asset to fund the investment in a new asset. For Ørsted, this was usually done by divesting 50% of the equity stake in an offshore-wind farm at a price approximately equal to its cost of capital, thereby allowing for upfront value realisation, which enables the company to invest in new value-creating projects. To provide the reader with an understanding of the divestment process in a typical farm-down, we have recreated a generic depiction of how the process works from Ørsted's capital markets day presentation in 2017 in Exhibit 24.

Exhibit 24: Generic depiction of a farm-down



Sources: Company reports

The point is that the owner farms down the investment by divesting a stake in the project to an outside investor. Through this, the owner is able to maintain the same NPV at 50% ownership post divestment, as with 100% ownership. At the final investment decision (FID), the project's NPV to the owner is DKK 20 billion, because the initial investment is DKK 23 billion and the present value of operating cash flows (OCF) from the project is DKK 43 billion. Upon farming down, the owner sells 50% of the project for a total value net of transaction costs equal to DKK 21.5 billion, corresponding to 50% of the present value of the operating cash flow (OCF). Moreover, the remaining 50% of the OCF value accrues to the outside investor, leaving an NPV post divestment of DKK 20 billion to the initial owner.

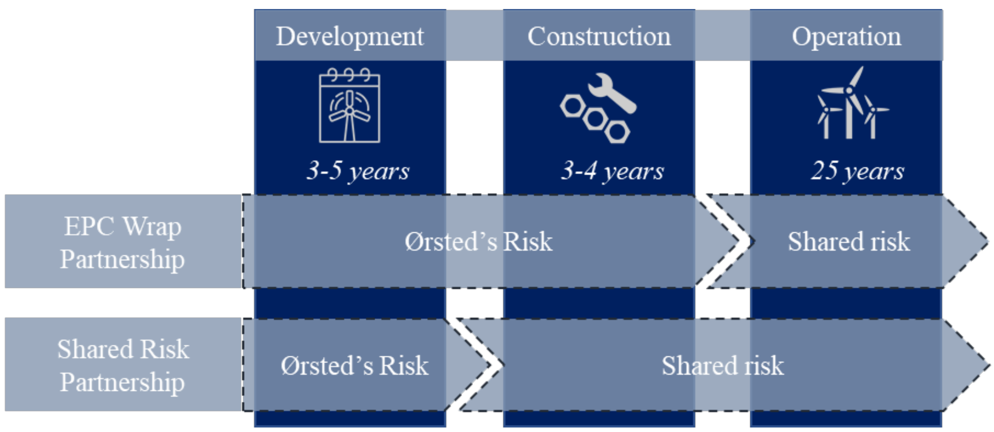
An indication of why the farm-down model was successful for Ørsted starts to form in light of how the equity-mix among investors, and their characteristics, in European offshore-wind projects evolved. In addition to WindEurope's suggested contributors to the increase in capital recycling[14] (farm-downs), we argue that an equally important contributor was that this strategy, combined with Ørsted's presence in the entire value chain, enabled the company to

[14] Larger projects, higher investment costs and distance to shore.

tailor the project risk to address investors' specific risk appetite. This concept is strengthened by the former CEO of Ørsted's offshore-wind business, Martin Neubert, who stated that the model resonated well with the Danish, Dutch and Canadian pension funds and later institutional investors as it enabled Ørsted to mitigate the risks associated with the phases of development, construction and operating of the projects to outside investors (Tryggestad, 2020).

In the context of flexibility, Ørsted distinguishes between three phases of the value chain of a project in which the project-investors can enter: Development, construction and operation. In short, development involves site selection and planning, construction involves building and commissioning and operation involves asset management, operating and finally decommissioning (Ørsted, 2016b). Furthermore, Ørsted explains that there have typically been two types of partnerships the company enters into in order to tailor the risk for potential project-investors when farming down an offshore-wind asset: EPC Wrap Partnerships and Shared Risk Partnerships. The Engineering, Procurement and Construction (EPC) partnership is the preferred model for Ørsted as it achieves the cheapest capital from taking on most of the risk for itself. This is due to investors being insulated from the complex construction phases of Ørsted's offshore-wind projects. Furthermore, shared risk partnerships de-risk Ørsted's share, which involves more expensive capital, but provides more upside for the project-investor as they have a larger risk exposure (Ørsted, 2016b).

Exhibit 25: Illustration of Ørsted's farm-down models



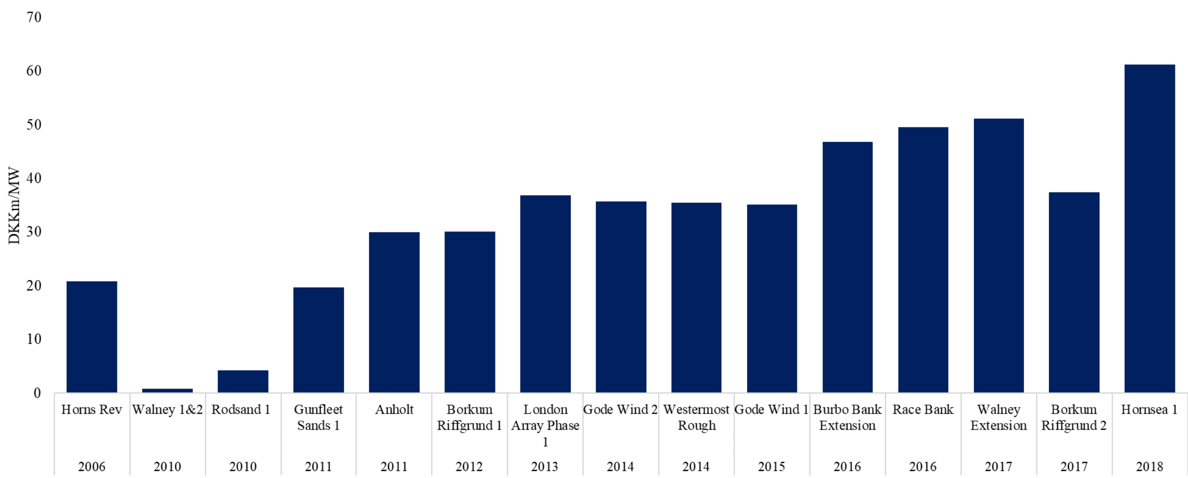
Sources: Company reports

Ørsted has practised farm-downs since 2006, from what we can see in the annual reports and company announcements, and pioneered the employment of this strategy, as Neubert stated in the McKinsey interview from 2020 (Tryggestad, 2020). In the continuation, the company's position as a leader within farm-downs is further evident in WindEurope's reports from 2011 and 2012, where it mentions that Ørsted's predecessor, DONG Energy, was the most active player in terms of acquisition and sales of stakes in projects, following its policy to "recycle" minority stakes in existing assets to finance new investments. (Wilkes et al., 2012; Wilkes et al., 2013). Undoubtedly, Ørsted pioneered and led the process that WindEurope claimed to be the "key strategy" to free up capital to fund new investments in offshore-wind projects (Corbetta et al., 2015).

Data from Ørsted's announced farm-downs shows the vast volume transacted throughout the company's transformation, representing proceeds available for reinvestment to grow its portfolio. Ørsted has sold stakes in 15 projects (as of November 2020), corresponding to a total value of DKK 112.3 billion in comparison to an IPO offering value of DKK 98.2 billion. Moreover, Exhibit 26 shows the implied value of Ørsted's farmed-down projects relative to its total capacity (in MW). This multiple should represent a valuation metric applicable for comparing the value of each project. As the exhibit illustrates, the overall trend could indicate that the valuation of Ørsted's projects has increased since its first farm-down in 2006. Among other factors, this development is widely affected by the fact that none of the projects entered before 2011 were EPC Wrap Partnerships,[15] resulting in higher cost of capital and thus lower valuations. From the data we are able to gather for each farm-down, we find that the average EPC Wrap deal has approximately been DKKm 44 per MW compared to an average of DKKm 19 per MW for shared risk partnerships. However, in this case, we emphasise the existence of other deal-specific factors impacting the valuation, and as such, we approach this aggregate interpretation with caution.

[15] The very first EPC Wrap Partnership was entered in 2011 when Ørsted divested Anholt to PensionDanmark and PKA.

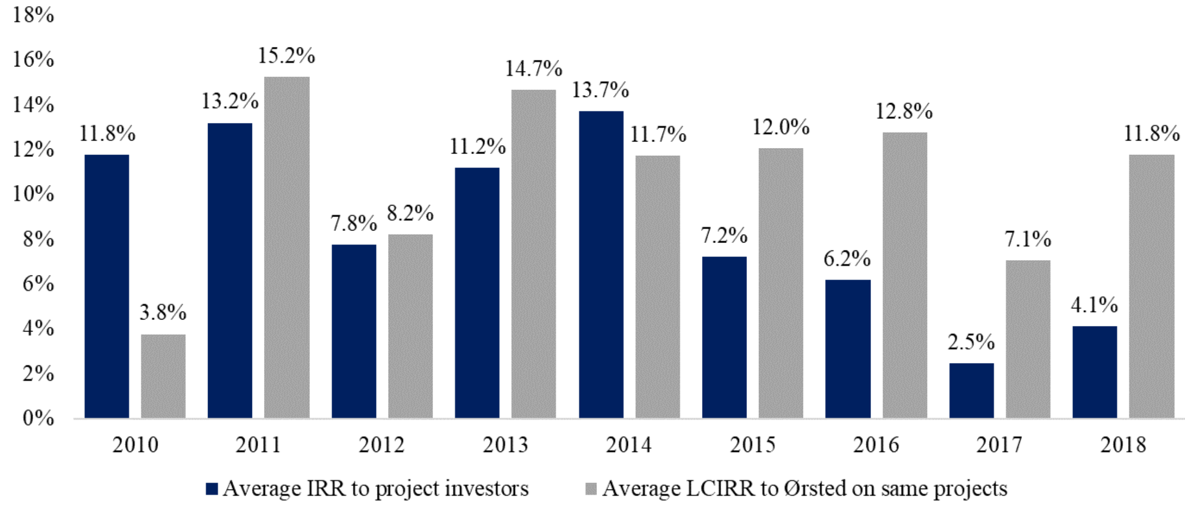
Exhibit 26: Implied value per farm capacity (MW) of Ørsted's farm-downs



Sources: Own calculations, company announcements, Offshore Wind, Wind Power Monthly, Renewables Now

Despite approaching the above interpretation with caution, a topic of reflection arises when one considers that higher valuations achieved in Ørsted's farm-downs should be tied to lower IRRs for the investors to whom parts of the projects are divested. Exhibit 27 shows our estimates for the IRRs achieved by the investors that chose to invest in Ørsted's projects, and Ørsted's LCIRRs for the same projects without the proceeds from the divestments. This indicates a declining trend in the IRRs for the project investors, whilst the LCIRRs to Ørsted remains relatively stable by comparison. We believe there could be several reasons behind this, and especially two worth highlighting. In particular, we argue that the lower IRRs accepted by project investors can be attributed to Ørsted's ability to mitigate the risk to which these investors are exposed to. In turn, this should materialise as lower required returns, higher valuations upon divestment, and lower IRRs accepted by project investors. Furthermore, and perhaps more interesting, could be the reflection of investors willingness to put fiscal value behind renewable energy projects at lower rates of return. This could either be a result of the former argument, i.e., Ørsted's ability to mitigate risk, or a broader reflection of the increased interest among investors to direct capital towards projects related to renewable energy. If this is the case, lower IRRs could reflect lower required returns due to the mere fact that investors have become more accustomed, and willing, to invest in offshore-wind projects. This train of thought will be further discussed in Section 4.

Exhibit 27: Returns of participating project investors and returns to Ørsted



Sources: Own calculations, company announcements, Offshore Wind, Wind Power Monthly, Renewables Now, and Ørsted's Asset Book

Note: In this exhibit we have calculated the average capacity weighted IRR to project investors and the average capacity weighted LCIRR to Ørsted for the same projects.

Sub-conclusion to funding strategy

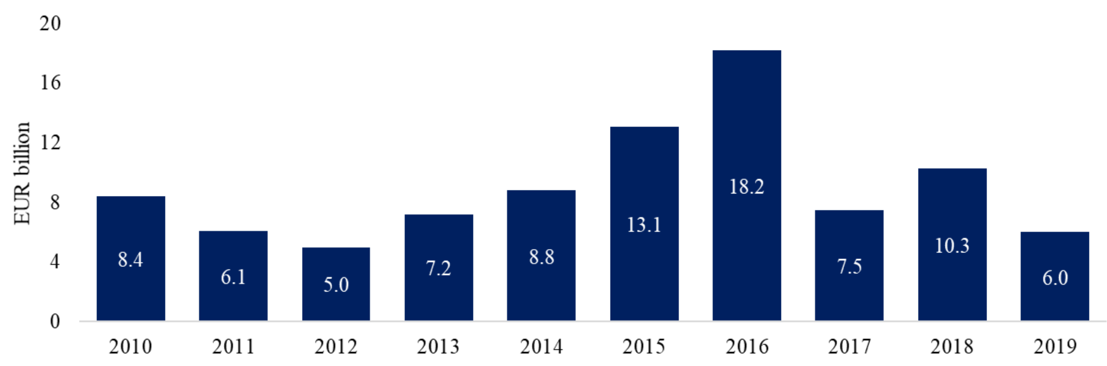
To conclude, we view farm-downs as a critical factor in Ørsted's successful transformation as it contributed to accelerating the developments of new offshore-wind projects. In our view, the farm-down model enabled this both through freeing up capital from existing projects to fund new ones, and as a means to capitalise on the arrival of institutional investors. Emphasising the model's importance, Neubert stated that Ørsted would not have been able to fund all its projects in Europe without the farm-down model (Tryggestad, 2020). Furthermore, we believe that the tremendous acceleration in new offshore-wind farms for Ørsted after 2011 allowed the company to stay competitive and maintain market shares in the fast-paced growth of the offshore-wind market. Ultimately, we argue that this created a virtuous circle, attracting more and more capital as Ørsted's business grew with the market.

Conclusion to the critical factors to Ørsted's successful transformation

So far, we have presented and analysed the financial aspects of revenue, costs and investments that relates to the financial performance (LCIRR) of Ørsted's offshore-wind projects. In doing this, we have been able to uncover the critical factors that made Ørsted's transformation successful and analysed the developments in these throughout the company's transformational phase. As explained thoroughly throughout the analysis, these factors were high and stable revenue through governmental support, evolution of the offshore-wind supply chain and technological improvements, as well as farm-downs as a funding strategy. Thus far, we have concluded with each factor's individual contribution to Ørsted's success. We do, however, argue that there are various interplays between the factors that added an additional contribution to the company's success, which we will briefly discuss in the following paragraphs.

The first interplay we believe to be recognisable was that the farm-down strategy was an important way to compensate for higher cost of capital as subsidies started to converge against market-prices in zero-subsidy auction rounds, such as those observed in Germany and the Netherlands. This notion is inspired by WindEurope reporting that the transition to subsidy-allocation through auctions led to a decrease in investment levels in 2017, breaking the continuous growth since 2012, shown in Exhibit 28 below. Furthermore, in the aforementioned interview BNEF had with Martin Neubert, he admitted that merchant prices involve higher risks, as these entail a less stable revenue stream than tariff-prices (Collins, 2017). In turn, we argue that less stable revenue streams, fluctuating with the market-prices, should be tied to a higher cost of capital than those tied to stable tariffs, and should thus materialise as lower investment levels. To compensate for this, however, the farm-down model represents a tool for which Ørsted could reduce the risk of outside project-investors by insulating them from selected phases of an offshore-wind project. As such, we argue that the farm-down model has been a tool Ørsted has used to attain its access to cheap capital as the revenue streams became dependent on the market-prices, which seems to be the development in European markets over the past years.

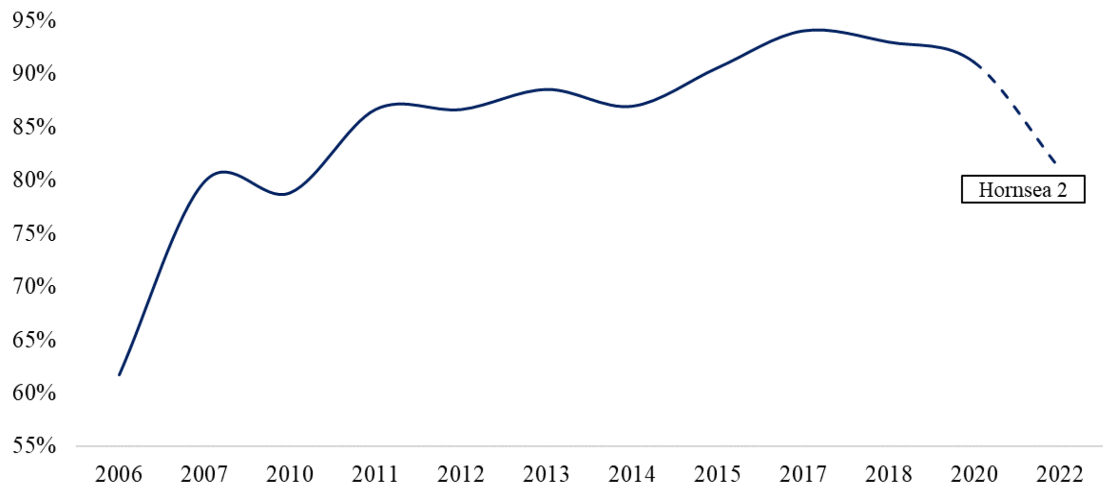
Exhibit 28: Investments in offshore wind



Source: WindEurope

Secondly, we argue that an interplay existed between the high tariff-prices Ørsted was awarded, whilst the company gradually reduced the costs of its projects. More specifically, we believe this is visible in the UK market, where Ørsted gradually increased its EBITDA-margin through reducing costs and maintaining the high tariffs associated with the rich UK governmental support, as shown in Exhibit 29 below. As the offshore-wind industry in the UK came under pressure from the government to cut costs in order to receive renewed political support, Ørsted and its peers became more cost-conscious. We have previously argued that annual running costs are primarily driven by the size of the wind turbines, as larger turbines are associated with lower operational and maintenance costs. As an example of the combination of high strike-prices and low costs, Walney Extension West commissioned in 2017, had 8.3 MW turbines and was achieved on a strike-price of EUR 165.4 per MWh. This resulted in an EBITDA-margin of 94%, marking the highest margin in Ørsted's entire UK portfolio. However, as competition intensified in subsequent CfD auction rounds, Ørsted was no longer able to secure high strike-prices, resulting in lower EBITDA-margins.[16] This is, for instance, the case with the previously discussed Hornsea 2, which achieved a far less favourable strike-price than Walney Extension West.

Exhibit 29: EBITDA-margin development in the UK for Ørsted



Sources: Own calculations, Ørsted's Asset Book

[16] As explained in Appendix D, there is practically no annual capital expenditures for an offshore-wind farm once it is operational. As such, EBITDA is a particularly good proxy for free cash flow for offshore-wind projects.

The third interplay, in our view, relates to a virtuous circle related to the deployment of the farm-down strategy, reduced costs and continued governmental support for Ørsted's projects. At the outset, we argue that the farm-downs enabled scalability, and thus cost reductions, through the accelerated development of offshore-wind farms. In turn, when Ørsted came under pressure from governments to reduce costs in order to receive continued governmental support, farm-downs enabled the cost reductions, and thus the desired continuation of support. Closing out, continued governmental support would again entail stable revenues as compared to market-prices, which attracted investors to participate in the company's projects.

Why did Ørsted succeed in its transformation from black to green?

We believe that Ørsted's first-mover advantage in the offshore-wind market was the root cause of the company's successful transformation. In our view, being first entailed a streak of luck, as well as the possibility to acquire a unique skill set that enabled the company to become the industry-leader in offshore wind. In the following paragraphs, we will provide a distinction between what we believe was skill and what was luck in Ørsted's transformation. The categorisation is done through an uncommon interpretation of Ørsted being in the right place at the right time.

By being in the right place…

In the following, being in the right place is interpreted as Ørsted being in the right state in the sense that the company was in a position where it possessed certain features. As such, being in the right "place" is something we attribute to Ørsted's skill set as a consequence of the company being the first-mover in the offshore-wind industry. Ever since Ørsted pioneered the offshore-wind market in 1991, the company was able to build extensive know-how in the offshore-wind industry before its competitors. The first area in which we believe this materialised was Ørsted's ability to reduce the construction costs[17] through creating strong partnerships with suppliers of turbines, foundations, and cables at a time when there was no firm supply-chain in the industry. We believe that this, coupled with the company's strategic pledge to vastly expand its business in offshore wind, enabled Ørsted to seek out potential

[17] Ørsted expressed in its annual report of 2009 that, expressed in present value, the cost of constructing an offshore-wind farm accounted for a substantial proportion of the wind farm's cost during its lifecycle, and therefore it was vital to bring down these costs and execute construction projects as quickly as possible.

projects years before its generalist rivals, and thus to secure projects on favourable tariffs (The Economist, 2019b). As Ørsted's portfolio of offshore-wind farms grew, the company built unique know-how and developed a database of wind turbines across Europe, which unarguably helped further optimise operations and allowed the company to design new projects more efficiently (The Economist, 2019b).

The acceleration of Ørsted's installed capacity is also attributed in part to skill, in our view, specifically related to pioneering the farm-down strategy. We argue that being the first to employ this strategy, that is, divesting existing projects to invest in new ones, enabled the company to rapidly grow its portfolio, and from the outset build strong relationships with institutional investors for investments in additional projects. Lastly, we attribute Ørsted's actions related to the recovery from the gas-crisis in 2012 to skill, where the company demonstrated the ability to both establish and execute a clear financial action plan[18] to save itself.

… at the right time.

The right time is interpreted as the timing of events during Ørsted's transformation. As the occurrence of the events is exogenous to Ørsted, we interpret them as luck. Before we discuss what we attribute to luck, we would like to clarify that Ørsted was not lucky in the sense of pure serendipity, but rather in the terms of being in a particularly favourable position to reap the benefits of unforeseen advantageous events. The first aspect that we believe fits into this category is the governmental support that Ørsted received in every country of its offshore-wind projects. This fits our definition of "lucky", in the sense that Ørsted's position as a pioneer in offshore wind coincided perfectly with the low competitiveness and unforeseen magnitude of governmental support towards offshore wind specifically. In turn, this seemed to be particularly true in the UK, where the strengthening of uncompetitive support schemes gradually proved to be the case right after Ørsted's entrance into this market (Tryggestad, 2020). Even though the company's experience in offshore wind placed it in the right place, luck would have it so that former DONG CEO Anders Eldrup's statement "DONG would

[18] As described in detail in Section 2, among other initiatives this entailed divestment of non-core businesses and expansion of core businesses.

clean up its act, but don't expect an overnight miracle" was an understatement to the company's successful transformation[19] (Reguly, 2019).

We extend Ørsted's luck to the concept of "blessings in disguise", which we believe is represented by the aforementioned gas crisis of 2012. Not to be confused with the endogenous actions we previously related to Ørsted's skills, the mere fact that the crisis exogenously happened is something we relate to Ørsted's luck. In this sense, we argue that upon facing financial turmoil from the crisis, Ørsted was forced to focus on areas where it had the largest potential to succeed. At the time, this area was clearly offshore wind, which the company had expanded extensively over the past three years. While the division that drilled for oil and gas fields operated in dwindling North Sea fields, offshore wind was, as the former CEO Henrik Poulsen put it, "The one business where we had some true differentiation" (The Economist, 2019b). We agree with Poulsen and add that Ørsted had established itself as a clear leader in a market that had achieved a 31% CAGR in installed capacity from 2010 to 2012. As such, we argue that Ørsted's transformation was in part spurred by the gas crisis, to the extent that the company was forced to take actions to accelerate its expansion in offshore wind in order to survive.

[19] The fact that it took 10 years, as opposed to the 30 years envisioned, could, to some extent, be argued to represent a miracle.

4. Equinor's energy transition

The problem statement of this thesis is to assess whether Equinor's commitment to renewable energy sources has the potential to achieve a similar success as Ørsted did when the company became the world's first energy company to execute a transformation from black to green. In our view, Ørsted's success is manifested by its ability to transform the company from black to green, whilst creating shareholder value through a successful expansion in the offshore-wind market. In that context, we have previously conducted a thorough analysis of Ørsted's transformation and identified the critical factors that enabled its success. In this part of the thesis, we discuss whether these critical factors carry similar characteristics in Equinor's transformation, to the extent that they may enable the company to achieve a success similar to Ørsted's.

Equinor the Norwegian oil major with a major commitment to renewables

Equinor, formerly Statoil, is the largest energy operator in Norway and one of the largest offshore operators in the world, developing oil, gas, wind, and solar energy in more than 30 countries worldwide. The company was formed in 1972 as the Norwegian State Oil Company and was listed on the Oslo and New York stock exchanges in 2001, with a 67% majority stake owned by the Norwegian government. Currently, Equinor produces around 2 million barrels of oil equivalents on a daily basis and is responsible for about 70% of the overall Norwegian oil and gas production (Equinor, n.d. a). In addition to being a large producer of crude oil, Equinor is also the second-largest supplier of natural gas to the European market, with activities in processing, refining, and trading (Equinor, 2019a). The current reporting of Equinor lacks specific financial information about its businesses in renewable energy sources, whereas this segment is currently included in "other segments".[20] We argue that this emphasises that the company's current cash-flow generation primarily stems from oil and gas, and the fact that Equinor is currently an oil and gas company.

[20] However, Equinor has previously communicated that more detailed reporting from its renewable segments will begin in 2021.

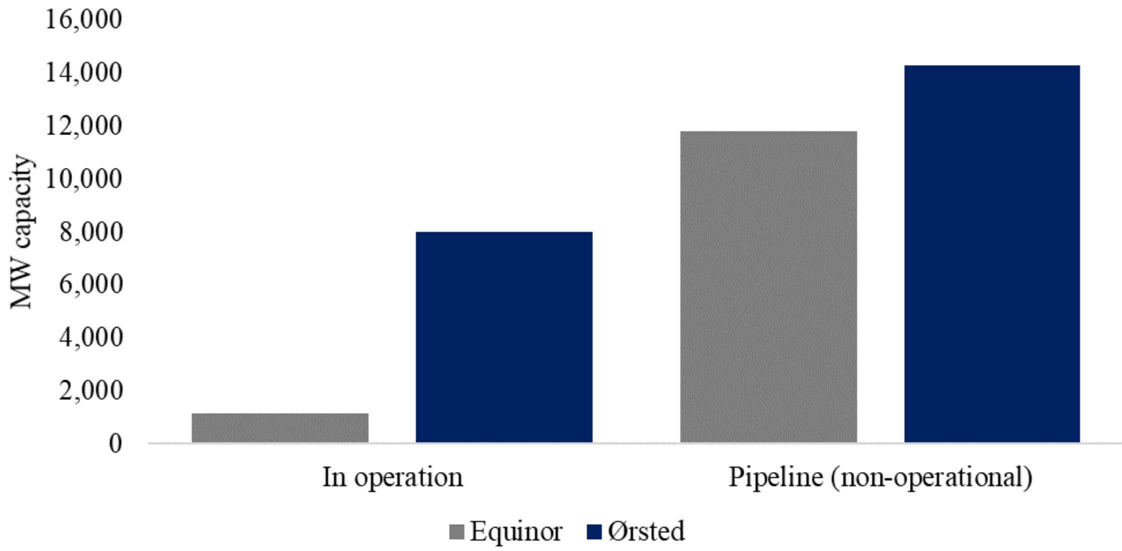
Equinor's commitment to renewable energy sources

The company has been investing actively in renewable energy, as a clear commitment to driving the company through an energy transition. According to Rystad Energy (2020), Equinor will account for USD 10 billion, or 55% of the capital oil and gas companies will spend on wind and solar by 2025. Moreover, Equinor guides capital expenditures of USD 2-3 billion towards renewables in 2022-2023, representing 17-25% of the company's total capital expenditures of USD 12 billion.[21] Furthermore, the company changed its name from Statoil to Equinor in 2018 to support its transition towards clean energy generation. Equinor's comprehensive ambition is to support and accelerate the energy transition and ensure a competitive and resilient business model in line with the Paris Agreement of 2016. As the company further emphasises, this commitment calls for growing its renewable energy capacity tenfold by 2026 and developing as a global offshore-wind major, while strengthening its industry-leading position on carbon efficient production over the next 30 years (Equinor, n.d. b). To a large extent, Equinor's ambition is to transform the energy output of the company, bearing a resemblance to the transformational strategy Ørsted laid out a decade ago.

Equinor's growth in renewables is predominantly based on developing as a global leader in offshore wind. This is evident from the 95% offshore-wind share of the company's renewables portfolio, as well as its belief that offshore wind is at the centre of the revolution of transitioning to low carbon and renewable energy (Equinor, n.d. b). In terms of the company's entire project portfolios counting projects in operation and pipeline, Ørsted surpasses Equinor in terms of total MW capacity, as shown in Exhibit 30. Moreover, Ørsted has far more capacity in operation, whereas most of Equinor's total capacity is yet to become operational. We believe that Equinor's vast pipeline also underlines the company's commitment to expanding its business in offshore wind.

[21] In other words, the primary portion of the company's spending will still be directed towards growing its oil and gas business.

Exhibit 30: Offshore-wind portfolios split by project-phase for Ørsted and Equinor



Sources: Ørsted's Asset Book, Facts about our renewable assets (Equinor)

Note: This exhibit shows capacity gross of divestments (before farm-downs).

Split by geography, Equinor has thus far only operational projects in Europe where 66% of its total capacity is in the UK and 34% in Germany, powering more than 1 million households combined (Equinor, n.d. a). The pipeline is primarily related to the UK, US, and Poland, where the largest share will be located in the US. Furthermore, Equinor believes that floating offshore wind is the next wave in renewable energy. Hence, the company seeks to differentiate from the current standard of turbines being fixed to the seabed, so-called bottom-fixed turbines. The company's rationale is that floating wind farms will enable positioning in areas with the best wind resources and open new sites to energy generation (Equinor, 2018). In this context, Equinor highlights its pioneer position in this segment and states that its offshore experience from the North Sea makes it uniquely qualified to lead the way in developing floating offshore-wind farms (Equinor, n.d. c). Assessing Equinor's portfolio, however, reveals that only two projects are categorised as floating: Hywind Scotland with 30 MW capacity already in operation, and Hywind Tampen with 88 MW capacity in pipeline.

Exhibit 31: Equinor's offshore-wind portfolio

	Capacity in MW	In operation	Sanctioned	Contract awarded	Acreage secured
Poland	3,000				• Baltyk I, II & III
Germany	385	• Arkona			
Norway	88		• Hywind Tampen		
USA	816; 3,600			• Empire Wind I	• Empire Wind II • Beacon Wind I, II
UK	749; 3,600; 719	• Sheringham Shoal • Dudgeon • Hywind Scotland		• Dogger Bank	• Dudgeon Extension • Sheringham Shoal Extension

■ In operation ■ Sanctioned ▫ Contract Awarded ▫ Acreage secured

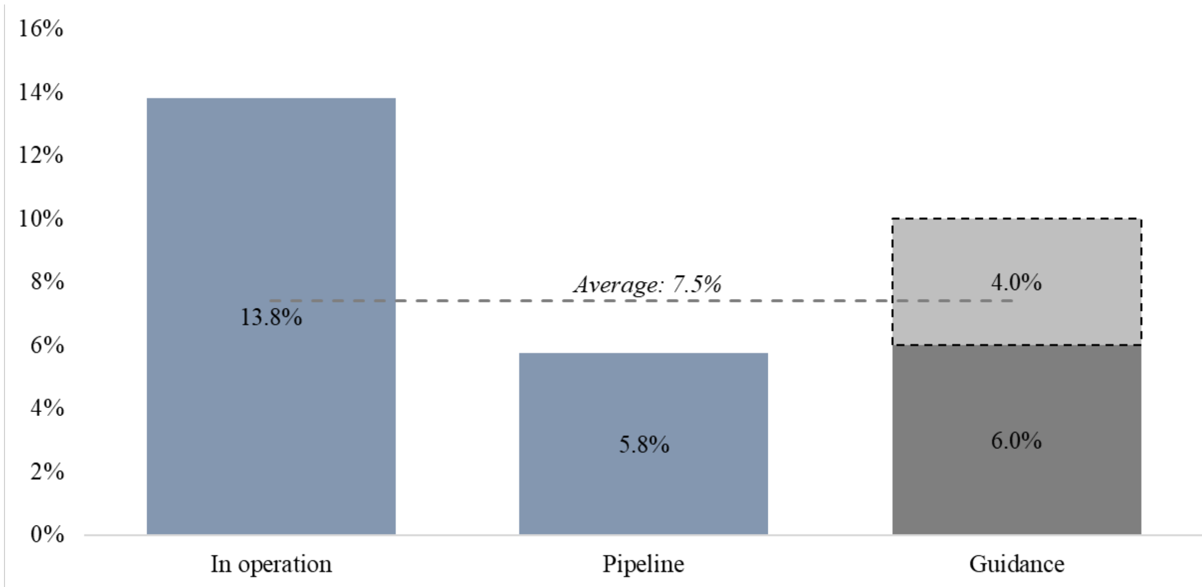
Sources: Facts about our renewable assets (Equinor)

Equinor's transformation assessed through the critical factors

A discussion of whether the critical factors that contributed to Ørsted's successful transformation exist to the same extent for Equinor requires that we specify what we define as "success". In this context, we dismiss the idea of success being a binary concept, but rather consider it a spectrum of which different degrees of success can be achieved. As such, we will address the critical factors to success by analysing if they can contribute to Equinor achieving a similar degree of success as Ørsted did. Furthermore, our analysis will consider the fact that the characteristics of the offshore-wind market has changed since Ørsted's transformation, and therefore that the criteria to success may be different for Equinor. In the same fashion as we did for Ørsted, each critical factor will be assessed separately starting with revenue, then costs and lastly investments.

Before we assess each critical success factor, we provide a comprehensive overview of the profitability of the projects in Equinor's offshore-wind portfolio. Similar to the analysis of Ørsted, we use the capacity weighted LCIRR to provide the overview. The assumptions related to this calculation are provided in Appendix E. Equinor's transformation is in the future, as shown in Exhibit 30. As such, the expected LCIRRs for future projects are incorporated in the total LCIRR to reflect the relevant projects to the company's transformation. The fact that a majority of the projects to Equinor's transformation are yet to exist implies that we do not have the necessary details to calculate the LCIRR for every expected project. In essence, the necessary details exist for the projects that are operational or have been awarded contracts, but not for those that have only secured acreage or been sanctioned. Consequently, our calculated LCIRR incorporates all projects except those in the last two categories. We argue that our calculation, however, still provides valuable insight in conjunction with the following analysis of each critical success factor. As our calculations show, Equinor's projects in operation yield a higher LCIRR, on average, than those not yet commissioned and the upper boundary of the company's guidance for future projects communicated in its capital markets update in November 2020 (Equinor, 2020a). Incidentally, Equinor's guidance for the LCIRR of future projects is in line with Ørsted's, which guides LCIRRs between 7-8%.

Exhibit 32: Equinor's capacity weighted lifecycle IRR (LCIRR) in offshore wind by project-phase



Sources: Own calculations, facts about our renewable assets (Equinor), company announcements

Note: Pipeline only includes projects that have been awarded contracts.

Revenue

As we have previously argued, governmental support materialising as a price difference between tariff- and market-prices, combined with the length of the subsidy contracts, constituted high and long-lasting revenues that contributed to the success of Ørsted's transformation. In terms of Equinor, we argue that in order to achieve a success akin to Ørsted's, these same characteristics must exist. In turn, we will address this by first analysing the revenue aspect of the projects Equinor has in operation before we analyse the projects the company has in pipeline.

In operation

Analysing the composition of Equinor's operational projects reveals that three of the four projects the company has in operation are located in the UK. Furthermore, Equinor commissioned its first offshore-wind farm in the UK in 2011, and similar to Ørsted, entered the UK market before the transition to competitive-based auctions under the Contracts-for-Difference (CfD) scheme. Sheringham Shoal and Hywind Scotland were awarded support under the Renewable Obligation Certificate (ROC) scheme, and thus receive consistently high revenue compared to the market-price. It is worth noting that Hywind Scotland receives 3.5 ROCs per MWh it produces, which is the highest support level registered in both Equinor's and Ørsted's portfolios. The highest support level achieved by Ørsted, by comparison, is 2 ROCs per MWh. The reason behind Hywind's favourable ROC agreement is that this project employs floating offshore-wind technology, which is costlier than standard bottom-fixed technology. Equinor's last operational UK project, Dudgeon, was awarded support under the CfD scheme in the early auction round of 2014. As described in the analysis of Ørsted, this entailed higher strike-prices than the subsequent official auction rounds due to low competition. As such, and similar to Ørsted's early CfD projects, Dudgeon is fixed on a high strike-price, and benefits from a high price-differential in relation to the market-price.

Equinor's first, and only, operational offshore-wind farm in Germany, Arkona, was commissioned in 2019. Similar to Ørsted's projects in Germany, this project receives two particular tariffs over two distinguishable periods: Eight and two years. The support level Arkona receives is identical to that received by Ørsted's Borkum Riffgrund 2, also commissioned in 2019. As such, this project also benefits from a high price-differential over the first 10 years, before converging with market-prices thereafter.

Pipeline

As shown in Exhibit 31, the projects that have been awarded contracts are located in the US and the UK. In the UK, Equinor has been awarded contracts for the commissioning of the Dogger Bank project, which consists of three phases. Each phase will receive support under the CfD scheme and was awarded contracts in the third auction round of 2019 (Department for Business, Energy & Industrial Strategy, 2019). As thoroughly covered in the revenue analysis of Ørsted, these strike-prices constitute a modest, if any, price-differential against the market-price. Analysing the awarded contract for Equinor's first planned commissioning in the US, Empire Wind I, reveals that the company has received a PPA-structured offtake agreement with an annual escalator of 2%. As reported in NYSERDA's contracting summary for the project in 2019, the annual increase is applied as Empire Wind I uses a Gravity-Based Structure (GBS),[22] a relatively more expensive substructure than traditional monopile and jacket solutions.

Although we lack revenue-specific details about the projects with only secured acreage, a discussion on the likely support levels these projects will receive is still valuable, in our view. The projects seeking to be awarded contracts in the UK will most certainly be commissioned under the CfD regime, as the ROC scheme was discontinued for all new generating capacity after 2017. Following the competitive developments leading to continuously lower strike-prices, we argue that the future projects, most likely, will not achieve any larger price-differentials, if any, compared to those observed in the last auctioning round of 2019.

For the future US developments, we direct the reader's attention to our discussion about the falling offtake-prices highlighted in the analysis of Ørsted in Exhibit 17. As such, we argue that Equinor's future developments will not achieve as high offtake-prices as the company did for Empire Wind I, should this development continue. In our view, this seems likely given the forecasted growth in the US market, coupled with lower costs and technology improvements (Wood Mackenzie, 2020). In fact, Wood Mackenzie, a leading industry research firm, expects the sector to ramp up from near-zero today and deliver as much as 25 GW by 2029, on the back of the entrance of experienced European renewable energy players and oil and gas producers, as well as domestic utilities and supply chain providers (Wood Mackenzie, 2020). In turn, we argue that this underlines that the US offshore-wind market will continue to mature over the coming years.

[22] The substructures for an offshore-wind turbine are essentially the foundation that lies at the seabed. The gravity-based structures rely on the sheer weight of the construction to hold the turbines in place (NYSERDA, 2019).

Sub-conclusion to revenue

Equinor's operational projects have thus far achieved the benefits of high price-differentials between the tariff- and market-prices. This characteristic is similar to Ørsted, which achieved this throughout its entire transformation. From the aspect of revenue, we consequently argue that in order for Equinor's transformation to achieve a success similar to Ørsted's, the high price-differential needs to be sustained throughout its impending transformation. As we highlight in the analysis above, this seems unlikely given the developments towards more competitive bids for tariffs in the locations where Equinor is planning to expand, leading to a convergence between the market- and tariff-prices. Consequently, the gradual maturation of the offshore-wind market will prohibit Equinor from achieving as high a price-differential throughout its transformation as Ørsted did when the market was immature.

Cost

Analysing the aspect of costs to address the critical factors to success in Equinor's transformation compared to Ørsted's requires consideration of the journey offshore wind has had from an immature to a mature market. This is crucial, as a key distinguishable feature between each transformation is that Ørsted's happened while the market was immature, and Equinor's while the market is mature. In this sense, the factors behind costs as contributors to a successful transformation have a different connotation. In an immature market, the high costs of offshore-wind projects required high revenue, where governmental support in the form of tariff-prices made the projects financially viable. As such, for Ørsted, cost reductions were necessary to prove that offshore wind was a worthy replacement to traditional energy sources, such as fossil fuels. In the developments towards a mature market, in contrast, revenue in the form of competitive tariff- or market-prices leaves offshore-wind operators without the comfort of ensured profitability through governmental support. As such, cost-effectiveness has become the key to provide financial viability.[23] In other words, instead of high revenue being the premise to survival in the immature offshore-wind market, low costs have captured this role as the market has become increasingly mature. As such, in relation to Equinor's

[23] Our point is not that cost-effectiveness was not important to Ørsted, but rather that it has become increasingly important as subsidies have become less applicable as the tariff-prices converge towards market-prices. Paradoxically, we acknowledge that the lower cost is the factor that has allowed the tariff-prices to converge against the market-prices.

transformation, the critical aspect of costs entails the potential to achieve a competitive advantage through cost-effectiveness in order to accomplish the same success as Ørsted did. The potential to attain a competitive advantage will be assessed by analysing if this can be achieved within the aspects of load factors, as well as operating and capital expenditures.

Load factors

As higher load factors represents a key driver in reducing the LCOE of offshore-wind operations, Equinor has, as with Ørsted, benefitted through increases in turbine sizes, in addition to increasing the distances to shore. In this context, we believe Equinor's implementation of floating offshore-wind technology is opening new possibilities for wind power locations, which in turn will provide higher load factors due to better wind conditions. Moreover, Equinor has been a pioneer in floating offshore wind, as manifested by the company's nearly 20 years of involvement in developing this technology. Floating wind farms target deeper water sites, typically at depths of over 60 metres, where bottom-fixed designs are unsuitable. These deep-water sites could host some 4 TW of global offshore-wind capacity, according to the industry association WindEurope (Wind Systems, 2020).

Furthermore, Equinor already operates one floating offshore-wind farm in the UK, Hywind Scotland, which was the world's first commercial-scale floating wind farm. The load factor on Hywind Scotland is 54%, which is significantly higher than the average load factor in the UK of ~40% (DNV GL, 2019). Thus, when combining this with Equinor's pioneer position, we argue that a successful employment of floating offshore-wind technology has the potential to constitute a competitive advantage for the company in terms of achieving cost-effectiveness through higher load factors.

Operational expenditures

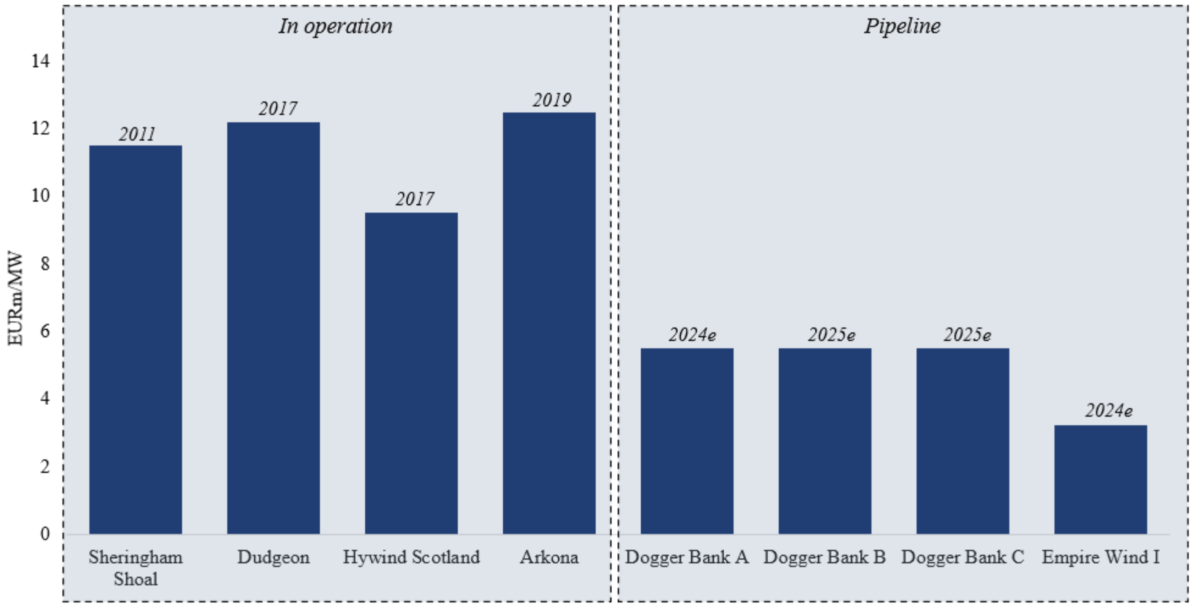
Furthermore, as we argued in the analysis of Ørsted, the increasing average size of turbines has been the key driver in reducing operating expenditures for offshore-wind operators. By observing the development in Equinor's operating wind farm portfolio, we see that the company, similar to Ørsted, has taken advantage of this development. This is evident from Sheringham Shoal's 3.6 MW turbines commissioned in 2011, compared to Dudgeon's and Hywind Park's 6 MW turbines commissioned in 2017. Moreover, as Equinor has decades of experience building offshore oil platforms, we believe the company is positioned to manage the logistical and technical challenges of developing and operating offshore-wind farms. We therefore argue that Equinor should benefit from increasing the size of wind turbines on the same level as Ørsted, and thus will achieve the same marginal benefit of larger turbine sizes. This notion is supported by the fact that Equinor has the potential to leverage synergies with its offshore oil and gas projects, in our view. This view is endorsed by the International Energy Agency, which estimates that approximately 40% of the full lifetime costs of a standard bottom-fixed offshore-wind project have significant synergies with the offshore oil and gas sector, particularly if wind and hydrocarbon assets are in close proximity (Shafto, 2019).

However, Equinor is far from the only oil major making an energy transition to offshore-wind energy and consequently does not have an exclusive potential to leverage synergies with oil and gas operations with operations in fixed-bottom offshore-wind farms, in our view. Besides, we cannot find compelling evidence to suggest that Equinor's synergies will lead to lower costs of operations than Ørsted or other wind farm developers, in terms of being better at exploiting larger turbine sizes. Consequently, we argue that Equinor benefits from increasing turbine sizes to the same degree as Ørsted, suggesting that Equinor will not achieve a competitive advantage in terms of lower operating expenditures.

Capital expenditures

Comparing the capital expenditures per MW of Equinor's projects in operation with its pipeline reveals that the company expects to become more effective in terms of the initial investments, i.e., capital expenditures, in its projects. Furthermore, in our view, there are two potential aspects that combined could lead to Equinor achieving a competitive advantage through low capital expenditures compared to other offshore-wind farm developers. The first aspect entails leveraging its expertise in oil and gas investments, while the second relates to successfully establishing itself as the first-mover in floating offshore wind.

Exhibit 33: Capital expenditures per farm capacity (MW) of Equinor's projects



Sources: Own calculations, company announcements, Power Technology

Note: This shows unsubsidised capital expenditures, meaning no governmental support to initial investments.

In the context of leveraging the company's oil and gas expertise, the former CEO of Ørsted, Henrik Poulsen, argued that building an offshore-wind turbine is not comparable to building an oil platform, and stated "We have much more experience and we have stronger procurement" (The Economist, 2020). Evidently, this depends on the offshore-wind technology one considers, as Henrik Bringsværd, the head of Equinor's floating offshore-wind developments, argues that "the technology that underlies floating wind is not especially new, and many of the competencies are an even stronger match for the existing oil and gas supply chain than with fixed-bottom offshore wind" (Parnell, 2020). As such, it could be argued that potential synergies exist during the installation and construction phases of floating offshore wind and oil and gas projects, which leaves potential for a competitive advantage to Equinor. In this sense, we argue that especially skills from the construction of foundations, subsea structures, cabling, floating platforms, and overall project management could be transferred from offshore hydrocarbon projects to floating offshore-wind projects (Shafto, 2019). Moreover, the growing activity in wind farm extension projects can benefit from existing utility connections and site infrastructure. Consequently, developing offshore-wind farms in the North Sea could, in our view, contribute to less capital expenditures for Equinor through leveraging synergies from oil and gas projects in the area. For this to constitute a competitive advantage, however, we emphasize that Equinor needs to be the first to successfully exploit these synergies.

Evidently, Equinor is first, as highlighted in the discussion regarding load factors and as demonstrated with Hywind Scotland. Moreover, the company is also developing the first floating offshore-wind farm in the North Sea, Hywind Tampen, to power the oil- and gas-fields of Gullfaks and Snorre. By using floating offshore-wind technology, Equinor envisions alleviating the additional capital expenditures imposed when investing in the foundations and substructures associated with using traditional bottom-fixed solutions. As the LCOE for floating offshore wind is currently up to four times that of bottom-fixed, the Hywind Tampen wind farm will hardly turn a profit (Andersen, 2019). Nevertheless, DNV GL estimates that the LCOE will come down to USD 63 per MWh in 2030, and USD 35 per MWh in 2050 (Rennesund et al., 2020). The belief in improved LCOE for floating offshore wind is also shared by the renewable energy consultancy company, BVG Associates, which asserts that the difference in capital expenditures between bottom-fixed and floating offshore wind will almost vanish by 2035 (Rennesund et al., 2020). These views are in line with Equinor's expectations for the Hywind Tampen project. In this sense, the company aims to reduce costs by 40% compared with Hywind Scotland through utilising new installation techniques, concrete substructures, and a shared mooring design (Reuters Events, 2019). To highlight the practical impact of one of the cost-reducing initiatives, concrete substructures are cheaper than the steel substructures used on Hywind Scotland, and additionally remove some of the complexity regarding the inshore marine operations.

Consequently, with respect to capital expenditures, we believe that the small-scale Hywind projects will provide Equinor with early and extensive know-how, exhibiting a resemblance to Ørsted's first-mover advantage in bottom-fixed offshore wind. As such, by pioneering floating offshore wind and leveraging its synergies from oil and gas developments, Equinor could potentially attain a cost-related competitive advantage through lower capital expenditures.

Sub-conclusion to costs

To conclude, we argue that Equinor will not be able to attain a competitive advantage in bottom-fixed offshore wind. However, due to the fact that Equinor has the potential to leverage synergies with its offshore oil and gas projects, we believe the company will be able to achieve the same marginal benefit of larger turbine sizes as Ørsted, which has been a key component in reducing operational expenditures. This also implies diminishing returns to larger turbine sizes, such that one can consequently not expect that larger turbine sizes will reduce operational expenditures at the same rate as in Ørsted's transformation. Nevertheless, we believe Equinor has the potential to achieve a competitive advantage through a successful employment of floating offshore-wind technology, as this would entail lower capital expenditures and higher load factors compared to other offshore-wind companies. As floating offshore-wind technology is only employed in small-scale utility projects, with a significantly higher LCOE than bottom-fixed offshore-wind farms, the technology is still in its infancy and we believe Equinor will need to invest in much larger facilities to implement the necessary cost savings to make it competitive.

Funding strategy to fuel investments

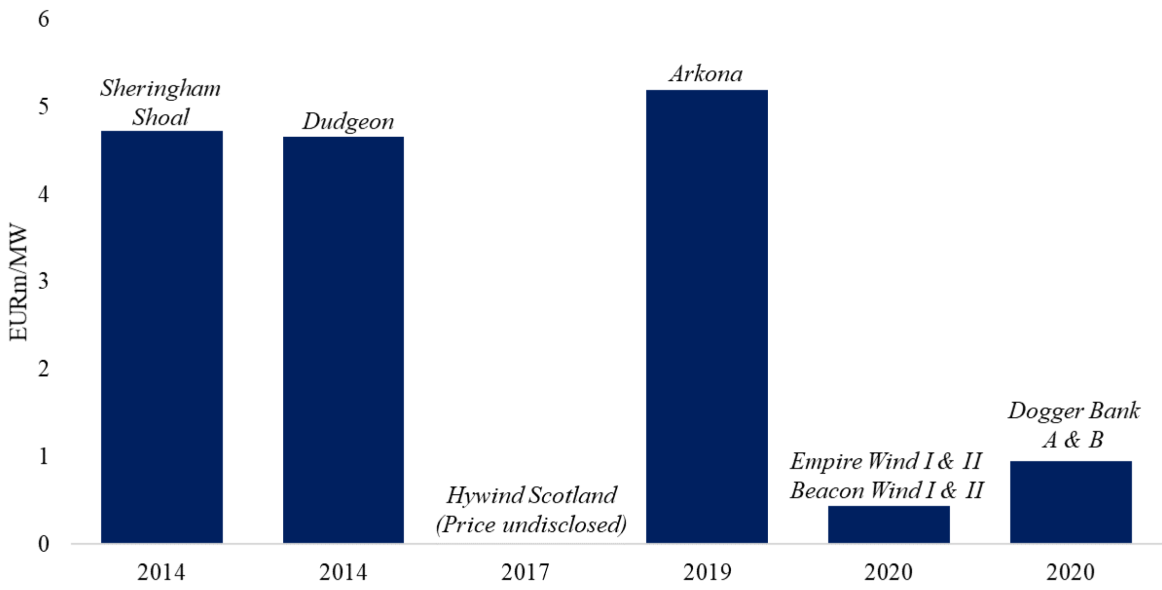
In the analysis of Ørsted's transformation, we concluded that the farm-down[24] funding strategy the company employed to accelerate investments in new projects was a critical factor in its success. In our view, there are two aspects to consider in relation to the question of Equinor employing a similar funding strategy that enables the company to achieve a success akin to Ørsted's. The first aspect is if Equinor in fact employs a similar funding strategy, and the second is if, through such a strategy, it is able to serve a comparable offering to potential project investors.

In analysing Equinor's portfolio, we find that the company has divested part of its stake to outside project partners in all of its four operational projects. Moreover, Equinor has recently shown high divestment activity, with the sale of stakes in the future Empire and Beacon Wind farms in the US in mid-September to British Petroleum (BP), as well as the divestment of Dogger Bank A and B to ENI in early December (2020). The largest transaction of these was with British Petroleum (BP), which joined forces with Equinor by purchasing 50% of the projects for USD 1.1 billion (Equinor, 2020b). All of Equinor's recorded transactions are illustrated in Exhibit 34. To the extent that Ørsted's funding strategy involved divestment of existing projects, we argue that Equinor has shown evidence of doing the same. The crucial aspect, however, in our view is if the divestments are motivated by a strategy to recycle capital

[24] As previously explained, this entails divesting an existing offshore-wind asset to invest in a new one.

by investing in new projects or merely to ensure profits while de-risking exposure to offshore wind. The latter would, in our view, imply a lack of commitment to offshore wind compared to the former. In the case of Equinor, we argue that the company's vast pipeline should underpin its commitment towards offshore wind. As such, we believe that the proceeds generated from divestments fit into a strategy to fuel new investments, which is similar to Ørsted's strategy.

Exhibit 34: Implied value per MW in Equinor's farm-downs



Sources: Own calculations, company announcements, Yahoo Finance, Renewables Now

One could argue that the very essence of Ørsted's funding strategy was that the company used capital generated internally, to the extent that proceeds from divestments fit this description, to fund new projects. In this context, it is worth emphasising Equinor's opportunities to use internal capital to fund the company's transformation compared to what Ørsted had at the early stages of its transformation. As previously described, two years after Ørsted's proposed strategy, the company experienced financial turmoil[25] and needed an equity injection of DKK 11 billion from Goldman Sachs and the Danish pension funds, ATP and PFA, to recover. By any measure, the company was at the time not in any condition to use internal capital generated by other business areas to fund its renewable energy expansion, in our view. Comparing this to Equinor, which as an oil major has a thriving oil and gas business combined with a strong

[25] The aforementioned gas crisis led to Ørsted needing a financial action plan to survive.

balance sheet, suggests that the company should have a greater opportunity to use cash generated from its other business areas to fund its renewable energy expansion. Currently, this seems indeed to be the practice of Equinor, which the company evidently also combines with a funding strategy similar to Ørsted's. We emphasise that the latter is of interest in this context, that is, the funding strategy Equinor employs within offshore wind specifically. As such, the relevant discussion lies in the specific offerings related to the funding strategy within offshore wind for Equinor compared to Ørsted.

The key aspect of Ørsted's successful funding strategy was the flexibility to offer different investment proposals to different project investors according to their risk preference. In relation to Equinor's farm-downs, we see that Sheringham Shoal was farmed down to the Green Investment Bank (GIB) at the project's operational phase, while the previously mentioned BP transaction happened before development (Sheringham Shoal Offshore Wind Farm, 2014). Consequently, we argue that Equinor offers a flexibility akin to Ørsted's, in terms of allowing project investors to invest in projects at different phases, according to their risk preferences.

A crucial facet, however, that contributed to mitigating the risks of outside project investors, and thus making investments in Ørsted's projects more appealing, was the company's refined partnership models[26] enabled by the company's visibility to potential risks and ability to manage them, especially in the early phases of a project. As Equinor has provided limited information about the company's explicit presence throughout the phases of its projects, a direct comparison where we address the individual presence of each company would not be very valuable. A result-oriented approach, however, would imply that Equinor's limited track-record of introducing institutional investors to earlier stages of its projects indicates that the company is not as successful in mitigating the risks to the same extent as Ørsted was. This comparison, however, is to some extent invalidated by the aspect of today's different dynamics in the competition for capital compared to when Ørsted pioneered the strategy, whereas securing capital from project investors has become more challenging as a larger portion of companies now employ flexible investment proposals to appeal to investors. On the other hand, the increase in capital directed towards investments in offshore-wind projects should

[26] EPC Wrap Partnership and Shared Risk Partnerships as mentioned in Section 3.

indicate an abundance of capital available for the industry, thus offsetting the effect of increased competition. Still, even in this case, we argue that the capital would be properly channelled to the most appealing projects that offer the most favourable risk versus returns. It is consequently unclear if Equinor's ability to mitigate the project-risk, and thus appeal to project-investors, is inferior to Ørsted's.

An additional point in terms of Ørsted's and Equinor's comparable offerings is that both companies are partly state-owned. This could represent a comforting attribute in terms of potential investors having a solid co-investor when providing capital. We argue that this specific offering is similar for Ørsted and Equinor.

Sub-conclusion to funding strategy

As this analysis reveals, Equinor employs a similar funding strategy to Ørsted's and, as evident from its previous farm-downs, in the same fashion of offering flexibility by introducing project investors at different phases of its projects. We believe, however, that the attractiveness of Equinor's offering versus that of Ørsted's is still unclear, in terms of Equinor providing limited information regarding how the company mitigates the risks for the potential project investors. Nevertheless, in light of the analysis above, we find it reasonable to assume that Equinor's funding strategy should enable the company to display the same success as Ørsted did with regard to this critical factor in its successful transformation.

Can Equinor's transformation achieve a similar success to Ørsted's?

Thus far, we have analysed whether Equinor's transformation can achieve a similar success to Ørsted's by assessing the financial aspects related to the LCIRR, namely revenue, costs, and investments in the context of Equinor's impending transformation. This analysis had the purpose of uncovering similarities within each financial aspect across the two transformations, in the sense that such similarities would allow Equinor to achieve a success akin to Ørsted's. In doing this, we find that Equinor will not be able to achieve the similar high price difference between tariff- and market-prices which historically has existed for Ørsted. Furthermore, we reveal, with consideration of the journey the offshore-wind industry has had from an immature to a mature market, that Equinor will not establish a competitive advantage within cost-effectiveness unless the company exploits the potential of floating offshore wind and establishes itself as a market leader in this segment of the industry. Lastly, we reveal that

Equinor employs a similar funding strategy to Ørsted, and as evidenced by its offering to outside project investors, has the potential to use this strategy to accelerate the growth of new projects in a similar fashion to that of Ørsted.

Compiling these findings yields two implications for the LCIRR of Equinor's projects relevant to its transformation. The first is that comparatively low revenue without drastically lower costs will result in a margin compression for Equinor's bottom-fixed offshore-wind projects. We argue that Exhibit 29 in Section 3 which illustrates the EBITDA-development for Ørsted substantiates this argument. The exception, however, is floating offshore wind where Equinor currently achieves relatively high tariff-prices due to the infancy of this technology. Combining this with a competitive advantage in costs, due to comparatively high load factors and low capital expenditures, could potentially lift Equinor's margins throughout its transformation. On the other hand, floating offshore-wind developments represent a minuscule portion of its currently communicated pipeline, in fact less than 1%, and would consequently, even as a success, not be a significant contributor to a higher aggregated LCIRR.

The second implication involves the fluctuating revenue streams that market-prices entail in conjunction with potential issues of continued investments in projects from institutional investors. In the analysis of Ørsted, we argued that its farm-down model was a tool the company used to attain its access to cheap capital (low cost of capital) by mitigating the risks to outside institutional investors during the last years of its transformation. By comparison, we believe that as the developments towards fluctuating revenue streams become more apparent, a curtailment of the overall presence of institutional investors in the equity-mix is not inconceivable. As such, the case could be quite different for Equinor's transformation compared to Ørsted's. This is due to the fact that a full materialisation of fluctuating revenue-streams discards the so-called "yield compression play"[27] in offshore wind, where the rationale suggests that returns from governmental guaranteed revenues bring about a spread against low-risk instruments issued by other high-quality issuers such as governments or low-risk investment grade companies. As such, we argue that the developments towards zero-subsidy bids could alter the equity-mix for offshore-wind projects. This would create a dissimilarity between the funding opportunities Ørsted had and Equinor has, and even though Equinor

[27] Industry term used by institutional investors. To mention some; Aquila Capital, Greencoat Capital, Gresham House etc.

employs a similar funding strategy to Ørsted's, a curtailment of financing to accelerate new projects would leave Equinor's transformation less successful than Ørsted's.

Ultimately, we argue that the findings in this analysis suggest that the critical financial factors that contributed to Ørsted's successful transformation no longer carry the characteristics that would allow these factors to contribute to Equinor achieving a similar success to Ørsted. We believe this is encapsulated by the fact that Equinor's transformation lacks the very root cause of Ørsted's success, in which the company was the first-mover in offshore wind. Considering the composition of Ørsted's and Equinor's offshore-wind portfolios, respectively, carries an important implication: Despite the fact that both Equinor and Ørsted guide similarly low LCIRRs for future projects, a far greater portion of Ørsted's offshore-wind portfolio is already operational and will continue to reap the benefits of the company's first-mover advantage over the coming years compared to Equinor. Even though Equinor has made efforts to replicate a first-mover strategy in floating offshore wind, we believe the scarce pipeline and infancy of this segment prohibits a clear conclusion, apart from identifying a mere potential, as to whether this will create a similar journey as Ørsted had in bottom-fixed offshore wind. As such, we believe Equinor will not achieve a similar degree of success as Ørsted did in its transformation from black to green. In turn, we believe this conclusion is strengthened by the fact that both Ørsted and Equinor guide lower LCIRRs for future projects, compared to those they have in operation.

This conclusion, however, attributes financial success solely to the returns generated throughout each respective transformation, measured comprehensively by the LCIRRs. On the back of the analysis above and both Ørsted's and Equinor's low guidance for LCIRRs for future projects, we argue that increasing the returns within offshore wind from current levels represents a difficult endeavour for Equinor. However, a crucial part of Ørsted's success was creating shareholder value, in our view. In this context, we extend our analysis to consider economic profit; that is, the returns one achieves compared to the returns one requires, where the latter remains a component left to consider in our analysis. In turn, considering the required returns of all investors in each company would be a valuable extension to the analysis of the returns, and as such, an inquiry could reveal potential measures, other than increasing returns, that Equinor could take to elevate the progress of its expansion in offshore wind. As such, we will assess the required returns of both Equinor and Ørsted in the following part.

The required returns for Ørsted and Equinor

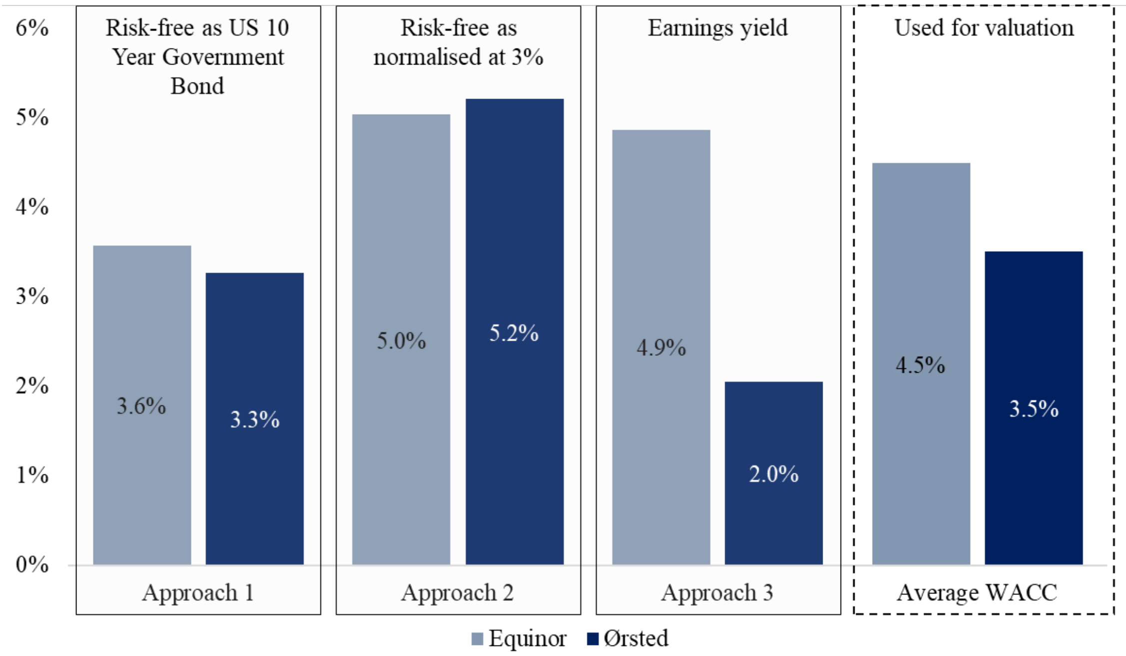
In the context of analysing the required returns of Equinor and Ørsted, we first accentuate the measure for the required returns we choose to assess. In our view, the most comprehensive measure for this is the weighted average cost of capital after corporate tax (WACC) as this considers every category of capital provider for each company (Koller et al., 2015, p. 283).

Furthermore, an acknowledgement of the different characteristics in the businesses of Equinor and Ørsted should be made before estimating the WACC for each. The fundamental idea is that the WACC should reflect the required returns from the operational part of a company (Koller et al., 2015, p. 283). For Ørsted, which predominantly generates cash-flow from offshore wind, the overall company WACC will to a large degree represent the returns all investors require from offshore wind. For Equinor, the predominant part of the overall cash-flows stems from the company's oil and gas operations, which means that the overall company WACC will reflect, to a large degree, the returns investors require the operations within oil and gas to generate. As such, the overall company WACC is not directly representative in terms of what investors expect its offshore-wind operations alone to generate. This is, blatantly, not what investors should expect when investing in Equinor, which constitutes part of the topic of discussion tied to this part of our thesis. To provide further insight into the differences in the WACC for each company, we provide a more detailed comparison in the following paragraphs.

Estimating the WACC for each company

In estimating the WACCs for Ørsted and Equinor, we calculate that Equinor has a higher average WACC than Ørsted, as shown in Exhibit 35. The WACCs we estimate for Equinor and Ørsted, respectively, is the average derived from three approaches based on different assumptions. In the following paragraphs, these approaches are discussed in detail.

Exhibit 35: WACC estimations for Ørsted and Equinor



Sources: Own calculations, Bloomberg LP, Johnsen T., PwC, FactSet

In approaches 1 and 2, we estimate the WACC of Ørsted and Equinor based on different assumptions for the risk-free rate. We argue that this provides a more nuanced estimate to both companies' WACCs, considering the currently low interest rates. Moreover, an elaboration on the theory and methodology behind the WACC calculations related to these approaches is provided in Appendix F. Approach 1 has the purpose of considering the current interest rates. As such, the estimate for the risk-free rate in this approach is based on the yield of a 10-year US government bond. According to Koller et al. (2015), this yield is a good proxy for the currently expected risk-free returns, since default expectations are virtually zero (Koller et al., 2015, p. 288). Approach 2 has the purpose of reflecting a more normalised risk-free rate and is based on a survey conducted by PwC in collaboration with the Norwegian Society of Financial Analysts in 2020. The normalised risk-free rate of 3% from this survey is based on the response of 1,000 Norwegian financial analysts, and reflects the normalised risk-free rate applied by Norwegian investors for investments in Norwegian companies[28]. Incidentally, this

[28] Until recently, Duff & Phelps - an industry provider of governance, risk and transparency solutions - applied a 3% normalised risk-free rate in the US. As of July 2020, this was revised down to 2.5% due to the effect of covid-19 on the global economy (Nunes et al., 2020). This, by comparison, highlights that 3% is not uniquely used by Norwegian investors.

does not consider our belief that the investor-bases in both companies are, to a large extent, internationally diversified, but we argue it provides a valuable nuance against the relatively low risk-free rate used in approach 1. In both approaches, we use the asset-beta to reflect the business-risk of Ørsted and Equinor, as this yields a pristine estimate of the business risk of each company without distortions from potential leverage-effects.[29]

The distinguishing factor for each company in both approaches is the different asset-betas, where we estimate 0.48 for Ørsted and 0.55 for Equinor. A practical reason we perceive as a reason for the differences relates to the distinctive cash-flow characteristics of the offshore-wind business versus that of oil and gas. In our analysis of both Ørsted and Equinor, we find that the stable revenue streams from governmental subsidies, combined with stable cost levels, result in minuscule fluctuations in the cash-flows generated. Oil and gas, on the other hand, entails revenue streams associated with volatile, and more cyclical, oil and gas prices leading to larger fluctuations in the cash-flows generated (Ernst & Young, 2007). Consequently, from this perspective it seems reasonable that offshore wind is awarded a lower cost of capital than oil and gas. However, as the estimates in Exhibit 35 shows, this holds true for approach 1 but not for approach 2.

In approach 3, we use the market implied cost of equity based on current share prices and the underlying corporate performance of Ørsted and Equinor. Earnings yield is defined as the earnings divided by the equity value, implicitly reflecting the returns equity investors require from a company, formulated as the inverse of the price-to-earnings (P/E) ratio (Koller et al., 2015, p. 290). Moreover, we use the consensus estimated P/E multiples for 2021 for Ørsted and Equinor to approximate the earnings yield for each company. This implies that the earnings yields we derive are nominal numbers, meaning that we do not adjust for inflation. Moreover, this approach assumes that both companies are in so-called steady states,[30] which will be discussed further below. Despite the fact that earnings yield is not the same as required return of equity, we believe the ratio serves as an acceptable proxy for cost of equity across companies on a relative basis, but not on an absolute basis. Through this approach, we estimate

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[29] The asset-betas of Ørsted and Equinor are derived against the monthly returns of the MSCI World Index. A more detailed description is provided in Appendix F.

[30] That is, no addition or detraction of value supplementing the going concern of the company.

a 2.0% WACC for Ørsted and a 4.9% WACC for Equinor. A detailed description of the calculations underlying this approach is provided in Appendix F.

As we can observe from Exhibit 35, the WACC estimated from the implied cost of equity differs from that of the two previous approaches. One potential reason is that we use historical betas when calculating the cost of capital in approaches 1 and 2, which do not necessarily serve as sufficient proxies for future betas. For Ørsted, one could argue that the asset-beta of 0.48 is too low compared to what one can expect for the future, as the company has since its IPO in 2016 gone through an expansionary phase. In this sense, the share price has fluctuated relatively more against the market-index[31] than that which can arguably be expected for the future, as the company gradually reaches a more stable phase. For Equinor, one could argue that its asset-beta of 0.55 is too high compared to what one could expect for the future, as the company gradually transitions into the offshore-wind business, which, as argued, has a comparatively lower asset-beta than the oil and gas business. Against this, we believe that the argument of Ørsted's asset-beta likely being higher than 0.48 offsets this effect, leading us to accept 0.55 as a reasonable estimate for the future asset-beta of Equinor. Furthermore, we believe investors are willing to buy Ørsted at a higher P/E multiple due to a so-called "green premium," which is not captured in the other two approaches. The concept of a green premium represents in broad terms the additional value investors are willing to assign to companies with growth opportunities in renewables. Note that this concept is more thoroughly elaborated upon throughout the rest of this section. Lastly, we acknowledge that investors may assume different risk-free rates than those used in our calculations, which consequently results in a WACC that differs between approaches 1 and 2.

Furthermore, we argue that a practical perspective in assessing the differences between the WACCs calculated from approach 3 for Equinor and Ørsted is valuable. In this sense, we argue that the emerging *Environmental, Social and Governmental* (ESG) investor sentiment is an interesting aspect pertaining to the differences in the cost of capital of offshore wind versus oil and gas. The ESG investor sentiment is, among other indicators, evident from the results of a survey conducted by Morgan Stanley, highlighting that 80% of asset owners have already incorporated ESG into at least parts of their portfolio (Whyte, 2020). According to Professor

[31] As explained in Appendix F, we use the MSCI World Index as the market-index, where we believe that Ørsted's stock-price have experienced a lower correlation with this index compared to what one can expect for the future.

Thore Johnsen (2020), the channels in which the investor sentiment may influence the cost of capital are through what he describes as positive and negative screenings of companies. Positive screenings entail the choice of investing in companies with business models that promote sustainable development, which is the case for renewable energy companies befitting the *Environmental* aspect of ESG. This effect thus drives an upward pressure in the prices of ESG stocks, ultimately resulting in a lower cost of capital, assuming the ESG rating is consistent among companies and that the expected cash-flows remain unchanged. Negative screenings, on the other hand, involve divesting, or avoiding investing in, companies not categorised as ESG. This results in a downward pressure in the prices for these types of companies, which in turn leads to higher expected returns for such investments, assuming unchanged expected cash-flows (Johnsen, 2020).

When we use the earnings yields as inputs for calculation of cost of equity, we implicitly assume that Ørsted and Equinor are in steady states. In other words, this implies that no value is added to or detracted from future growth. This assumption, however, is challenged when assessing the value of each stock price as broken down to the sum of its going concern value and the present value of growth opportunities. In light of the discussion from the previous paragraph, one could argue that a significant part of Ørsted's stock price reflects the present value of the company's growth opportunities through investors' expectations of future growth in renewables, i.e., an assignment of a green premium. For Equinor, in contrast, the significant part could be assigned to its going concern value, or rather a detraction of value if the case is that investors see no future at all for the oil and gas business. Thus, we acknowledge that it seems unlikely that both Ørsted and Equinor are in steady states. One may also argue that the cyclicality of Equinor's earnings is a challenging factor to the assumption of steady state, especially when considering the collapse in crude oil prices this year (2020). However, as we base our calculations on earnings estimates for 2021, we are more likely encapsulating a more normalised earnings scenario than the present.

The described effects of upward pricing pressure for ESG companies reflects, in essence, an abundance of capital chasing green investments. This point deserves further reflection, as one could argue that the relative abundance gradually diminishes as the opportunity-set for ESG related investments progressively expands. In such a case, the logical result is a less persistent upward pricing pressure, which in turn increases the required returns for the investors of ESG companies. Furthermore, this would imply that the pricing pressure is a temporary concept. If so, this ultimately suggests that the implicitly low required returns will not necessarily sustain to perpetuity for companies such as Ørsted. As with most concepts in the financial markets, the more frequently a momentarily auspicious position is exploited, the less favourable it becomes.

In conclusion, we find reason behind the results pertaining to Ørsted currently having a lower WACC than Equinor. In turn, this implies that the appropriate WACC of the offshore-wind business of Equinor is likely lower than the overall company WACC of 4.5%, and more similar to Ørsted's WACC of 3.5%. Moreover, a theoretical implication of differences in cost of capital could be that we see a difference in the valuation of the offshore-wind business of Equinor versus that of Ørsted. A more detailed discussion of this is provided in the following part.

Stock-prices and valuation: The power of the green premium

This part has the purpose of assessing how the contributors to the different WACCs of Equinor and Ørsted affect the companies' respective valuations, with an emphasis on the values of their offshore-wind businesses, as this is the predominant renewable energy segment for each company. We emphasise that the valuations we provide in this part are pragmatically chosen to fit the purpose of this analysis.

Our valuation of Equinor's offshore-wind business is methodically divided between the value of the company's current operations and pipeline within offshore wind. We provide a detailed description of the calculation of Equinor's value in Appendix H. We value Equinor's current offshore-wind operations on a project-by-project basis, discounting all future free cash-flows at the 4.5% WACC of the company.[32] Moreover, the value of Equinor's pipeline is calculated on a precedent transactions basis. In this sense, we value the projects of its pipeline that have been divested according to the considerations paid related to the divestments. These projects include Empire and Beacon Wind in the US related to the BP-transaction, in addition to Dogger Bank in the UK related to the ENI-transaction. For the remainder of the company's pipeline, which includes four projects that have not yet been awarded subsidies and only

[32] This assumes that Equinor's company WACC is applicable to its offshore-wind projects. As we previously argued, the WACC for Equinor's offshore-wind business is likely lower than the overall company WACC, and more similar to Ørsted's. Nevertheless, for the purpose of this analysis we apply the overall company WACC to reflect the value of the offshore-wind business as discounted by the company's overall cost of capital.

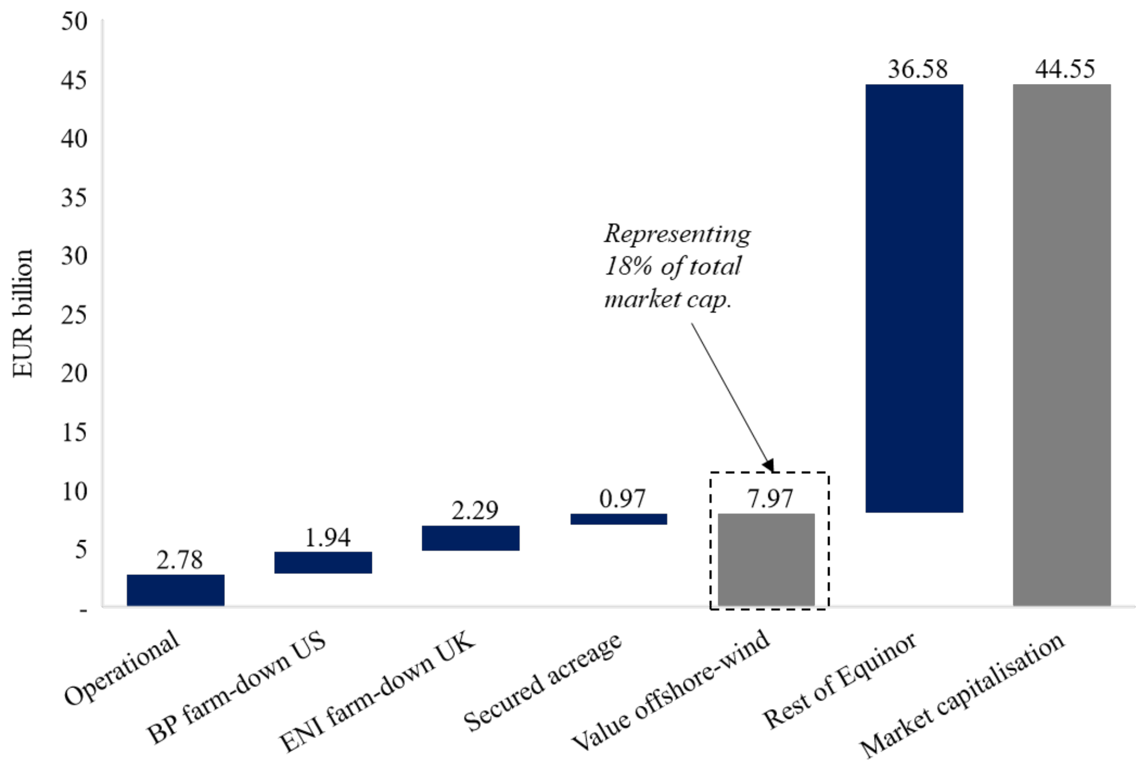
secured acreage in terms of their location, we use the transaction value per MW (TV/MW) associated with the BP-transaction. Using this transaction multiple assumes that the BP-transaction is representative for the remainder of Equinor's pipeline.

In our view, the potential flaws related to the applicability of the TV/MW multiple to the four projects without subsidy contracts require a discussion of the uncertainties related to the choice of this multiple. The first point of discussion relates to applicability by location, as two of the remaining projects, Dudgeon Extension and Sheringham Shoal Extension, are located in the UK, whereas the BP-transaction entailed projects in the US. This could suggest that using the TV/MW multiple in the ENI-transaction is more applicable, as this transaction entailed divestments of the UK projects Dogger Bank A and B. These projects, however, have been awarded subsidy contracts, which is quite distinctive from projects without awarded subsidy contracts. In this context, we argue that distinguishing by project phase yields a more representative measure, as the consideration investors are willing to pay for a project depends on the visibility of the cash-flows the project will generate. As such, there is a significant difference between a project with and without awarded subsidy contracts. In this sense, as the BP-transaction entailed phases of the projects both with and without awarded subsidy contracts, one could argue that such uncertainty was to a greater extent discounted for in the consideration paid by BP, compared to the payment of ENI.

The second point of discussion involves the fact that the BP-transaction entailed the introduction of a long-term partnership within offshore wind in the US, as well as the sale of more than one project, which may have resulted in a discount in the consideration paid by BP. Against this, however, the deal was initiated on a so-called "arm's length" basis, indicating that a commercial non-associated buyer was willing to pay for future earnings under uncontrolled conditions (T. Sveen-Nilsen, personal communication, 8th October 2020). Lastly, we argue that the scarce financial information about the projects that have not yet been awarded subsidy contracts in the pipeline of Equinor leaves alternative forms of valuation entail a great deal of uncertainty in any case. As such, we currently view the TV/MW multiple from the BP-transaction as the most indicative metric for the value of these projects.

Exhibit 36 illustrates the value of Equinor's offshore-wind business, divided into operational and pipeline, as parts of the company's total market capitalisation. We estimate the total value of Equinor's offshore-wind business to be EUR 7.97 billion, corresponding to around NOK 27 per share. The residual part represents the remainder of Equinor's businesses, which should primarily reflect the company's oil and gas related businesses. As shown, Equinor's pipeline value of offshore wind is larger than its current operations, which could reflect the fact that the size of the company's pipeline is 10 times the size of its projects in operation. Notably, the difference in value is not nearly as large. In total, our estimates indicate that offshore wind constitutes 18% of Equinor's total current market capitalisation as of 4th December 2020, suggesting that the predominant portion of the company's market value is tied to its oil and gas business, as one can expect.

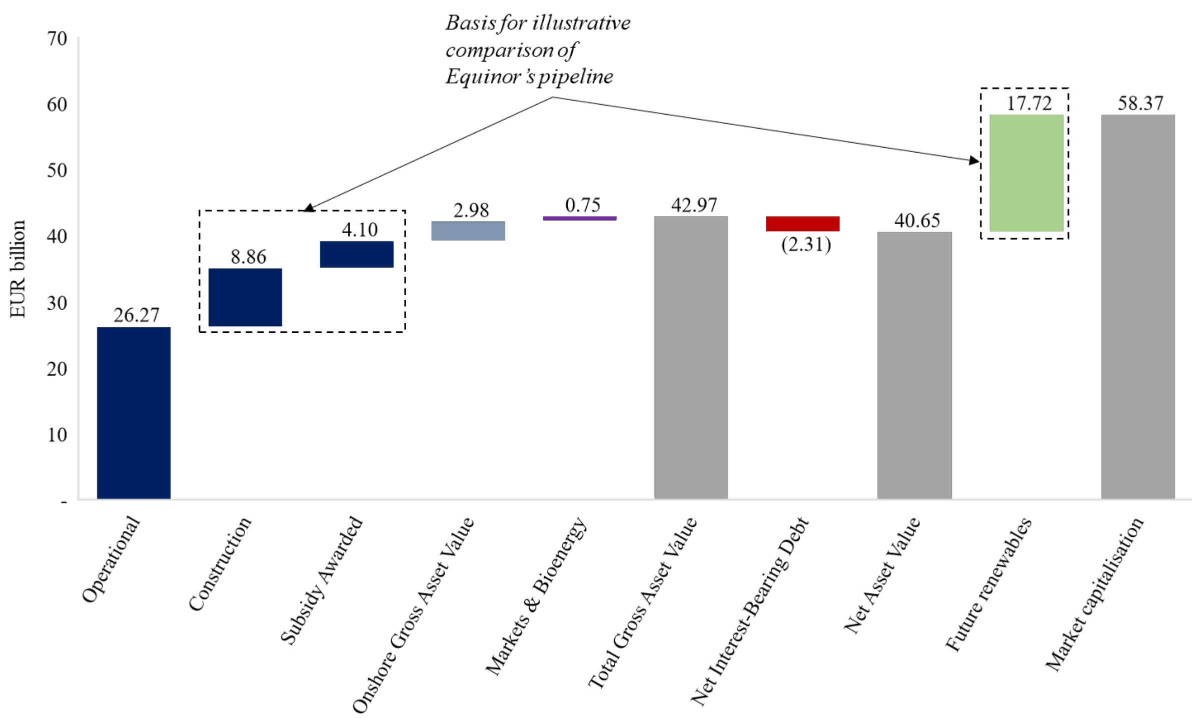
Exhibit 36: Sum-of-the-parts (SOTP) valuation of Equinor



Sources: Own calculations, company announcements, facts about our renewable assets (Equinor), Euronext

We value Ørsted through a SOTP-approach, distinguishing between the company's three current areas of operations: Offshore wind, Onshore wind (including solar energy) and Markets & Bioenergy. A detailed description of the valuation is provided in Appendix H. Offshore and onshore wind are valued on a project-by-project basis, where we discount all future free cash flows at the company WACC of 3.5%. We distinguish the offshore-wind business based on Ørsted's defined project-phases presented in Section 3 (funding strategy). The difference is that we only value the projects in development with subsidy contracts, due to the lack of financial information about those without. As Exhibit 37 highlights, Ørsted's operational projects constitute the largest share of its offshore-wind portfolio, as well as the Gross Asset Value (GAV) of the company. The residual value of Ørsted's market capitalisation less our calculated Net Asset Value (NAV) represents what the market values as future renewable energy projects, which in our view, should predominantly reflect unannounced offshore-wind projects. This is supported by Ørsted's guidance as of the last annual report (2019), stating that the company will increase offshore-wind capacity the most until 2030.

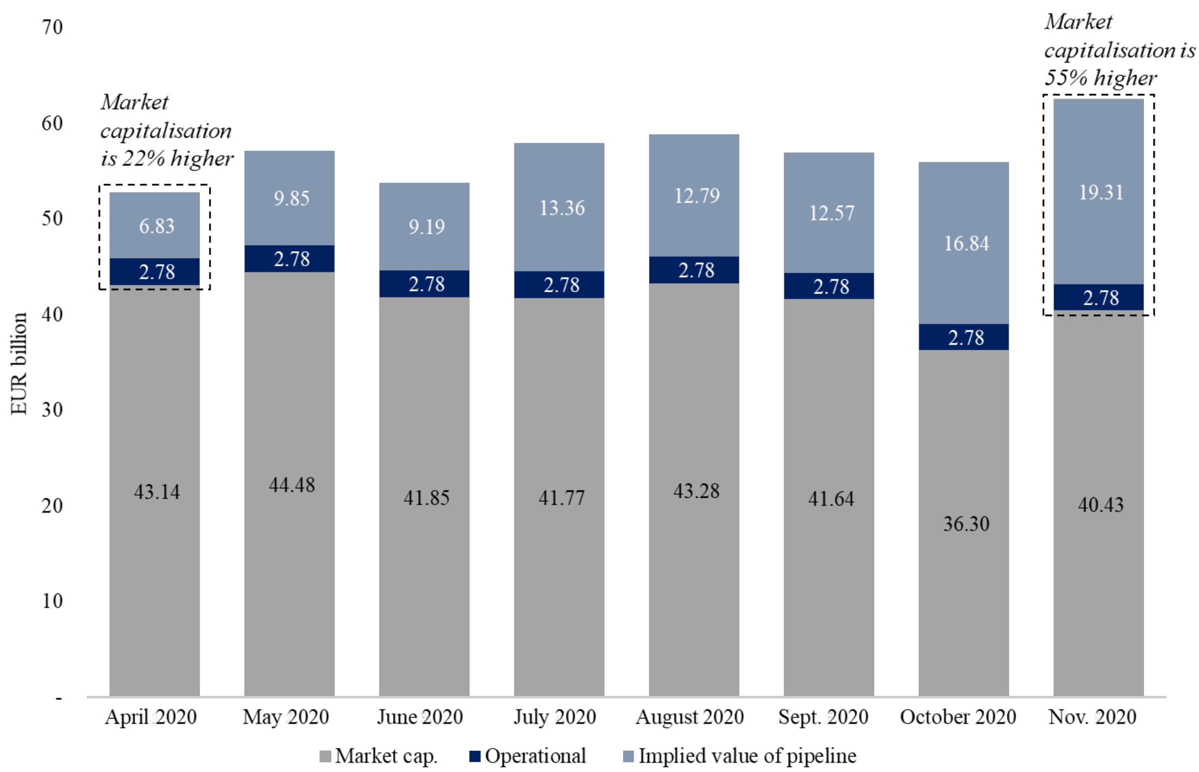
Exhibit 37: SOTP-valuation of Ørsted



Sources: Own calculations, SEB Equity Research, company reports, Ørsted's Asset Book, Ørsted's share-price monitor

As the purpose of this analysis was to uncover how the different overall company WACCs impact the valuation of Equinor's and Ørsted's offshore-wind businesses, we perform an exercise using the value of Ørsted's pipeline as implied by the market, and thus WACC, to value the pipeline of Equinor. As such, we set the operational value of Ørsted's pipeline as fixed and assume that the market determines the value of Ørsted's projects that are not yet operational. The project-phases this involves are highlighted in Exhibit 37 above, representing Ørsted's pipeline. As such, we depart from our valuation of the projects that are in construction and have been awarded subsidies and let the values of these projects be dependent on the market value of Ørsted. The market-implied value of Ørsted's pipeline is divided by the size of the company's pipeline (in MW), yielding a multiple we can use to value Equinor's pipeline by multiplying Ørsted's implied pipeline-value per MW with the size of Equinor's pipeline. Furthermore, we fix Equinor's operational projects to the previously calculated EUR 2.78 billion, such that only the pipeline is determined by the implied value from Ørsted. The result is shown in Exhibit 38, where the time period spans from when Ørsted's last project, Borselle in the Netherlands, became operational on 28th April 2020. A detailed overview of the calculations, and assumptions, behind this is provided in Appendix H.

Exhibit 38: Equinor's implied value of offshore-wind business versus the company's market capitalisation



Sources: Own calculations, Euronext

Note that this timeframe entails the impact of covid-19 on both companies' pricing, which has drastically impacted the pricing of oil companies.

This exercise is merely illustrative, but we argue it underpins an insightful intuition: A company with a lower WACC has a higher market capitalisation and consequently a higher valuation of its offshore-wind business. We argue, in light of this exercise, that the opposite is the case for Equinor, as its market capitalisation had been close to 55%[33] higher in November, had its offshore-wind business received the same implicit pricing as Ørsted's. This, of course, assumes that Ørsted is correctly priced in the market, which in our view is a topic of discussion on its own, but highlights the potential value-add from the offshore-wind business of Equinor. Furthermore, we believe the reason behind why this is currently not true for Equinor, to a large extent, can be traced back to an extension of the previously mentioned investor sentiment, in which investors are more willing to put fiscal value behind offshore-wind businesses associated with pure-play renewable energy companies, than for oil and gas companies.

We have dedicated a significant portion of this thesis to analysing the developments in the offshore-wind market throughout Ørsted's transformation. Indeed, finding that Ørsted's root cause to a successful transformation was the company's first-mover advantage underlines that the developments to a more mature market likely indicate the end of the high returns (LCIRRs) previously witnessed. In turn, this is strengthened by both Ørsted and Equinor guiding lower LCIRRs for future projects compared to those they have in operation. In this context, we find it particularly interesting that almost one-third of Ørsted's current market-capitalisation is tied to future growth opportunities in renewables, where, for instance, projects without firm subsidy contracts are incorporated. Moreover, given the more favourable characteristics of its operational portfolio by comparison, we believe that the high share, and thus value, of its future growth opportunities of the market value may represent the very embodiment of the green premium that investors award to Ørsted.

To conclude, we argue that Equinor does not fully benefit from the ESG investor sentiment, due to the fact that the company is by definition not an ESG company. Ørsted on the other hand, was, as similar to its entry to the offshore-wind market, in the right place at the right time to catch the immense wave of investments from ESG focused investors.

[33] Assuming that the value of Equinor's offshore-wind business was not discounted for in its market value at all.

5. What should Equinor do?

Thus far, we have discussed the reasons behind Equinor's evidently higher cost of capital compared with Ørsted, and how this contributes to a lower valuation of the company. Furthermore, an implication to Equinor of a high cost of capital is that the company will not be able to source capital as cheaply as Ørsted in the capital markets. Hence, we argue that Equinor will not be able to realise the full potential of its offshore-wind expansion, and therefore not maximise shareholder value. In turn, we believe a suggestive option for Equinor is to spin off the renewable energy business from its oil and gas operations, which we believe will award its offshore-wind business a higher valuation multiple. A spin-off is the most common form of a public ownership transaction, where the parent company gives up control over the business unit by distributing the subsidiary shares to the parent's shareholders (Koller et al., 2015, p. 642). Moreover, a spin-off coincides with the notion that the stock market rewards pure-play companies focused on a single line of business with higher stock prices than conglomerates (Birkeland et al., 2019). In the following part, we will discuss how a spin-off may help Equinor to unlock the full potential of its offshore-wind expansion.

The broad belief among market analysts is that separation transactions can result in improved management focus and creation of a new equity currency (Birkeland et al., 2019). In terms of management focus, we argue that a spin-off in particular will enable Equinor to devote a singular focus on renewables in terms of its corporate mission of executing an energy transition. As a spin-off creates a pure renewables-based company, we also emphasise the maximisation of strategic flexibility of its renewable energy operations. In this sense, we especially believe that this will entail more freedom to improve its offshore-wind operations by more easily imitating best-practices from other competitive renewable energy companies, without creating conflicts of interest with the company's oil and gas operations. However, with two separate entities, one may argue that Equinor's offshore-wind business will not be able to fully leverage the synergies with its current oil and gas business. As we previously highlighted in Section 4, synergies related to transferring the skills in developing and managing offshore oil and gas projects to offshore-wind projects is a facet we believe to be important for Equinor's progression in the latter. As a spin-off entails two independent companies, the transferability of these skill sets might, to some extent, be obstructed. Incidentally, this would depend on how the spun-off entities are interconnected, and the potentially "new" Equinor is organisationally structured. Such a discussion, however, is past the scope of our suggestion. As such, we argue that focusing on maintaining transferability of skills between the spun-off entities will be important if Equinor opts for a spin-off.

We have previously highlighted evidence of institutional investors showing willingness to participate in Equinor's projects, where Equinor farmed down its share in Sheringham Shoal to the Green Investment Bank (GIB). We have also discussed the effect of positive and negative screenings of companies, where negative screenings result in investors avoiding investing in companies not categorised as ESG. These aspects combined suggest that the prohibiting factor for Equinor to gain full access to the abundance of capital towards green investments seems to be its negative ESG screening in the equity capital markets. We argue this is evident from offshore wind constituting only 18% of Equinor's total current market capitalisation,[34] substantiating the fact that the company cannot as of yet be categorised as an ESG company. Therefore, we believe a spin-off would entail positive screenings for the renewable energy focused subsidiary, and eventually provide institutional investors with the opportunity to invest in the company's offshore-wind business through the equity capital markets.

Another area where we believe a spin-off would provide for cheaper funding are the debt capital markets, where ESG focused companies are able to borrow at lower costs. This, as an example, is evident through so-called green bonds, which are fixed-income financial instruments designed to support ESG related projects, thus often cheaper than a straight bond (ICMA, 2018; Reznick, 2019). In this sense, Equinor may obtain higher borrowing rates compared with pure-play renewable energy companies such as Ørsted, which we believe is a disadvantage in the company's offshore-wind expansion. Additionally, Equinor is currently funding growth in renewables with cash flow from its oil and gas operations. As a spin-off makes this impracticable, one could argue against carving out the renewable business as it would complicate the current funding practices. However, we believe that Equinor's funding strategy (farm-downs) and implicit backing of the Norwegian government will enable the company to secure attractive financial terms to fund further growth, even without its oil and gas operations.

[34] According to our calculations, discussed in Section 4.

Nevertheless, observing other oil and gas companies make the decision to restructure as they transition to renewables gives us more confidence in our suggestion of a spin-off for Equinor. For example, the Italian oil and gas major ENI announced a restructuring to become an energy transition leader earlier in June (2020), by dividing the company into two business entities (ENI, 2020). In our view, the strategic move will allow the management teams of the separate companies to focus on each distinct core business, oil and gas, and renewables, unhindered by the needs of the other business. In turn, such a strategic move should lead to superior performance and results for both the parent company and its subsidiary (Birkeland et al., 2019). Moreover, Aker Solutions, a Norwegian oil-service company, recently resolved to spin off its wind development business as well as the carbon capture technology business to the Aker Solutions' shareholders in two separate companies (Aker Solutions, 2020). Regarding the spin-off, Øystein Eriksen, the Chairman of Aker Solutions, stated "It has become increasingly clear that these businesses represent value creation in a world transitioning to green solutions at accelerated speed and have more potential as stand-alone companies than as an integrated part of an oil service business" (Aker Solutions, 2020).

From the discussion above, we argue that it seems financially reasonable for Equinor to spin off the renewable business to achieve a greater valuation multiple, including a more favourable cost of capital. However, as the Norwegian government is the major shareholder in Equinor, the question of carving out the only portion that could currently be considered as environmentally friendly, is just as much a political matter in our view. In this sense, we believe there are at the least one particular issue that may arise. This issue is if the Norwegian government will consent to once again being the major shareholder in a pure-play hydrocarbon company. As Equinor's preliminary motivation for incorporating renewable energy sources in the company's corporate mission undoubtedly came as a repercussion from the increased political pressure towards the fossil-fuels industry, we underline that consent from the Norwegian government seems unlikely.

6. Limitations and further research

Although it is tempting to say that we have an undisputed answer to what made Ørsted's transformation successful, and concurrently, the issues related to Equinor's impending transformation, we acknowledge that there are some limitations to our thesis. In this section, we present some main underlying assumptions and the implications of these before we suggest how similar analyses could be conducted for further research.

We implicitly assume that the critical factors identified for Ørsted's success must necessarily exist to the same degree for Equinor in order for its transformation to achieve a similar success to Ørsted's. This can be discussed, as we potentially omit other, less important, critical factors to Ørsted's success that are more important for Equinor in today's renewable energy industry. This view is strengthened by the notion that the different characteristics of the current offshore-wind industry could entail critical factors to success other than those relevant for Ørsted. We have sought to address this to the best of our ability by considering how each transformation occurs at different eras of the offshore-wind market. Furthermore, we argue that considering all aspects of IRR provides the most collectively exhaustive analysis of the contributors to financial success. Furthermore, narrowing our analysis down to primarily offshore wind might implicitly entail that we do not devote enough attention to other renewables-segments such as onshore wind and solar energy. Against this, we argue that following each company's, and especially Equinor's, own expressed priority yields the most logical indication for which segment to prioritise in our analysis.

Furthermore, we believe that extended research related to our topic could involve comparing the transformation of other oil majors to Ørsted's. We argue that this would provide a more comprehensive understanding of energy transitions as a whole, enabling a more general interpretation of possibilities to success, rather than on a company-versus-company basis. Moreover, as we define the success of an energy transition based solely on Ørsted's success, we conduct our analysis from a historical perspective of one single company. In this context, as the sample of companies executing energy transitions becomes larger, one could potentially discover other, or additional, criteria for success by assessing the energy transitions of these. Lastly, following our suggestions in Section 5, a more detailed assessment of a potential spin-off of Equinor's renewable business, and how this would be optimally executed, is an interesting topic deserving further research, in our view.

7. Conclusion

In a general sense, the extensive message of this thesis is the true benefit of being first. Indeed, having a first-mover advantage in offshore wind was of such benefit to Ørsted that it represents the very root cause of the company's successful transformation. Naturally, attempting to replicate the success of Ørsted is enticing to many energy companies, and especially those striving to execute a successful energy transition. As revealed in this thesis, the consequence of such attempts has been a maturation of the offshore-wind market, inherently leading to a diminishment, and alteration, of the critical factors that came as a result of Ørsted's first-mover advantage, and thus facilitated the company's success. Implicitly, the financial performance of Ørsted's future offshore-wind projects will likely not match those related to its transformation.[35] This argument, along with the implication that any attempts to replicate Ørsted's success lack its very root cause, indicates that Equinor's transformation by expanding in bottom-fixed offshore wind will not be able to achieve a similar success to Ørsted's.

Ørsted's first-mover advantage embodied the root cause of the company's successful transformation because it entailed a streak of luck, as well as the possibility to acquire a unique skill set early on, enabling the company to become the industry leader in bottom-fixed offshore wind. What may carry a resemblance to this for Equinor is its pioneer position in floating offshore wind. Certainly, whether Equinor will experience the element of luck in the sense of Ørsted's is impossible to either confirm or deny, which combined with its limited share of the company's communicated pipeline leaves us to view this at present as a mere potential. Moreover, with the inability to leverage the critical factors to a similar extent as Ørsted, it follows that the LCIRRs of Equinor's offshore-wind portfolio will be lower than those of Ørsted's in its transformation. As such, we look to the required returns to uncover potential measures Equinor can take to maximise the entire potential of its offshore-wind expansion, and thus transformation. Here, we find that Equinor does not benefit from the ESG investor sentiment in the manner that Ørsted does, resulting in a relatively lower valuation of its offshore-wind business compared to Ørsted. To mitigate this, we suggest that Equinor should spin off its renewable business to lower its cost of capital and devote a more singular focus in terms of its corporate mission to execute an energy transition.

[35] As we show in Section 3, this is strengthened by the fact that Ørsted guides a lower LCIRR for future projects compared to the LCIRR of the offshore-wind projects related to the company's transformation.

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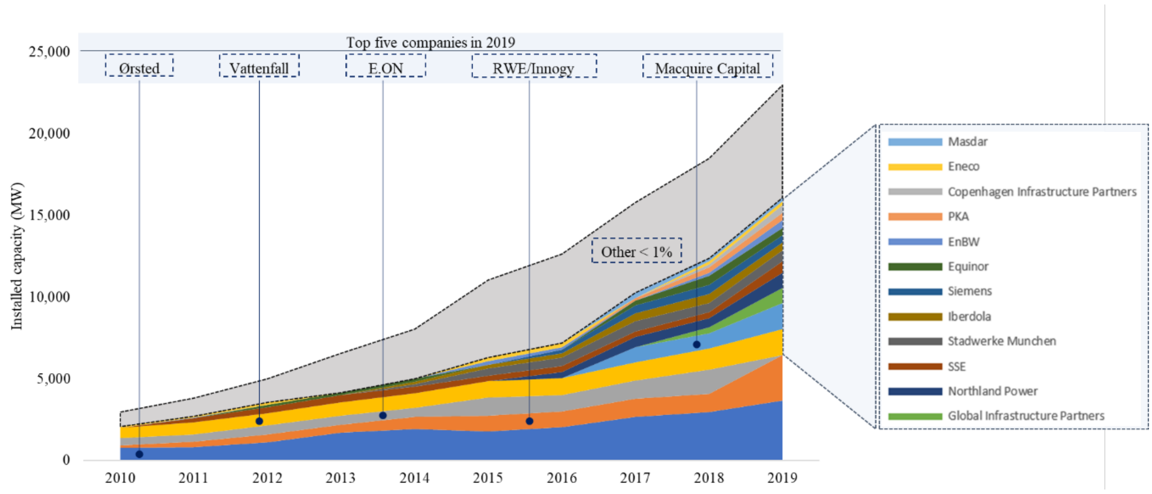
Appendix

The appendices offer complements to the analysis presented in the thesis, as well as a thorough description of the central assumptions we have made. First, we provide supporting information about the market for offshore wind in Europe from 2010 to 2019. Thereafter, we explain the assumptions related to choosing the day-ahead prices for electricity as the market-prices for electricity. Following this, we briefly present the formula for LCOE and present its main components. Next, we explain the necessary assumptions related to calculating the LCIRR of Ørsted's and Equinor's offshore-wind portfolios before we explain the same for Ørsted's onshore renewable energy portfolio. Following this, we explain the assumptions related to calculating the WACC of both companies before we offer a detailed description of each company's respective valuations. Lastly, we offer complementing information about the project acquisition activity in the European offshore-wind market in 2019.

Appendix A: Market-data for offshore-wind in Europe

In Figure A.1 below, we present the development of installed offshore-wind capacity in Europe the past decade, highlighting the five largest offshore-wind developers. The data used for this is gathered from WindEurope's *The European offshore wind industry key trends and statistics* from 2010 to 2019.

Figure A.1: Cumulative installed capacity of offshore-wind operators in Europe

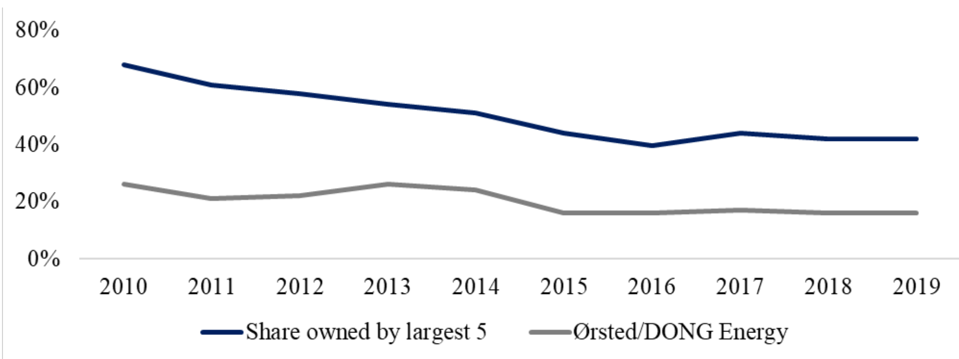


Sources: WindEurope

Other <1% entails the sum of capacity for the offshore-wind operators with less than 1% of the total installed capacity.

Figure A.2 shows the total market share owned by the largest five farm owners in Europe, during the period of 2010 to 2019. The data used for this is gathered from WindEurope's *The European offshore wind industry key trends and statistics* from 2010 to 2019.

Figure A.1: Market share development of Ørsted and the five largest offshore-wind operators in Europe



Source: WindEurope

Appendix B: Day-ahead electricity market-prices

In this appendix, we briefly comment on the assumption related to the use of day-ahead electricity prices as the market-prices for electricity in our thesis. The day-ahead prices entail the price at which electricity generators are prepared to receive for the electricity generated each hour the following day. According to Professor Mette Bjørndal, these electricity prices are the comparable alternatives at which Ørsted would have sold electricity at, had the company not received support through subsidies (M. Bjørndal, personal communication, 27th October 2020).

In Europe, electricity is traded on the NordPool power-exchange. As such, we have used the data-library of NordPool on 3rd October 2020 to retrieve the historical day-ahead prices for electricity in the UK, Denmark, Germany, and the Netherlands. See references for further details.

For Taiwan, we use the day-ahead electricity prices provided by the Taiwan Power Company (Taipower). Taipower only provides annual figures for the day-ahead prices for electricity for lighting and power. As such, we use the annual average of these prices to reflect the annual day-ahead prices. This assumes that the alternative prices Ørsted would have achieved in Taiwan without its PPA with the Taiwan Power Company are these annual prices. We retrieved this data from the Taiwanese Bureau of Energy's website on 20th November 2020. See references for further details.

In the US, the relevant day-ahead prices are assumed to be those quoted in the state where Ørsted's project, Block Island, delivers electricity. This state is Rhode Island, and we therefore use the relevant day-ahead prices for this state for comparison. The data for these electricity prices is retrieved from LCG Consulting Energy Online. We retrieved this data on 20th November 2020. See references for further details.

Appendix C: Levelised cost of electricity

In broader terms, LCOE for offshore wind is the net present value of all costs over the lifetime of the wind turbine divided by an appropriately discounted total of the energy output from the wind turbine over that lifetime (U.S. Energy Information Administration, 2020). LCOE for offshore wind is given by the formula:

$$\frac{\sum_{t=1}^{n} \frac{I_t + M_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{E_t}{(1+r)^t}} \tag{1}$$

where,

I_t: Investment expenditures in the year *t*

M_t: Operational expenditures in the year *t*

E_t: Electrical energy generated in the year *t*

r: Discount rate

Appendix D: Assumptions to the LCIRR of Ørsted's projects

This appendix presents the assumptions made in relation to developing the financial model to calculate the LCIRR of Ørsted's projects. The financial data used to develop our model is provided by Ørsted in its publicly published *Asset Book*, last updated in the third quarter of 2020. Moreover, the data for the initial investments for each project are retrieved from Equity Analyst Magnus Solheim in Fearnley Securities (M. Solheim, personal communication, 2nd October 2020). The Asset Book contains information about every offshore-wind project in its portfolio (Ørsted, 2020). A summary of the data we have used to calculate the LCIRR of each project is provided in Table D.1 at the end of all the appendices.

Tariff-rates and duration of subsidy contracts

United Kingdom

Ørsted's offshore-wind projects in the UK have received support through the ROC and CfD schemes. As the ROCs represent an additional stream of income, we model the revenue for projects commissioned under this scheme as the aggregate of the market-price and the income generated from ROCs (Ørsted, 2016). For projects with income streams after 2020, we assume that the current market-prices grow stable by following the target inflation rate (CPI) in the UK at 2% and make annual adjustments accordingly. Moreover, the effective ROC-prices after 2020 are assumed to grow at the average annual rate from when the scheme started in 2002. This growth continues to 2027, where it subsequently enters a long-term value fixed at the buyout price of 2027 plus 10% and linked to inflation until a final backstop date in 2037 (Ørsted, 2016).

Projects commissioned under the CfD scheme receive a fixed price until the subsidy expires. Upon expiry, the project receives the market-price, which in a given year after 2020 is assumed to follow the target inflation rate of 2% in the UK (Bank of England, 2019).

Denmark

Ørsted's offshore-wind projects in Denmark have received support through FiTs and FiPs. The projects receiving FiTs receive the market-price upon subsidy expiry, which is assumed to be growing according to the 2% target inflation rate in Denmark after 2020 (Danmarks Nationalbank, 2020). For the projects receiving FiPs, the premium is added to the inflation adjusted market-price after 2020. Upon expiry, only the inflation-adjusted market-price is received by these projects.

Germany

The FiTs received by Ørsted's projects in Germany entail two distinctive tariff-prices over two distinctive periods, before settling to a guaranteed minimum price-floor for the remaining duration of the subsidy. We model the revenues based on this and assume that the projects receive the 2% inflation adjusted market-price after the subsidy expires (European Central Bank, 2020).

Netherlands

Ørsted's offshore-wind project in the Netherlands receives an FiT, which we model in the same fashion as for Denmark. Upon expiry, we assume that the relevant projects receive the 2% inflation adjusted market-price, according to the Dutch inflationary target (European Central Bank, 2020).

Taiwan

The projects in Taiwan receive support through the FiT scheme, which we model in the same fashion as for the Netherlands. Upon expiry, the project receives the market-price adjusted for the Taiwanese 2% inflationary target (Loh & Lee, 2020).

United States

We model the offtake agreements according to the fixed price received in the PPA made between Ørsted and the state to which it supplies electricity to, adjusting for any additional arrangements in the agreements. After expiry, the projects receive the inflation-adjusted market-price according to the 2% inflationary target of the US (U.S. Federal Reserve, 2020).

Operating expenditures, depreciation, and tax-rate

We model operating expenditures based on Ørsted's guidance provided on the company's capital markets day of 2018, where it relates the operating expenditures (in DKKm) per MW to the wind-turbine size (in MW capacity) for a given project. As such, we apply the function in Exhibit 20 (Section 3) to estimate the annual operating expenditures related to each project. Moreover, we assume a 25% annual depreciation rate for each project, which according to the

Equity Analyst Casper Blom[36] who covers Ørsted, is the regular depreciation schedule for the balance-value of offshore-wind projects (C. Blom, personal communication, 7th October 2020). Furthermore, we apply the tax-rates communicated by Ørsted on the company's capital markets day of 2017. This varies by country and we model: Denmark with 22%, UK with 18%, Germany with 30%, Netherlands with 22%, US with 22% and Taiwan with 22%. (Wiinholt, 2017).

Capital expenditures

We assume that the capital expenditures for an offshore-wind project only entails initial investments, which in other words implies that there are no annual capital expenditures for Ørsted's projects. According to Casper Blom, the minuscule annual capital expenditures are captured through the function for operating expenditures presented above (C. Blom, personal communication, 7th October 2020).

Load factor

Ørsted provides quarterly summaries of the load factor for each project. As our model is on an annual basis, we calculate the average annual load factor and assume this to be constant over the lifetime for a given project.

Expected lifetime of project

We assume that the expected lifetime for an offshore-wind project is 25 years, which we apply to every project in Ørsted's portfolio. This assumption is in line with Casper Blom's own assumptions for the lifetime of offshore wind assets (C. Blom, personal communication, 7th October 2020).

The LCIRR

In sum, the assumptions above constitute our financial model which derives the unlevered annual free-cash flows for each of Ørsted's projects. This, in turn, is the basis on which we calculate the LCIRRs of every project in Ørsted's portfolio. To comprehensively measure the

[36] Casper Blom is an Equity Research analyst at ABG Sundal Collier's office in Denmark, and during his decade-long coverage of Ørsted, he participated as an analyst when DONG Energy became public in 2016 (C. Blom, personal communication, 7th October 2020).

returns of Ørsted's portfolio throughout its transformation, we calculate a capacity weighted LCIRR. This figure weighs the LCIRRs over the entire life of each project by their size in MW. Furthermore, as this figure is based on the unlevered free-cash flow, it disregards capital structure and thus gives the best indication of pure profitability for the projects, in our view.

Appendix E: Assumptions related to the LCIRR of Equinor's projects

In this appendix, we present the assumptions made in relation to calculating the LCIRRs of Equinor's projects. Our calculations are based on the financial information thus far provided by Equinor about its projects, available in a publicly published factsheet called *Facts about our renewable assets,* which was last updated in July 2020. A summary of the financial data used to calculate the LCIRR of Equinor's projects is provided in Table E.1 at the end of all the appendices. The financial data includes the locations of Germany, United Kingdom and USA. As such, Equinor has projects in the same locations as Ørsted, and incidentally receives support under the same subsidy schemes. As such, we model the revenues for Equinor, as we did for Ørsted. The remaining assumptions for calculating the financial items are identical to those used for Ørsted, except the ones applied with respect to load factors, and taxes.

Load factor

Equinor does not provide data for the load factors of the company's offshore-wind projects. As such, we have retrieved the load factors for the projects in the UK: Sheringham Shoal, Dudgeon and Hywind Scotland, from Energy Numbers (Smith, 2020). The load factor for Arkona in Germany is provided in the *Factbook* of RWE Renewables of 2019, which is one of Equinor's partners on the Arkona project.

For the future offshore-wind farms related to Dogger Bank A, B and C and Empire Wind I, we lack any firm estimates, and therefore rely on our own assumptions. We base our assumption for the entire Dogger Bank project on DNV GL's report *Potential to improve Load Factor of offshore wind farms in the UK to 2035.* In this report, it is asserted that the offshore-wind industry is expecting project load factors to increase to over 50% in the period to 2035. For Empire Wind I, we base our assumptions on the current operational wind farms of Ørsted in the US, and consequently apply a 42% load factor. The load factors for each wind farm are provided in Table E.1.

Tax

We apply a tax rate of 22% for Equinor's offshore-wind projects, to reflect the nominal corporate tax rate of Norwegian companies. Moreover, we argue that this reflects Equinor's operations outside the Norwegian Continental Shelf, such as its offshore-wind projects. The exception is the tax applied to Equinor in the US, where Equinor has a tax-advantage.

According to Equity Analyst Teodor Sveen-Nilsen, this advantage can be used for offshore-wind projects, leaving zero-tax in the US compared to Ørsted (T. Sveen-Nilsen, personal communication, 8th October 2020).

Appendix F: Theory and calculation of WACC for Ørsted and Equinor

In this appendix, we will introduce the theoretical frameworks we consider most relevant to estimating the WACC for Equinor and Ørsted.

Weighted Average Cost of Capital (WACC)

The WACC represents the returns that all investors in a company, equity, and debt, expect to earn for investing their funds in one particular business instead of others with similar risk, also referred to as their opportunity cost (Koller et al., 2015, p. 283). In general, WACC is a function of the risk-free rate plus a premium for the risk associated with the investment. In its simplest form, the WACC equals the weighted average of the after-tax cost of debt and cost of equity, shown with the formula below. (Koller et al., 2015, p. 284).

$$WACC = \left[\frac{E}{E+D}\right] * (RF + \beta_E * MP) + \left[\frac{D}{E+D}\right] * (1-t) * R_D \tag{2}$$

where,

$\frac{E}{E+D}$ is the target level of equity to enterprise value using market-based (not book) values

$\frac{D}{E+D}$ is the target level of debt to enterprise value using market-based (not book) values

RF: Risk-free rate

MP: Market risk premium

R_d: Pre-tax cost of debt

WACC where cost of equity is derived from CAPM (Approaches 1 and 2)

The capital asset pricing model (CAPM) is recognised as being one of the most efficient methods for pricing risky assets in practice (Koller et. al., 2015). Deduced from the formula above, WACC consists of three parts: (i) risk-free rate *RF*, (ii) the market risk premium *MP* scaled with the asset beta, β_A, and (iii) γ-adjustment for the company's cost of debt (Johnsen, 2017).

$$WACC = RF + \beta_A * MP + \gamma \tag{3}$$

The unlevered beta, or the asset beta, is the beta of a company without the impact of debt. This is also known as the volatility of returns for a company, without taking into account its financial leverage. The formula for the unlevered beta is shown below.

$$\beta_A = \left[\frac{E}{E + D}\right] * \beta_E + \left[\frac{D}{E + D}\right] * \beta_D \tag{4}$$

$$\gamma = \left[\frac{D}{E + D}\right] * [(1 - t) * R_D - (RF + \beta_D * MP)] \tag{5}$$

Table F.1 shows the values we have used in our calculations to derive the WACC. Here, we also provide further details about the parameters used in our estimates, which we have not yet mentioned in our thesis. The estimate for the risk-free rate in approach 1 is Bloomberg's reported current yield of the 10-year US government bond, as of 3rd December 2020. The market risk-premium is assumed to be 5%, which is in line with the risk-premium for stocks used by Johnsen (2017). The risk-premium of 5% is also coherent with the estimates of Koller et al. (2015). Using the asset-betas assumes that the investor-bases of both companies can be considered as internationally diversified investors and are based on regressing the monthly returns of Equinor and Ørsted against the monthly returns of the MSCI World Index over the past four years. According to Johnsen (2017), the best practice for estimating the asset beta has traditionally been five years. As Ørsted was publicly listed in 2016, we are limited to using only four years. The debt-betas are assigned according to the current S&P credit-ratings of Ørsted and Equinor, gathered from Johnsen (2017), which based the debt-beta as monthly regressed against the S&P 500 from 1983 to 2016. The current rating of Ørsted is BBB+ and Equinor is AA-, which gives the assumed debt-betas of 0.15 and 0.10, respectively.

Table F.1: WACC estimates derived from CAPM assuming different risk-free rates

WACC-estimates	**Approach 1**		**Approach 2**	
	Ørsted	Equinor	Ørsted	Equinor
Risk-free rate (RF)	0.93%		3.00%	
Business-risk ($\beta_A * MP$)	2.40%	2.75%	2.40%	2.75%
Cost of debt adjustment (γ)	-0.05%	-0.12%	-0.20%	-0.70%
WACC	**3.27%**	**3.57%**	**5.21%**	**5.04%**
Parameters				
Asset beta (β_A)	0.48	0.55	0.48	0.55
Debt-share ($\frac{D}{E+D}$)	6.00%	29.00%	6.00%	29.00%
Debt beta (β_D)	0.15	0.10	0.15	0.10
Equity beta (β_E)	0.50	0.74	0.50	0.74
Tax rate	22.00%	22.00%[1]	22.00%	22.00%[1]
Market risk premium (MP)	5.00%		5.00%	

Notes: 1) We apply the nominal tax rate of 22% for Norwegian companies to Equinor to reflect the tax-rate applicable for Equinor's investments outside the Norwegian Continental Shelf, such as offshore-wind projects.

WACC using the market implied cost of equity (Approach 3)

Approach 3 estimates cost of equity based on current share prices and the underlying corporate performance of each company (Koller et al., 2015, p. 290).

$$Equity\ Value = \frac{Earnings(1 - \frac{g}{ROE})}{k_e - g} \quad (6)$$

where,

Earnings: Equity earnings

g: Expected growth in earnings

ROE: Expected return on equity

k_e: Cost of equity

Solving for the cost of equity gives the following equation:

$$k_e = \frac{Earnings(1 - \frac{g}{ROE})}{Equity\ Value} + g \tag{7}$$

Earnings divided by the equity value is the inverse of the price-to-earnings (P/E) ratio, thus we can reduce the equation to the following:

$$k_e = \left(\frac{1}{\frac{P}{E}}\right)\left(1 - \frac{g}{ROE}\right) + g \tag{8}$$

From the basis of formula 8, we calculate the WACC as shown in Table F.2. Note that in steady state, the real earnings growth of the company is equal to zero. Moreover, as we derive the nominal earnings yield of the company, we arrive at the cost of equity without adjusting for inflation.

Table F.2: WACC-estimates derived from earnings yield

WACC-estimates	**Approach 3**	
	Ørsted	Equinor
Earnings yield	2.13%[1]	6,45%[2]
Cost of equity	**2.13%**	**6.45%**
Cost of debt (pre-tax)	1.00%	1.30%
Tax rate on interest	22.00%	22.00%
Cost of debt (after tax)	**0.78%**	**1.01%**
Debt-share	6.00%	29.00%
WACC	**2.05%**	**4.87%**

Source: FactSet (02.12.2020)

Notes: 1) Based on consensus P/E for 2021 of 46.9, 2) Based on consensus P/E for 2021 of 15.5

Appendix G: Ørsted's onshore portfolio

This appendix includes an overview of Ørsted's onshore portfolio, divided between onshore wind and solar energy. As we previously argue in Section 3, offshore wind was the predominant business segment related to the company's transformation, leading us to omit a further discussion of onshore wind and solar energy. However, as these segments are relevant to the valuation of Ørsted, a brief description of how we value these is provided in the following paragraphs. A summary of Ørsted's onshore portfolio is provided in Table G.1 at the end of all the appendices.

Onshore Wind

Onshore wind constitutes 7% of the total capacity (MW) in Ørsted's renewables portfolio, counting projects in operation and announced future projects. The financial items related to onshore wind are shown in Table G.1. In that context, we provide a brief description of the assumptions behind the modelling of these financial items in the following paragraphs.

<u>Revenue</u>

Ørsted's onshore-wind farms are solely based in the US, where it receives Production Tax Credits (PTCs) as governmental support, and fixed revenues from corporate PPAs. We model the revenue as the aggregate of achieved PTCs and the PPA-price. According to Ørsted's Asset Book, all projects qualify for a 100% PTC, yielding USD 24 per MWh in effective add-backs to EBITDA. As such, we count these as revenue in our model (Ørsted 2018).

Moreover, Ørsted stated in its CMD of 2018 that the average offtake-price through PPAs for Tahoka, Willow Springs and Amazon were USD 22 per MWh, while Plum Creek, Sage Draw and Lockett received between USD 12-15 per MWh. As such, revenues for these projects are modelled accordingly. We assume that the PTCs have a duration of 10 years, in line with Ørsted's statements, and that the PPAs continue over the entire projects' lifetime.

<u>Costs</u>

We model costs based on estimated operating expenditures per MW for onshore-wind farms. As the turbine sizes used in each project are very similar, we argue that assuming the same Opex/MW multiple for each project is justifiable. Our operational expenditures estimate of DKKm 2.1 per MW is based on the assumptions made by SEB analysts Lars Heindorff and

Mikael Petersens in their Initiation of coverage (IOC) report of Ørsted issued earlier this year (Heindorff & Petersen, 2020).

Load factor

We assume an average load factor over the entire lifetime of the project, following the same assumptions as for offshore-wind projects. The data regarding onshore-wind load factors are provided in Ørsted's Asset Book as quarterly load factors for each project.

Depreciation, capital expenditures, tax rate and expected lifetime of projects

As for offshore wind, we apply a 25% annual depreciation rate, and zero annual capital expenditures after initial investment. The tax rate is assumed to be 22%, while the expected lifetime is 25 years.

Solar Energy

Solar Energy constitutes 2% of Ørsted's renewables portfolio, counting projects in operation and announced future projects. We have not calculated any financial items for these projects, as we believe this is not relevant to our thesis. A further explanation of this is provided in the next appendix regarding the valuation of Ørsted and Equinor.

Appendix H: Valuation of Ørsted and Equinor

In this appendix, we provide a summary of the SOTP-valuation of Ørsted and Equinor.

Ørsted

The summary of the SOTP-valuation of Ørsted is provided in Table H.1. The values used to derive the Gross Asset Value (GAV) for Ørsted's offshore - and onshore-wind portfolios can be found in Table D.1 (offshore-wind portfolio) and Table G.1 (onshore-wind portfolio) both at the end of all appendices. Due to the lack of financial information about Ørsted's solar energy projects, and their contribution to the total renewable portfolio, we value these at cost. Markets & Bioenergy is valued at an EV/EBITDA basis, where we apply the consensus estimated EBITDA of 2021 and SEB's estimate of seven times EBITDA, which according to them is in line with relevant peers (Heindorff & Petersen, 2020). Lastly, we use the Net Interest-Bearing Debt (NIBD) provided by Ørsted in its annual report of 2019 to derive the Net Asset Value (NAV) of Ørsted's current contracted portfolio. Note that currently contracted projects include offshore-wind projects that are in the construction phase and have been awarded subsidies.

The implied value per MW of Ørsted's pipeline is provided on the right-hand side of Table H.1. Here, we consider every non-operational project, including those in construction and awarded subsidy, as part of the company's pipeline. The capacity in Ørsted's pipeline is adjusted for the company's net ownership in order to reflect the size, and thus value, of the projects belonging to the company. For the projects with 100% ownership, we assume that in the case of farm-downs the implied divestment value corresponds exactly to the initial investment of Ørsted, thus conservatively assumed to yield zero returns.

Table H.1: SOTP-valuation of Ørsted

SOTP-valuation of Ørsted	EUR
Offshore Wind	
Operational	26,272,477,522
Construction	8,859,333,083
Subsidy Awarded	4,096,366,315
Gross Asset Value Offshore Wind	**39,228,176,919**
Onshore	
Onshore Wind Operational	2,946,211,547
Solar Energy Operational[1]	36,000,000
Gross Asset Value Onshore	**2,982,211,547**
Markets & Bioenergy	
EBITDA 2021e (Consensus)[2]	107,816,400
EV/EBITDA[2]	7.0 (x)
Gross Asset Value Markets & Bioenergy	**754,714,800**
Net-Asset-Value Calculation	
Sum-Of-The-Parts (SOTP)	42,965,103,266
Net Interest-Bearing Debt (NIBD)	2,310,543,000
Net Asset Value (Current contracted portfolio)	**40,654,560,266**

Implied value of Ørsted's pipeline	EUR
Net Asset Value (Current contracted portfolio)	**40,654,560,266**
Offshore Construction	8,859,333,083
Offshore Subsidy Awarded	4,096,366,315
Net Asset Value (Operational portfolio)	**27,698,860,868**
Market Capitalization (as of 04.12.2020)	58,374,347,978
Implied value of renewables pipeline	30,675,487,110
Capacity of pipeline (MW)	10,991
Implied value/MW of pipeline	**2,790,888 (x)**

Notes: 1) Solar Energy valued at initial investment of Ørsted, 2) M&B EV/EBITDA 2021e based on SEB estimate, EBITDA 2021e based on consensus.

Equinor

The value of Equinor's operational portfolio is the aggregate of the values from Table E.1 in Appendix E (offshore-wind portfolio). In this context, we assume that Equinor's offshore-wind business has zero net debt, such that the GAV is equivalent to the NAV. The pipeline of Equinor's offshore-wind portfolio is based on the implied values from the BP- and ENI-transactions as of September and December 2020, respectively. As the ENI-transaction entailed divestment of Dogger Bank A and B, we assign a total value on the entire Dogger Bank development (A, B and C) based on the EUR 229 million ENI paid for 10% of phase A and B. Similarly, we value the entire Empire Wind (Phase I and II) and Beacon Wind (Phase I and II) based on the EUR 970 million BP paid for 50% of these projects. The rest of Equinor's pipeline (Baltyk Wind Phase I, II and II, Dudgeon Extension and Sheringham Shoal Extension) are based on the TV/MW multiple from the BP-transaction. How we ultimately arrive at the implied pipeline value is shown in Table H.2. Moreover, on the right-hand side we use the implied value of Ørsted's pipeline to derive the value of Equinor's. In this context, we adjust the capacity of Equinor's pipeline to the company's net ownership in each project and make the same assumption regarding divestments as we did for Ørsted. We emphasise once again that we assume Ørsted's implied value from its market capitalisation to predominantly reflect the future value of offshore-wind projects. Note that in Exhibit 38 (Section 4), the implied value of Ørsted's pipeline changes with its market capitalisation, consequently changing the implied value of Equinor's pipeline as well. In the table below, we merely illustrate the calculation for one date, as of 4th December 2020.

Table H.2: Valuation of Equinor's offshore-wind business

Valuation of Equinor's offshore-wind business	**EUR**
Operational Offshore-Wind Portfolio	
Value of operational projects	**2,775,615,323**
Pipeline Offshore-Wind Portfolio	
Value as of transactions	
BP-transaction, US	1,939,410,000
ENI-transaction, UK	2,285,313,750
Total value	**4,224,723,750**
Implied value of pipeline: Acreage secured	
Consideration from BP-transaction	969,705,000
Capacity divested	2,208
Implied value per MW	439,178
Capacity acreage secured in pipeline MW	2,219
Pipeline value: Acreage secured	**974,535,958**
Total pipeline-value	**5,199,259,708**
Total value of offshore-business	**7,974,875,081**

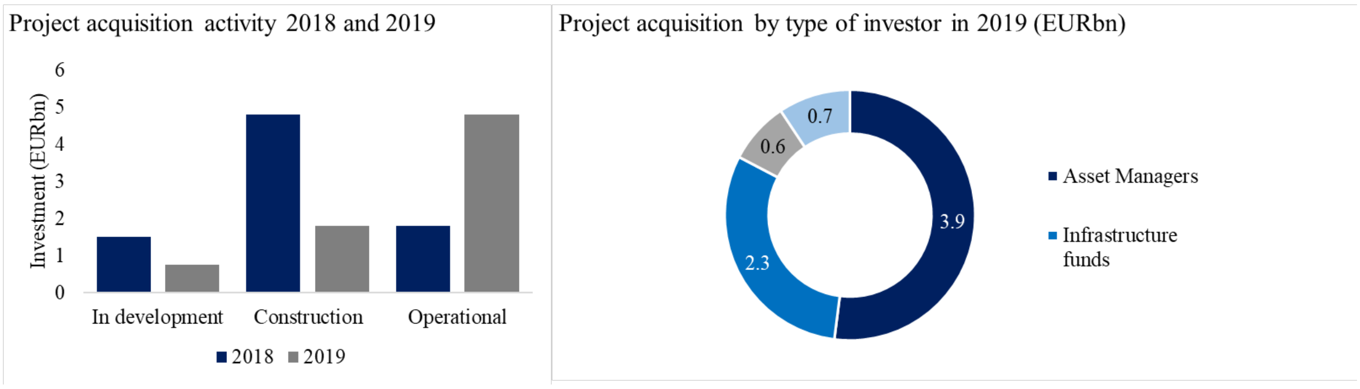
Implied value of Equinor's offshore-wind business from Ørsted's market capitalization	**EUR**
Operational Offshore-Wind Portfolio	
Value of operational projects	2,775,615,323
Pipeline Offshore-Wind Portfolio	
Implied value per MW of Ørsted	2,790,888 (x)
Capacity in pipeline (MW)	5,987
Implied pipeline-value	**16,709,046,366**[1]

Notes: 1) Implied value as of 04.12.2020. In Exhibit 38, this value varies with Ørsted's market-value.

Appendix I: Project acquisition activity in Europe, 2019

In this appendix, we briefly present an overview of the project acquisition activity by project phase and type of investor. The data behind these figures is provided in WindEurope's reports *The European offshore-wind industry key trends and statistics* from 2019.

Figure I.1: Project acquisition activity in Europe, divided by project phase (left-hand side) and type of investors (right-hand side)



Source: WindEurope

Table D.1a: Ørsted's offshore-wind portfolio

		Commissioning year	Size (MW)	Ørsted's ownership	Turbine size (MW)	Status	Subsidy scheme	Average tariff-price (EUR/MWh)	Subsidy duration	Load factor	Average EBITDA-margin	Depreciation	Investment (EURm)	LCIRR	WACC	Value (EUR)
Denmark	*Average/Total to the right*		*950*		*2.8*			*77.0*		*42%*	*59%*			*8.3%*		**1,928,736,278**
	Anholt	2013	399.6	50%	3.6	Operational	FiT	141.2	10	50%	87%	25%	1,500.0	14.1%	3.5%	1,407,332,428
	Horns Rev 2	2009	209.3	100%	2.4	Operational	FiT	69.6	12	48%	66%	25%	448.0	8.2%	3.5%	444,099,504
	Rodsand 1	2004	165.6	43%	2.3	Operational	FiT	60.9	12	36%	46%	25%	248.0	3.8%	3.5%	47,184,932
	Horns Rev	2002	160.0	40%	2.0	Operational	FiP	47.7	20	39%	32%	25%	270.0	-1.0%	3.5%	12,008,531
	Avedore Holme	2011	10.8	100%	3.6	Operational	FiP	65.4	5	40%	64%	25%	25.0	4.6%	3.5%	18,110,884
	Vindeby	1991	5.0	100%	N/A	Decommissioned	Market-price	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A
UK	*Average/Total to the right*		*8,713*		*5.2*			*148.8*		*42%*	*88%*			*14.3%*		**21,637,577,815**
	London Array Phase 1	2013	630.0	25%	3.6	Operational	ROC	167.1	20	43%	88%	25%	2,441.0	14.7%	3.5%	1,412,890,941
	West of Duddon Sands	2014	388.8	50%	3.6	Operational	ROC	164.4	20	46%	88%	25%	1,975.0	12.1%	3.5%	1,889,651,991
	Walney 1	2011	183.6	50%	3.6	Operational	ROC	165.7	21	45%	89%	25%	581.0	18.0%	3.5%	804,070,274
	Walney 2	2012	183.6	50%	3.6	Operational	ROC	169.5	20	45%	89%	25%	581.0	18.4%	3.5%	850,801,978
	Lincs	2012	270.0	25%	3.6	Operational	ROC	169.5	21	45%	89%	25%	843.0	18.6%	3.5%	621,730,468
	Westermost Rough	2015	210.0	50%	6.0	Operational	ROC	162.0	20	45%	91%	25%	988.0	13.4%	3.5%	1,042,566,532
	GunfleetSands1	2010	172.8	50%	3.6	Operational	ROC	133.9	20	38%	84%	25%	350.0	18.0%	3.5%	466,322,264
	Barrow	2006	90.0	100%	3.0	Operational	ROC	97.6	19	35%	74%	25%	147.0	14.3%	3.5%	232,680,229
	Burbo Bank	2007	90.0	100%	3.6	Operational	ROC	125.3	20	40%	84%	25%	132.0	25.0%	3.5%	416,198,018
	Gunfleet Sands 3	2013	12.0	100%	6.0	Operational	ROC	167.1	20	37%	90%	25%	40.0	15.0%	3.5%	93,993,991
	Burbo Bank Extension	2017	256.0	50%	8.0	Operational	CfD	165.4	15	35%	91%	25%	970.0	11.8%	3.5%	898,574,105
	Race Bank	2018	573.3	50%	6.0	Operational	ROC	144.8	19	39%	88%	25%	2,200.0	13.2%	3.5%	2,337,684,029
	Walney Extension West	2017	320.0	50%	8.3	Operational	CfD	165.4	16	50%	94%	25%	1,375.0	15.6%	3.5%	1,636,075,114
	Walney Extension East	2018	329.0	50%	7.0	Operational	CfD	165.4	15	50%	93%	25%	1,370.0	15.9%	3.5%	1,712,720,459
	Hornsea 1	2020	1,218.0	50%	7.0	Operational	CfD	154.3	16	42%	91%	25%	5,138.0	11.8%	3.5%	5,156,757,876
	Hornsea 2	2022	1,386.0	100%	8.0	Construction	CfD	63.4	16	42%	81%	25%	2,400.0	10.2%	3.5%	2,064,859,545
	Hornsea 3	2025	2,400.0	100%	4.0	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A
	Hornsea 4	N/A	N/A	N/A	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A
	Isle of Man	N/A	N/A	N/A	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A
Germany	*Average/Total to the right*		*2,501*		*8.1*			*77.5*		*42%*	*75%*			*9.1%*		**3,215,800,006**
	Borkum Riffgrund 1	2015	312.0	50%	3.6	Operational	FiT	101.8	10	36%	57%	25%	1,234.0	8.2%	3.5%	409,618,607
	Borkum Riffgrund 2	2019	464.8	50%	8.3	Operational	FiT	92.3	10	34%	74%	25%	1,800.0	7.1%	3.5%	918,250,692
	Gode Wind 1	2017	330.0	50%	6.0	Operational	FiT	96.2	10	41%	72%	25%	1,247.0	12.0%	3.5%	661,989,985
	Gode Wind 2	2017	252.0	50%	6.0	Operational	FiT	90.2	10	40%	70%	25%	953.0	10.4%	3.5%	437,252,459
	Borkum Riffgrund 3	2024	900.0	100%	11	Awarded	Zero-subsidy	39.7	10	46%	81%	25%	1,629.3	5.3%	3.5%	120,719,329
	Gode Wind 3	2023	110.0	100%	11	Awarded	FiT	60.0	10	48%	85%	25%	199.1	10.1%	3.5%	292,858,333
	Gode Wind 4	2023	132.0	100%	11	Awarded	FiT	62.0	9	48%	87%	25%	239.0	18.4%	3.5%	375,110,601
Netherlands	*Average/Total to the right*		*752*		*8.0*			*72.7*		*30%*	*77%*			*6.0%*		**1,822,557,183**
	Borssele 1 & 2	2020	752.0	100%	8.0	Operational	FiT	72.7	15	30%	77%	25%	1,500.0	6.0%	3.5%	1,822,557,183

Sources: Ørsted's Asset Book, M. Solheim (personal communication), C. Blom (personal communication).

Table D.1b: Ørsted's offshore-wind portfolio

		Commissioning year	Size (MW)	Ørsted's ownership	Turbine size (MW)	Status	Subsidy scheme	Average tariff-price (EUR/MWh)	Subsidy duration	Load factor	Average EBITDA-margin	Depreciation	Investment (EURm)	LCIRR	WACC	Value (EUR)
Taiwan	*Average/Total to the right*		*1,936*		*7.2*			*134.9*		*43%*	*88%*			*5.6%*		**5,344,306,709**
	Formosa 1	2017	8.0	35%	4.0	Operational	FiT	209.3	20	37%	89%	25%	68.0	5.6%	3.5%	25,752,251
	Greater Changhua 1	2022	600.0	100%	8	Construction	FiT	157.6	20	49%	94%	25%	1,700.0	22.3%	3.5%	4,611,110,647
	Greater Changhua 2b	2025	458.3	100%	8	Awarded	FiT	75.0	20	35%	81%	25%	1,500.0	3.5%	3.5%	(92,176,498)
	Greater Changhua 4	2025	570.0	100%	8	Awarded	FiT	75.0	20	43%	84%	25%	2,600.0	2.8%	3.5%	(331,106,949)
	Greater Changhua 2a	2022	300.0	50%	8	Construction	FiT	157.6	20	49%	94%	25%	900.0	21.1%	3.5%	1,130,727,259
US	*Average/Total to the right*		*7,462*		*9.3*			*132.9*		*42%*	*91%*			*9.7%*		**5,279,198,927**
	Block Island	2016	30.0	100%	6.0	Operational	PPA	273.1	20	47%	95%	25%	290.0	9.7%	3.5%	495,601,796
	Revolution Wind	2023	704.0	50%	8	Construction	PPA	88.0	20	45%	87%	25%	1,322.3	15.8%	3.5%	1,052,635,633
	Skipjack Wind Farm	2022	120.0	100%	10	Awarded	MD OREC	116.3	20	45%	93%	25%	350.0	14.2%	3.5%	490,894,965
	Sunrise Wind	2024	880.0	100%	8	Awarded	NY OREC	73.5	25	45%	85%	25%	2,500.0	7.5%	3.5%	1,072,821,226
	South Fork Wind Farm	2023	128.0	100%	12	Awarded	PPA	143.7	20	36%	94%	25%	250.0	21.9%	3.5%	631,205,617
	Ocean Wind	2024	1,100.0	50%	12	Awarded	NJ OREC	103.0	20	36%	N/A	25%	2,200.0	14.8%	3.5%	1,536,039,691
	Bay State Wind	2025	2,000.0	50%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A
	Garden State Offshore Energy	2025	400.0	50%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A
	Constitution Wind	2026	2,100.0	50%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A

Sources: Ørsted's Asset Book, M. Solheim (personal communication), C. Blom (personal communication).

Table E.1: Equinor's offshore-wind portfolio

		Commissioning year	**Size (MW)**	**Equinor's ownership**	**Turbine size (MW)**	**Status**	**Subsidy scheme**	**Average tariff-price (EUR/MWh)**	**Subsidy duration**	**Load factor**	**Average EBITDA-margin**	**Depreciation**	**Investment (EURm)**	**LCIRR**	**WACC**	**Value (EUR)**
UK	*Average/Total to the right*		*5,068*		*8.5*			*118.3*		*49%*	*89%*			*11.8%*		**2,289,722,091**
	Sheringham Shoal	2011	317	40%	3.6	Operational	ROC	165.7	21	40%	86%	25%	1,457.3	8.8%	4.5%	781,790,699
	Dudgeon	2017	402	35%	6.0	Operational	CfD	158.4	15	48%	91%	25%	1,715.8	14.0%	4.5%	1,164,654,740
	Hywind Scotland	2017	30	75%	6.0	Operational	ROC	233.7	21	54%	93%	25%	214.4	14.8%	4.5%	343,276,652
	Dogger Bank A	2024	1,200	50%	12.0	Awarded	CfD	48.9	15	50%	88%	25%	3,300.0	5.3%	4.5%	N/A
	Dogger Bank B	2025	1,200	50%	12.0	Awarded	CfD	51.4	15	50%	89%	25%	3,300.0	5.8%	4.5%	N/A
	Dogger Bank C	N/A	1,200	50%	12.0	Awarded	CfD	51.4	15	50%	89%	25%	3,300.0	5.8%	4.5%	N/A
	Dudgeon Extension	N/A	402	100%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.5%	N/A
	Sheringham Shoal Extension	N/A	317	100%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.5%	N/A
Germany	*Average/Total to the right*		*385*		*6.3*			*93.2*		*45%*	*76%*			*17.6%*		**485,893,282**
	Arkona	2019	385	25%	6.3	Operational	FiT	93.17	10	45%	76%	25%	1,200.0	17.6%	4.5%	485,893,282
US	*Average/Total to the right*		*4,416*		*12.5*			*79.0*		*42%*	*88%*			*6.4%*		*N/A*
	Empire Wind Phase I	2024	816	50%	12.5	In development	Index OREC	79.03	16	42%	88%	25%	2,640.0	6.4%	4.5%	N/A
	Empire Wind Phase II	N/A	1,200	50%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.5%	N/A
	Beacon Wind Phase I	N/A	1,200	50%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.5%	N/A
	Beacon Wind Phase II	N/A	1,200	50%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.5%	N/A
Poland			*3,000*		*N/A*			*N/A*		*N/A*	*N/A*			*N/A*		*N/A*
	Baltyk Srodkowy I	N/A	1,440	50%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.5%	N/A
	Baltyk Wind Phase II & III	N/A	1,560	50%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.5%	N/A
Norway			*88*		*8.0*			*N/A*		*N/A*	*N/A*			*N/A*		*N/A*
	Hywind Tampen	2022	88	41%	8.0	Sanctioned	N/A	N/A	N/A	N/A	N/A	25%	N/A	N/A	4.5%	N/A

Sources: Facts about our renewable assets (Equinor), DNV GL, RWE Renewables, Energy Numbers, Power Technology, company announcements.

Table G.1: Ørsted's onshore portfolio

		Commissioning year	**Size (MW)**	**Ørsted's ownership**	**Turbine size (MW)**	**Status**	**Subsidy scheme**	**Average tariff-price (EUR/MWh)**	**Subsidy duration**	**Load factor**	**Average EBITDA-margin**	**Depreciation**	**Investment (EURm)**	**LCIRR**	**WACC**	**Value (EUR)**
Wind	*Average/Total to the right*		*1658*		*2.6*			*35.5*		*42%*	*91%*			*9.4%*		**2,946,211,547**
	Willow Springs	2017	250.0	100%	2.5	Operational	PTC	39.1	10	44%	92%	25%	305.0	10.8%	3.5%	521,506,103
	Amazon	2017	253.0	100%	2.3	Operational	PTC	39.1	10	44%	92%	25%	295.0	11.5%	3.5%	531,045,506
	Tahoka	2018	300.0	100%	2.5	Operational	PTC	39.1	10	46%	93%	25%	350.0	12.0%	3.5%	676,546,055
	Lockett	2019	184.0	100%	2.5	Operational	PTC	31.9	10	46%	91%	25%	220.0	9.0%	3.5%	343,661,554
	Sage Draw	2020	338.0	100%	2.8	Operational	PTC	31.9	10	38%	89%	25%	400.0	6.6%	3.5%	519,765,646
	Plum Creek	2020	230.0	100%	2.8	Operational	PTC	31.9	10	38%	89%	25%	270.0	6.7%	3.5%	353,686,682
	Willow Creek	2021	103.0	100%	2.6	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A
	Western Trail Wind	N/A	N/A	100%	N/A	In development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5%	N/A
Solar	*Average/Total to the right*		*450*		*N/A*			*N/A*		*N/A*	*N/A*			*N/A*		**536,000,000**
	Oak	2012	10.0	100%	N/A	Operational	Market-price	N/A	N/A	21%	N/A	N/A	12.0	N/A	N/A	12,000,000
	Carnegie Road Storage Project	2018	20.0	100%	N/A	Operational	Market-price	N/A	N/A	21%	N/A	N/A	24.0	N/A	N/A	24,000,000
	Permian Energy Centre	2021	420	100%	N/A	Construction	N/A	30.4	N/A	21%	N/A	N/A	500	N/A	N/A	500,000,000
	Muscle Shoal	2021	N/A	100%	N/A	Construction	ITC	N/A	N/A	21%	N/A	N/A	N/A	N/A	N/A	N/A

Sources: Ørsted's Asset Book, SEB Equity Research, company reports, company announcements.