



The offshore Kentish Flats power plant consists of 30 V90-3.0 MW* turbines and 15 V112-3.3 MW* turbines. The purpose of the red marks is to make the blades more visible when the rotor is parked for helihoist operations.

Activities in the **Offshore wind power** area

2017 was another eventful year for MHI Vestas Offshore Wind A/S. Several milestones were reached as the company continued to secure new orders, expand its manufacturing set-up, and introduce new technology.

The company's financial performance was characterised by increased activity levels, progress on earnings and a strong order backlog. Short-term earnings are still to be impacted by the expected expensive ramp-up and large amortisation of the 8 MW platform.

During the year, MHI Vestas Offshore Wind won more than 700 MW of orders in Germany and confirmed two preferred supplier agreements in the UK. The solid order intake provided conditions for the steady ramp-up of manufacturing, underlined by a new blade painting and logistics facility in the UK and recruitment of more than 400 employees in Denmark.

In 2017, MHI Vestas Offshore Wind successfully installed the first V164-8.0 MW™ turbine, and also updated the 8 MW wind turbine platform, enabling it to reach 9.5 MW at specific site conditions.

The main priorities for MHI Vestas Offshore Wind in 2018 are focus on continued manufacturing ramp-up, project execution, and securing profitability.

Financial performance and accounting method

Founded in April 2014 as a joint venture between Mitsubishi Heavy Industries, Ltd. and Vestas Wind Systems A/S, MHI Vestas Offshore Wind has equal ownership status between the two parent companies.

The joint venture is accounted for using the equity method, and Vestas' share of MHI Vestas Offshore Wind's overall net result for the year is recognised in the income statement as "Income from investments in joint ventures and associates".

For Vestas, the investment amounted to a loss of EUR 40m in 2017, compared to a loss of EUR 101m in 2016. The improvement was mainly attributable to Vestas' share of loss in the joint venture on a standalone basis being reduced during 2017, combined with timing difference in elimination of proportional profit on deliveries from the Group to MHI Vestas Offshore Wind.

For further information about the investment in MHI Vestas Offshore Wind, see note 3.4 to the Consolidated financial statements, page 087.

Global trends in the offshore wind power market

Positive outlook

Offshore wind power plays an increasingly important role in the overall energy mix. In 2017, annual installed capacity for offshore wind power globally is expected to have reached 3 GW, compared to 2 GW in 2016.¹⁾ This indicates that offshore wind power is still a fast-growing renewable energy technology.

This trend is expected to continue, and the outlook for the offshore wind power industry remains positive. According to MAKE Consulting, annual global offshore wind power installations are expected to reach 13 GW in 2026, which constitutes a compound annual growth rate of 19 percent from 2016.¹⁾

Northern Europe, with Germany and the UK in the lead, continues to be the most mature offshore wind power markets.

In September, the UK held the second round of the Contract for Difference (CfD) auction with more than 3 GW of offshore wind power allocated, with delivery of the projects scheduled to begin in 2021. The third round of the CfD auction is scheduled for 2019, when the unallocated budget from the second round is added to the overall budget for this round.

Germany also completed an auction round during 2017, when 1,490 MW of offshore wind power projects were allocated.²⁾ With significant reductions in bid prices, the auction highlighted the increased competitiveness of offshore wind energy.

Looking into other European markets, the Federal Government of Belgium recently announced a strike price of EUR 79 per MWh for its next round of projects.³⁾ In the Netherlands, there is currently an open tender for the Zuid Holland projects. The tender process will conclude in early 2018.³⁾

The USA showed commitment to offshore wind power after the Massachusetts Legislature passed a bill mandating that the state's utilities procure 400 MW of offshore wind power in 2017 – as a step to 6.2 GW of installed capacity by 2030. It is expected that the USA will commission its first large-scale offshore wind power plant by 2020.³⁾

While China has already established a market for offshore wind power and has set a 5 GW target by 2020³⁾, other countries in Asia are moving in the same direction as well. Japan, South Korea, and Taiwan are expected to have installed large-scale offshore wind power plants by 2020.¹⁾

Reduction in the cost of offshore wind power as a key driver

2017 was a milestone year for the offshore wind power industry.

In the first round of the German offshore auction, three projects with a total capacity of 1,380 MW were awarded with a zero-subsidy bid, and are hence only reliant on the wholesale power price. The three projects are planned to be commissioned in 2024, subject to a final investment decision in 2021, and demonstrate that the offshore wind power industry has made considerable progress in reducing the levelised cost of energy. More importantly, it also highlights the confidence that the cost of offshore wind power can be lowered even further.

As the offshore industry grows and technology improves, various players turn to offshore as a realistic solution for deploying large-scale wind power plants. This is key in order for the positive outlook for the industry to materialise.

MHI Vestas Offshore Wind's market development in 2017

During the year, MHI Vestas Offshore Wind announced two firm and unconditional orders; its largest order ever of 450 MW for the Borkum Riffgrund II project in Germany, and a 252 MW order for the Deutsche Bucht project, also in Germany.

Furthermore, the joint venture confirmed that it had been appointed preferred supplier for both the Triton Knoll (860 MW) and Moray Firth (950 MW) projects in the UK.

Compared to the overall order activity in the market, the joint venture is satisfied with the amount of orders received, and finds itself well-positioned as one of the leading offshore players.

MHI Vestas Offshore Wind has been a very active participant in the market, and has generally had a presence in most tenders taking place since its formation.

Developments in the offshore business during the year

Further upgrades to the world's most powerful wind turbine

During 2017, MHI Vestas Offshore Wind once again pushed the boundaries of offshore wind power by launching the V164-9.5 MW™ turbine, based on the 8 MW platform originally designed for the V164-8.0 MW™ turbine. The increased rating is a result of great offshore experience and deep understanding of wind turbine technology. It is furthermore an important step in order to continue the reduction of the levelised cost of energy for offshore wind power.

The upgrade increases energy production per wind turbine and will add great value to future offshore projects by reducing the logistical costs, the amount of foundations, and sub-sea electrical cabling needed.

High activity levels, and still ramping up

As a result of a good order intake and a positive outlook for MHI Vestas Offshore Wind's activity levels, the joint venture is ramping up for future production.

The current manufacturing footprint comprises blade production on the Isle of Wright, UK and at Nakskov, Denmark, an assembly facility at Lindø, Denmark, plus pre-assembly facilities in the port of Esbjerg, Denmark. In addition, as announced in November 2017, the company will establish a blade painting and logistics facility at Fawley in the UK, which is expected to be operational in April 2018.

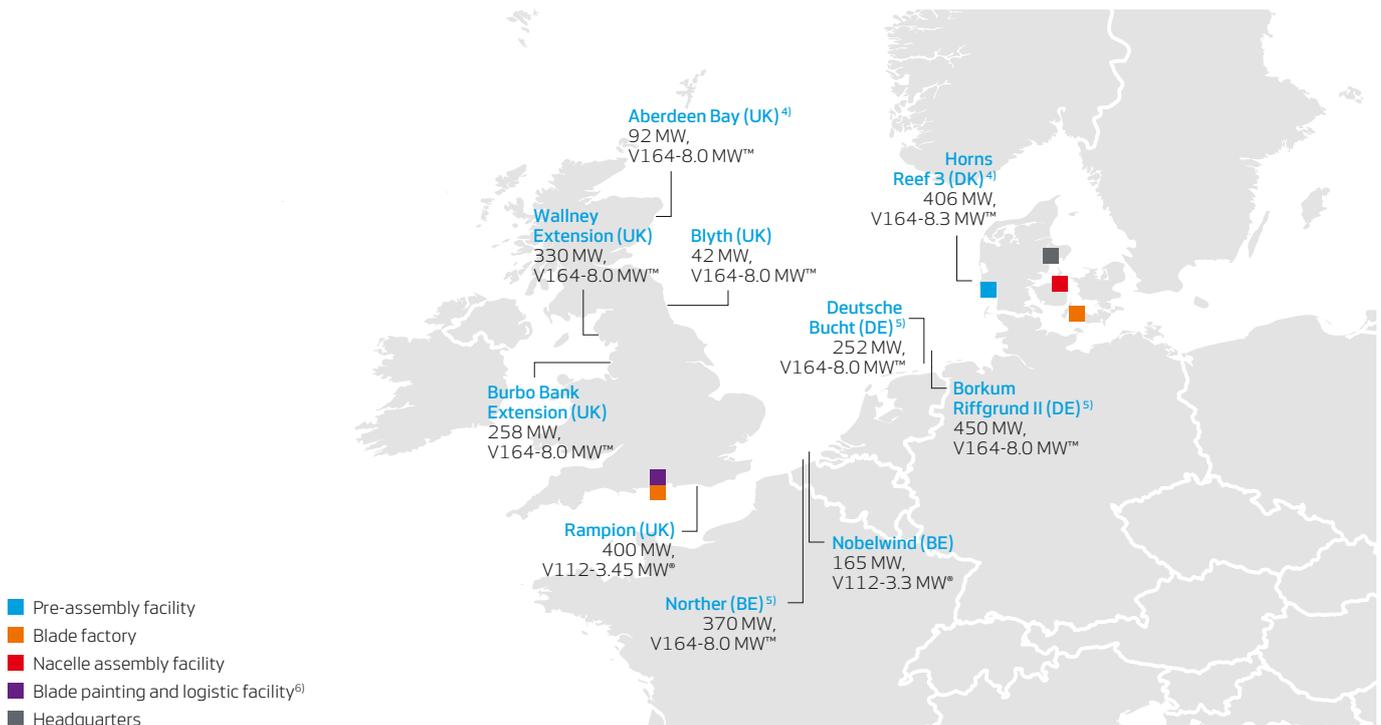
During 2017, a state-of-the-art, 5,600 m² Power Converter Modules (PCM) manufacturing facility was inaugurated close to the pre-assembly facility at the port of Esbjerg. The expansion of the manufacturing footprint follows a hiring ramp-up at existing production facilities in Denmark earlier in the year, when more than 400 employees were recruited to the blade factory and nacelle assembly facility in Denmark.

1) Source: MAKE Consulting: Market Outlook Update. November 2017.

2) Source: Bundesnetzagentur (article): Bundesnetzagentur erteilt Zuschläge in der ersten Ausschreibung für Offshore-Windparks. 13 April 2017.

3) Source: Bloomberg New Energy Finance: H2 2017 Offshore Wind Market Outlook. December 2017.

MHI Vestas Offshore Wind - manufacturing footprint and headquarters, and projects delivered or under construction in 2017



MHI Vestas Offshore Wind completed the installation of 3.45 MW turbines for its largest offshore wind park to date, the 400 MW Rampion project in the Southern UK. Nobelwind in Belgium (165 MW), using the 3.3 MW turbine, was likewise completed during 2017.

In October 2017, MHI Vestas Offshore Wind announced a partnership with Clemson University in South Carolina, USA. The partnership entails all testing and verification of the V164-9.5 MW™ turbine's gearbox and main bearings at Clemson University's 15 MW test bench. Through utilisation of big data from the extensive testing results, the joint venture can ensure optimum reliability and minimise the fatigue on components. The partnership further highlights the confidence in the competitiveness and future position of the V164-9.5 MW[®] turbine in the US market.

Successful installations of V164-8.0 MW™ turbines

During the year, MHI Vestas Offshore Wind finalised the installation and commissioning of the 258 MW Burbo Bank Extension project – the first large-scale project to use the V164-8 MW™ turbine. Installation has also been finalised for Walney Extension in the UK (330 MW), and Blyth in the UK (42 MW).

Financial guidance

MHI Vestas Offshore Wind continues to enjoy success in the marketplace and activity levels are expected to continue to increase with factories ramping up for new installations of projects for the 8 MW platform. In the short-term, this will adversely impact earnings. In addition, large amortisations of the 8 MW platform will likewise impact financial performance.

Accordingly, MHI Vestas Offshore Wind expects to double its revenue over a three-year period from a base of its completed financial year 2015/2016, while EBITDA is expected to reach break-even by 2018 and pre-tax profit is anticipated to reach break-even by 2019.

The expected development is in line with previous internal expectations, and the strong financial position secured during the first years of operation is tailored to cope with this expected performance.

4) Expected installation year 2018.

5) Expected installation year 2019.

6) Expected operational in April 2018.