

Record growth in global offshore wind capacity

CLARKSON RESEARCH Worldwide, 2021 was another record-breaking year for the offshore wind industry, according to latest figures from UK analyst Clarkson Research. While new additions to the grid were modest in Europe, China overtook UK as the largest offshore wind market.



In 2021, China led the way for new capacity additions and overtook the UK as the largest offshore wind market. Shown is the 500-MW wind park *Shanwei Houhu* in the South China Sea

Source: CGN

In 2021, 84 wind farms (3,400 turbines) with a total of 18.5 GW increased the global active capacity by 58% to an all-time high of 50.5 GW, according to Clarkson Research. Commenting on the latest data, Steve Gordon, the analyst's managing director, said, "This takes offshore wind to approximately 0.3% of total global energy supply: our energy transition modelling suggests this could reach 6-9% by 2050 and generate 4,870 TWh to 5,990 TWh of power."

The following summaries the findings of Clarkson Research. China led the way for new capacity additions and overtook the UK as the largest offshore wind market, with 16 GW coming on-line, mostly in the final two months of the year, ahead of the expiry of a government subsidy deadline at the end of the year. New capacity additions were more modest in Europe, as 1.8 GW was fully commissioned, with 17 GW currently under development in the region.

Offshore wind project capex commitments reached USD 44.6 billion in 2021 (the second highest total on record), with a number of significant projects reaching final investment decision (FID), including the first utility-scale offshore wind project in the US (*Vineyard Wind*, 806 MW). In Europe, USD 18.7 bil-

lion of project capex was committed to offshore wind projects, compared with USD 10.3 billion earmarked for offshore oil and gas projects.

The offshore wind vessel market continued to evolve, reaching nearly 1,100 vessels by year end. Global wind turbine installation vessel (WTIV) utilisation averaged 83% in the year (up 6% points year-on-year), while exceptional demand for vessels off China consistently kept utilisation over 90% in the second half of the year. Rates responded, with the average day rate assessment for third generation WTIVs in Europe up 18% across the year.

Record newbuild investment developed during 2021, with over USD 4 billion of orders placed and increasing focus on alternative fuels and energy-saving technologies. This included over 17 (plus nine options) WTIV newbuild contracts placed (totaling about USD 2.5 billion), the highest yearly total on record; 15 commissioning service operation vessels (CSOVs) with a total value of about USD 0.8 billion, also the highest number on record; and 39 crew transfer vessels (CTVs).

Both original equipment manufacturers and wind farm developers came under pressure from rising material costs in 2021. Chinese steel prices averaged USD 827/tonne over the

year (up 47% year-on-year), while annual average copper prices increased by 51% to USD 9,317/tonne. Lower than average wind speeds in much of Europe also limited power output from offshore wind farms, reducing the volumes that operators could sell into the market. Offshore wind farms in Germany generated 23.5 TWh of power in 2021, compared with 26.9 TWh in 2020.

Power prices in Europe surged in 2021, due to tight gas supplies and lower average wind speeds. Day-ahead electricity prices averaged EUR 97.75/MWh in Germany in 2021 (more than triple their level in 2020) and EUR 103.55/MWh in the Netherlands (up 236% y-o-y).

For 2022, Clarkson Research is projecting that a healthy 9.5 GW of offshore wind capacity and 1,400 turbines will come online, bringing the fully commissioned global total to 60.0 GW. Offshore wind capital commitments are expected to total some USD 55 billion, just below the record of USD 56 billion in 2020.

The longer-term projections suggest that the global offshore wind sector may reach 712 farms involving over 29,000 turbines and 235 GW by 2030. Current capacity is made up of 250 farms and 10,800 turbines generating 50.5 GW of power.

› NO NEW INSTALLATIONS IN GERMANY IN 2021

Due to incorrectly set political framework conditions, no wind turbine construction took place in the German North and Baltic seas in the entire year 2021. Motivated by the need for climate protection and economic sustainability, the new German Government has set higher and more long-term targets in the coalition agreement. By 2030, 30 GW of installed capacity should be available. So far, however, only about 7.8 GW of capacity is connected to the grid. In order to achieve the set targets, industry associations are now calling for the creation of suitable framework conditions for the expansion. "The commitment of the traffic light coalition to significantly accelerate the expansion of offshore wind energy is just as correct as the concrete target of at least 30 GW by 2030. This target creates a positive perspective for the entire value chain," the industry organisations BWE, BWO, VDMA Power Systems, WAB and the Offshore-Windenergie Foundation noted, commenting on the new expansion targets. "Now the grid and area planning for the implementation of the targeted expansion path should be revised without delay. The aim must be to leverage all acceleration potentials in order to enable an economic and climate-protection-friendly expansion."



In Germany, the Federal Maritime and Hydrographic Agency (BSH) has now determined the suitability of further areas in the North Sea for the installation of offshore wind parks

Source: BSH

AiP for integrated feeder barge



Source: Friede and Goldman

Illustration of the integrated feeder barge

WTIV | Classification society ABS has granted Approval in Principle (AiP) to a coordinated design for a wind turbine installation vessel (WTIV) in conjunction with the innovative BargeRack feeder barge system by Houston-based Friede and Goldman (F&G).

The design provides the Jones Act-compliant barge with a lifting system that F&G says reduces motion and increases the window of operational time. The design was reviewed in accordance with the ABS 2017 Guidance Notes on Review and Approval of Novel Concepts.

"To achieve the scale of US offshore wind market by 2030, the industry will be reliant on the delivery of the variety of vessels that will be needed to install and maintain the turbines, while navigating various port constraints. ABS has been at the forefront of supporting this process, facilitating a succession of vessel developments that will prove critical to the future of this industry. This design from F&G is the latest where we are proud to be able to assist with our extensive knowledge of US regulations and our deep involvement with the entire offshore wind supply chain here in the US," said Greg Lennon, ABS vice president, Global Offshore Wind.

"F&G has developed a superior feeder vessel solution. Typical feeder solutions are inherently risky due to feeder vessel motions with the impact on equipment transfer. We've solved this problem by completely eliminating the feeder vessel motion, as well as reducing the feeder vessel cost by an order of magnitude compared to other feeder vessels," Robert Clague, vice president of Engineering at F&G, added.

Development of the BargeRack WTIV is the latest vessel designed specifically for US offshore wind operations to be supported by ABS. A subsea rock installation vessel is to be built to ABS Class and *Charybdis*, the first Jones Act-compliant WTIV, is also now under construction to ABS Class. The first US-flagged Jones Act offshore wind farm service operation vessel ever ordered will be built to ABS Class. These vessels will join the first ABS-classed crew transfer vessel in the US, *Windserv Odissey*.