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DAY
TWO

Offshore wind sector slammed: 'only luck' has prevented deaths, says Shell

ANDREW LEE

Offshore wind is lagging well behind the oil & gas industry over safety, with "only luck" preventing a fatality in the sector last year, warned a senior executive from Shell.

Dorine Bosman, the company's vice president for offshore wind, told WindEurope Offshore yesterday that the fast-growing sector quickly needs to follow the lead of oil & gas, which "learned lessons the hard way through tragedies such as Piper Alpha", the devastating oil rig fire that killed 167 in the UK North Sea in 1988.

Bosman told delegates that offshore wind experienced 256 high-potential incidents — with the possibility of death or life-changing injury — in 2018. "Only luck stood between something worse happening," she said.

Offshore wind's rate of total "recordable incidents" was 4.55 per million hours worked, compared to 0.9 per million in oil & gas, she added.

And Bosman warned that the sector's steep growth trajectory, and the millions of hours of extra work it will involve, makes the issue even more urgent.

"If you make these numbers work in your head, are you still convinced you'll have zero fatalities? Would you recommend this industry to a friend?"

The figures quoted by Bosman come from 2018 safety data produced by G+ Global Offshore Wind, a sector safety organisation backed by major players such as Orsted, Vattenfall and ScottishPower.

The organisation's data showed that the 256 high-potential incidents



Shell's Dorine Bosman speaking at WindEurope Offshore yesterday

represented a 13% drop on 2017's level, with no fatalities in either year. When the statistics were released in June, G+ chairman Paul Cowling said other key safety metrics showed "a remarkable improvement in 2018".

The G+ figures cover the European offshore wind markets plus US and Taiwan, but not China.

Jakob Lau Holst, chief executive of wind OEM-backed safety training specialist GWO, told *Recharge* that it was "remarkable and encouraging" that a senior executive used a major offshore wind speech to highlight safety.

"We're not doing badly but we could do much better," he said,

pointing out that offshore wind is a much younger industry.

Mike Rice, commercial director at Dropsafe, a specialist in safety in industries spanning energy, marine, mining and other sectors, said: "There is still a visible gap between offshore wind and oil & gas in its approach to tackling core safety risks."

However, Rice added that demand for proven health and safety equipment, and best practices from oil & gas, is growing, "indicating a desire not only to tackle safety and associated financial risks, but also to address the threat to reputation that may be posed by a serious incident."

Industry warned offshore wind job losses could mirror onshore

BERND RADOWITZ

The European offshore wind industry needs to avoid the thousands of job losses that occurred in onshore wind in recent years, and push for clear policies to make it the backbone of a new Green Deal in the EU, industry executives told WindEurope Offshore yesterday.

"Onshore wind is a precedent right in front of us, not an example," said Philippe Kavafyan, chief executive of offshore turbine maker MHI Vestas

To build a sustainable offshore wind industry, the sector needs to learn its industrial and policy lessons from the past, he added.

The wind industry at large is under unprecedented pressure, with margins getting tight all across Europe, Vattenfall wind chief executive Gunnar Groebler warned.

"The supply chain is having a hard time, we have lost more than 38,000 jobs in the wind industry in Germany alone over the last four years," he said.

A combination of ill-designed onshore wind auctions, a permitting malaise, bureaucratic hurdles, and anti-wind protests have pushed German onshore wind additions to their lowest figure since 2000, resulting in severe job cuts at wind OEMs and suppliers.

To avoid such problems, the offshore industry must show that it is a strategic industry to Europe that exports equipment worth billions of euros every year, said Groebler. ☐

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Offshore wind tenders 'should be opened up to land-locked nations'

BERND RADOWITZ

Countries holding offshore wind tenders should open those up for land-locked European nations, Luxembourg's energy minister Claude Turmes demanded at the opening of WindEurope Offshore yesterday.

Turmes said his plea was not primarily geared towards his own inland country, but had EU members in mind that have not been at the forefront of the transition towards renewables, such as the Czech Republic or Slovakia.

"Why do you think they are stubbornly [remaining] in the old [energy] world?" Turmes, a former green party member of the European Parliament, asked the audience. "Because they have a less competitive edge on their solar and wind. You have to open your national tenders for land-locked countries so that they also gain access to what will be the cheapest energy, which I think will be offshore wind."

Turmes added that governments should opt for UK-style contract for difference (CfD) support schemes, under which operators receive set remuneration



Luxembourg's energy minister Claude Turmes (right) speaking at WindEurope Offshore yesterday

determined by a tender, with governments providing a top-up on the wholesale power price when required, and the developer giving the state their surplus income when wholesale prices exceed the strike price.

Without a CfD system, tenders will increase stress on suppliers and developers, but projects won't get cheaper, given the increased

volatility created by power markets, Turmes cautioned.

Pieter Van Oord, chief executive of Dutch contractor Van Oord, agreed, saying that the current zero-subsidy environment in some European countries has "put a tremendous pressure on all of us — developers, turbine manufacturers, contractors and the supply chain." ☐

'Opex is next frontier' for offshore wind cost-cutting

LEIGH COLLINS

Manufacturers have done well to reduce the levelised cost of energy from their turbines, but the offshore sector needs to now cut costs of installation, servicing and in the supply chain, senior OEM executives told WindEurope Offshore yesterday.

According to MHI Vestas chief executive Philippe Kavafyan, "Opex [operational expenditure] is the next frontier" for cost-cutting.

"We have so much to save on the asset management of these wind farms offshore and the fact that we'll have more and more offshore wind farms and that they will be close to each other will allow some mature aggregation of infrastructure, will allow some different concepts for being more efficient and reduce your back-end [costs]," he told delegates.

Andreas Nauen, offshore wind chief executive at Siemens Gamesa, added that installation of turbines offshore is still too expensive, "especially when we go to new countries".

"If we optimise the whole supply chain, including installation, then afterwards the servicing, then we will get the costs [down]. If we just focus on the little part in between, then we can't really get there, so it has to be everything."

John Lavelle, chief executive of GE Renewable Energy's offshore wind business, added that there is room for cost-cutting across these areas, with standardisation of components and services being key.

"It's the building out of modern vessels that can handle the bigger machines, it's the skilled workforce, it's the bigger supply chains that we all need to develop. And doing it in a rational way so we don't build up too large of a cost structure, so we can all maintain a competitiveness in the market and then keep a high reliability level of the operating fleet, which allows financiers to come in." ☐

Floating installation vessel to debut at Arcadis Ost 1

DARIUS SNIECKUS

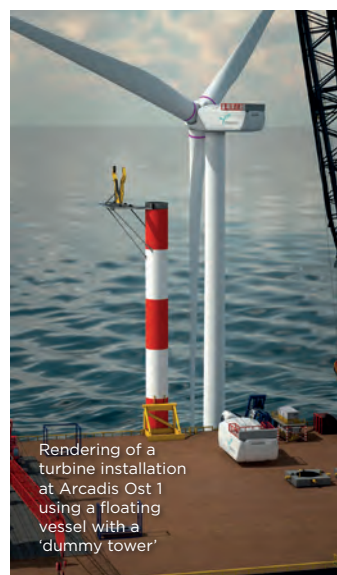
Parkwind will make the first use of a floating installation vessel at its Arcadis Ost 1 project in the Baltic Sea, after completing a year-long investigation of the technique with Heerema Marine Contractors (HMC) and MHI Vestas, which will be supplying turbines to the 257MW development.

The decision to opt for a floating vessel at Arcadis Ost 1, located 20km northeast of the German island of Rügen, was prompted by "challenging" soil conditions at the project site, which made use of conventional jack-ups problematic.

"Taking the turbine installation based on a floating vessel from theory to practice is a major step forward for the offshore wind industry," said Parkwind's co-chief executive Eric Antoons.

The installation, on monopile foundations, will see the as-yet-unnamed vessel transport all turbine components on its deck including a "dummy tower", which will provide a stable platform on board the vessel to assemble the nacelle and the blades.

This technique is seen as having two "unique" advantages: it "avoids all interaction" with the seabed to reduce operational risk compared to a jack-up installation, and also, cuts installation time. ☐



Rendering of a turbine installation at Arcadis Ost 1 using a floating vessel with a 'dummy tower'

Lithuania's targets 'mission impossible' without offshore

BERND RADOWITZ

Lithuania will need to have at least 700MW of offshore wind capacity up and running by 2030 to meet the targets included in its National Energy and Climate Plan that the Baltic country has submitted to the European Commission, energy minister Žygimantas Vaičiūnas told WindEurope Offshore yesterday.

Lithuania wants renewables to make up 45% of its power mix by 2030, which would likely translate in a production of 7TWh that year, the government in Vilnius has said. That would be up from 1.3TWh in 2017.

"It was very clear that our target for 2030 without offshore is mission impossible," Vaičiūnas told delegates.

To be able to build a first 700MW of offshore wind in Lithuania, the country is considering holding first tenders for offshore wind projects in two years time, Vaičiūnas said.

With neighbour Poland having plans to install up to 10GW of offshore wind in its part of the Baltic Sea by 2040, Lithuania sees big potential.

"With the new government [in Warsaw], there is hope that there will be a new impetus for regional cooperation," Vaičiūnas said. ☐



Žygimantas Vaičiūnas at WindEurope Offshore yesterday



Christina Aabo, Ørsted's director of R&D, speaking at Recharge's Annual Summit

Ørsted: 'you can't have it both ways' on price and local benefits

ANDREW LEE

The offshore wind sector is increasingly having to tell politicians they can't have it both ways over cheaper power and demands for local benefits such as jobs, said a senior executive at global industry leader Ørsted.

Christina Aabo, head of R&D at the Danish offshore wind giant, said expansion into new global markets is creating the need for frank discussions, with policymakers keen to secure high-profile benefits while at the same time insisting on rock-bottom electricity prices.

"As we step into new markets we

see requirements on local content, harbours and job creation," Aabo told the Recharge Summit in Copenhagen on Monday.

Developers like Ørsted are having to ask politicians whether they want the cheapest possible offshore wind, or to prioritise other spin-off benefits such as job creation, she explained.

"Right now, it's 'we want both'. But honestly, as an industry we are stepping up and saying simply, 'guys, you cannot have it,'" Aabo said, adding that to accommodate all the extra requirements would be adding cost, potentially decreasing quality and increasing project risk, but not reducing the price of energy.

The Ørsted executive said the focus should be on planning regionally rather than "state by state or even city by city sometimes".

Local content is increasingly emerging as a potential headache for offshore players, putting pressure on developers, which fear a needlessly fragmented supply chain will reverse some of the huge cost cuts the industry has made in the past five years.

Taiwan is piling the pressure on developers and the supply chain to commit to local investments, while Australian labour unions recently warned they want to see tangible local benefits from the first offshore wind projects there. ☐

Iberdrola rolls projects into 3.1GW East Anglia Hub

ANDREW LEE

Iberdrola will roll its three remaining East Anglia UK offshore wind projects into a single 3.1GW, £6.5bn (\$8.4bn) mega-development that it says will be on line by 2026, selling power with or without government contract-for-difference (CfD) deals.

The East Anglia Hub will unite

the EA1 North, and EA2 and EA3, previously envisaged as distinct projects, into a single complex, with a combined procurement programme "to leverage their scale with a continuous installation programme" from 2022.

The news comes after the 1.2GW EA3 lost out in the last round of UK CfD auctions, outgunned by the 3.6GW Equinor/SSE Dogger

Bank project that took the lion's share of capacity awarded at record low prices.

Jonathan Cole, Iberdrola's global offshore wind manager, said the Spanish group expects "the East Anglia Hub to be a key part of the UK's decarbonisation plans, regardless of whether that power will be sold via government backed contracts or private power sales arrangements". ☐

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BERND RADOWITZ

RWE Renewables, the recently formed global number two in offshore wind, is exploring offshore opportunities in India, South Korea and Taiwan, in addition to previously announced plans in Japan, the company's chief executive tells *Recharge*.

"We have an eye on several markets in the APAC [Asia-Pacific] region: Japan is certainly the market where we have spent much of our time and been the most engaged so far, but we are also looking at Korea, Taiwan and India, for example," said Anja-Isabel Dotzenrath.

"We continue to monitor China but consider this less relevant for the time being."

RWE Renewables last month opened its first Asian office in Tokyo, and with local partner Kyuden Mirai Energy, plans to jointly develop, build and operate fixed-bottom projects in the Kyushu area off southern Japan.

As part of a wide-ranging asset and share swap deal, German utility E.ON recently transferred its renewable generation assets to RWE, including the former's partnership with Kyuden Mirai. And early next year, the renewable assets of its former subsidiary Innogy will also be brought back into the RWE fold, making the German company the world's



RWE Renewables chief executive Anja-Isabel Dotzenrath speaking at last year's WindEurope conference

RWE eyes South Korea, Taiwan, India and Japan for offshore wind

second-largest offshore wind player with 2.5GW in operation.

"Our strategy to become a leading offshore player in Japan is to join forces with Japanese partners, like Kyuden Mirai Energy. Their local expertise complements our global

experience and technical know-how well," Dotzenrath said, adding that RWE would like to expand the cooperation in Kyushu to other Japanese projects in the near future.

Japan's government enacted a law earlier this year to enhance

the development of offshore wind. It has identified 11 areas as potentially suitable for development, four of which were designated as "promising areas" where the preparation process, such as wind and geological research, will start immediately. ☐

Recharge Summit told offshore wind can scale for global climate fight

ANDREW LEE

Hitting the scale and reach needed to battle the climate emergency was a dominant theme to emerge from the *Recharge* Annual Summit on Monday, which this year took place in Copenhagen and focused on offshore wind.

The scale challenge was addressed by senior executives from high-profile organisations including the World Bank, the International Energy Agency, MHI Vestas, Orsted, Equinor and DNV GL, who spoke under 'Chatham House rules' at the event — meaning speakers cannot be identified, in order to

encourage openness.

Recharge Editor-in-Chief Darius Snieckus, opening the event, warned the scale-up is not happening "anywhere near rapidly enough to avert the gathering storm of climate change".

Offshore wind can help by expanding into untapped nations such as India and Brazil, said a senior official from an international financial organisation, pointing to a "three-terawatt prize" of technical potential in emerging offshore wind markets.

An offshore wind executive agreed that the sector is penetrating more new markets all the time, but warned that this growth is

prompting increasingly robust discussions with governments over the trade-off between competitive power prices and other benefits



Darius Snieckus

such as local content.

Other speakers said matching offshore wind's scale with innovation in areas like green hydrogen production could help it play a more central role in the energy transition.

Another senior financial official told the 70 delegates that "if you're going to see offshore wind meet its potential in emerging markets, a lot will be floating". An executive from the floating industry highlighted its ability to provide significant local benefits almost everywhere it operates.

The event was sponsored by GE Renewable Energy, Goldwind, DNV GL, Rostec and MHI Vestas Offshore Wind. ☐

Digitalisation will drive 'next era' of offshore wind cost cutting

Artist's impression of a drone with offshore oil platforms and a wind farm in the distance



DARIUS SNECKUS

Rapid advances in digitalisation and automation will be needed to drive the next era of cost reduction in the offshore wind industry, or developers could fall foul of ever-narrowing project margins as the sector enters the zero-subsidy era, according to DNV GL.

The “mega trend” of projects upsizing to gigawatt-scale to reach an ever-levelled cost of energy (LCOE), would not be enough for future offshore wind auctions where margins “are so tight”, said DNV GL global head of offshore wind Peter Brun, speaking exclusively with *Recharge* ahead of today’s launch of the DNV GL report, *Offshore Wind: The Power to Progress*.

“Offshore wind is not an infant technology any more — it is maturing so rapidly. It has passed the juncture where we are not looking into the minutiae, we are looking at truly big scale. That’s the game-changer: offshore wind is about to grow immensely,” he stated.

“But we will have to find new ways to improve the profitability of the future offshore wind farms because much as we

have achieved impressive cost reductions through bigger and bigger turbines and so on — and we’ve been very innovative already — there is much more to do.

“We need to ‘cluster’ because the auction prices we are seeing in Europe are extremely aggressive [and] the margins are so tight. But we also need to make a leap in [the use of] digitalisation.”

Developers have “just started on the digitalisation journey”, Brun said, noting “we have high hopes this will lead to even greater efficiencies, bringing improvements to planning, installation and operation in the next era [of offshore wind]”.

In the first instance, future improvements to the hardware — turbines and foundations — will be further streamlined by digitalisation, Brun said.

“There will be further cost reductions of the hardware and much of this will be done by digital twins [where technology can be modelled and virtually tested on-screen] because the way everything is being developed in a way now where you can test out different engineering options — for specific geotechnical or meteorological conditions, for instance — and get a stable proof-

point that way.”

But this digital leverage will be “equally if not more important” in automating future offshore project development and operations, Brun predicted, with robots “supplementing” and later supplanting humans in heavy-lift and underwater work, especially for wind farms located in remote



and hazardous environments.

“From construction through to O&M [operations and maintenance] there is a lot to gain from doing this all more digitally, more smartly,” said Brun. “New digital tools including AI [artificial intelligence] will help the industry drive cost reduction and expansion faster.”

The arrival of oil & gas giants

into the offshore wind space will bring not only “big capital [but also] big digital innovations”, he added. “This will be one of the biggest drivers. The oil industry is now very keen to enter the power sector through offshore wind and they understand the ‘technology environment’ very well, including digital and automation.

“The ambition is to make offshore wind LCOE the most cost-competitive large-scale power generation technology there is. And part of that is scale. But the other part is efficiency and much of that is down to digitalisation — and increasingly so.”

DNV GL calculates that offshore projects will account for 40% of all wind projects by 2040, as the industry builds capacity to around 600GW, en route to installing 1,500GW by mid-century.

“If you model [the growth of the offshore wind industry] based on the technologies’ progress, then the main message is that on the global scale expansion is going to be staggering and will require still more scaling-up of turbines, improvements in construction methodologies in the ports and harbours and so on but will, like everything, be digitally-enhanced, digitally-driven.” ☐

HIGHLIGHTS OF THE DAY

WEDNESDAY, 27 NOVEMBER

 #offshore2019

→ Individual session tickets are available at the registration desk!

Programme overview

CONFERENCE

08:30 Energy talk with Henrik Stiesdal
09:00 A15

09:00 Financing the expansion of offshore wind
10:15 A15

10:15 Break
10:45

10:45 Revenue Streams
12:15 A10

Ports and the industrialisation of offshore wind
A11

Research and innovation priorities
A12

12:15 Lunch
14:00 Hall B

14:00 Financing offshore wind outside Europe
15:30 A10

Happy coexistence with aviation and the military
A11

15:30 Poster viewing
16:15 Auditorium Foyer

Science & Research Symposium
A12

16:15 Installing larger turbines: challenges and solutions
17:45 A10

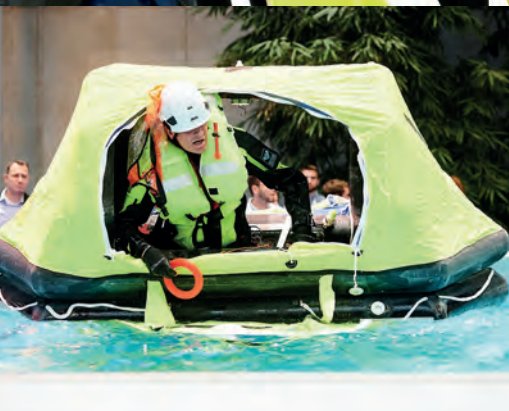
Preserving marine biodiversity
A11

Ends at 18:00

19:30 Gala Dinner - Sponsored by Iberdrola and hosted by Wonderful Copenhagen
22:30 Copenhagen City Hall

See the programme online:
windeurope.org/programme

Visit the WindEurope Stand E-D21 to meet the WindEurope team, pick up your copy of our industry-leading reports, try out our market intelligence tools and book your stand for WindEurope Electric City 2021.



HIGHLIGHTS OF THE DAY

WEDNESDAY, 27 NOVEMBER

 #offshore2019

Social events



Networking lunch with the WindEurope Ports Platform

12:15 – 14:00

WindEurope Stand E-D21

Join representatives from over a dozen European ports for this networking lunch.



Networking drinks at the Innovation Park

16:30 – 18:30

The Innovation Park, Hall E

The ideal occasion to build contacts with the start-ups and EU projects poised to change how offshore wind works.



WindEnergy Hamburg 2020 stand party

17:00 – 18:30

WindEurope Stand E-D21

Join us for a special announcement on the 2020 edition of WindEnergy Hamburg, the world's largest wind energy event!



Gala dinner

19:30 – 22:30

Copenhagen City Hall

Guests will experience the culinary delights which Denmark is so renowned for, in the form of a 3-course dinner, all while being seated alongside the crème de la crème of the wind industry!

Side events



Offshore wind farm visits

12:15 – 16:00

Departure from Bella Center, Reception Desk

Please note the bus will depart from Bella Center at 12:15, and the boat departs at 13:00.



The Safety Experience by Ørsted

10:30 – 11:15

Meeting room 20, level 1

Come and experience how expanding offshore wind power globally can be done with high safety standards and proper business.



Wind Energy and Aviation

10:00 – 13:00

Meeting room 18, level 1

This is where we create opportunities to overcome the challenges for the happy coexistence of wind energy and aviation sectors.



PROMOTiON

Technical challenges and solutions for Meshed Offshore Grid development in the Northern Seas

14:30 – 17:00

Meeting room 19, level 1

How we can maintain security of supply while cost-effectively integrating large quantities of renewable energy into the future power grid.



R&I by Ørsted

15:00 – 16:00

Meeting room 20, level 1

Learn about some of the Ørsted offshore wind power research projects with universities, research institutions and other partners.

Exhibition halls (HALL E)

Global Markets Theatre

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10:00 – 17:30

What's happening in the key global markets for offshore wind? Our expert presenters will tell you everything you need to know.

windeurope.org/globalmarkets

Innovation Park

Powered by



09:30 – 18:00

The Innovation Park is where you'll find the start-ups and innovative projects transforming how wind works.

windeurope.org/innovationpark

Safety, Skills & Training Zone

In association with



10:00 – 16:30

A unique 200m² area showcasing the industry's commitment to an injury-free working environment in offshore wind.

windeurope.org/trainingzone

DARIUS SNECKUS

Rapidly growing energy demand in many developing regions of the world could be met with offshore wind power alone, according to a World Bank report into emerging markets in Brazil, India, Morocco, the Philippines, South Africa, Sri Lanka, Turkey and Vietnam.

The study, which was spun out of a \$5m market development programme launched last year, calculated a total of 3.1TW of potential offshore wind power in the waters off the eight countries — with two thirds of that coming from deep-water floating turbines.

The scale of the resource outlined in *Going Global: Expanding Offshore Wind to Emerging Markets*, produced with its sister organisation the International Finance Corporation (IFC), surprised even the report's authors.

"Emerging' markets, such as we call them, have been watching what has been happening in offshore wind in Europe a while and many of them have had the growing sense that it represented a huge opportunity for them, but this is the first time we have put a number to it," says Sean Whittaker, senior renewable energy specialist at the IFC and co-author of the report, with World Bank senior energy specialist Oliver Knight and consultant Alastair Dutton.

"Not only are we and these countries that we case-studied aware that it is an achievable [industrial development opportunity], but offshore wind also represents several times the countries' energy demand," he tells *Recharge*. "So, I think it's the scale of it that is most surprising."

"In almost all of these markets you have rapidly increasing energy demands, fuelled mainly by the growth in major coastal conurbations. These countries see offshore wind as increasingly economically viable and they are beginning to fit that into their long-term energy plans and realise it is something they can start acting on now, but the future [where offshore wind can be a large part of their energy mix] is fast-approaching."

The data collected for the

World Bank: 'Offshore wind alone could power fast-growing emerging markets'

Fishermen working in front of Vietnam's first wind power farm, the 99.2MW coastal Bac Lieu project

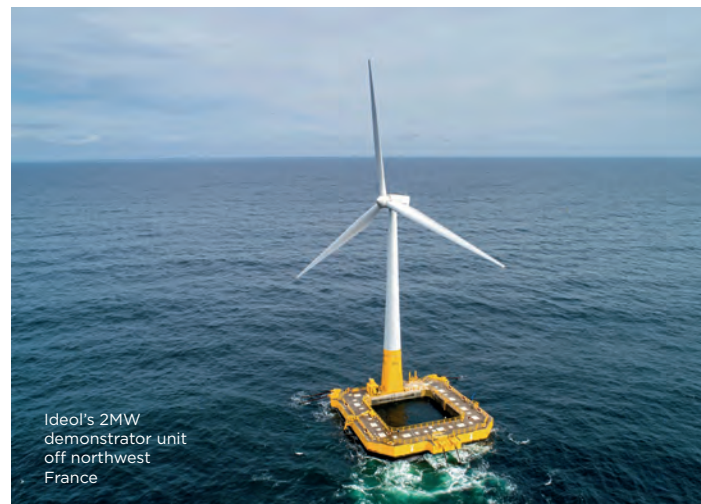
report is arguably the most comprehensive to date, as it is based on the World Bank's latest Global Wind Atlas (GWS) which

used high-resolution "Geographic Information System" analysis to scope out the far offshore waters of the eight countries.

"In the last edition of the GWS we went 30km offshore; with this latest one, we went 200km out. It gives you a much clearer idea of the big picture potential of offshore wind — and often particular floating — for many countries that wouldn't be immediately thought of as 'offshore wind' countries," Knight tells *Recharge*.

"Many of the countries we looked at have been building their solar capacity as fast as they can but really they are focused on how they are going to meet the growth in their energy demand, which can be going up in double-digits every year. Offshore wind is increasingly being seen as key to filling that gap."

Offshore wind's fit applies across



Ideol's 2MW demonstrator unit off northwest France



the range of seascapes, with India, Sri Lanka and Turkey having significant bottom-fixed offshore wind potential in shallower

These countries see offshore wind as increasingly economically viable and they are beginning to fit that into their long-term energy plans

waters, and others, including the Philippines and South Africa, that would be reliant on floating foundations to develop projects in depths down to 1,000 meters.

“Feasibility work, in the

broadest sense, is what are aiming to do with these countries,” says Whittaker. “That ranges from wind resource to grid integration but also [includes] environmental and social considerations, one of the main aspects of which is the economic development potential that offshore wind brings.”

Knight

continues: “This came out really strongly in our discussions with [the different countries’] delegations: ‘How can this benefit us on a sub-national level, in our industrial supply chain, how can

we use offshore wind to create jobs?’

“Many of these countries have declining offshore oil sectors and it is clear there is an interest in exploring possible skills transfer and industrial diversification and transitioning, as part of this.”

Tantalising as it is, development of an offshore wind industry – in any country – will not be a quick or easy process, Whittaker notes. “All the pieces will have to come together – you can have the greatest wind resource but if you no logistics, or a weak supply chain, it won’t work.”

The report underlines that countries looking to adopt offshore wind as a mainstream energy supply would need a “big picture” approach to grid and port infrastructure, using “innovative approaches” to financing, setting up stable policy frameworks, and cooperating on sensible supply chain development.

Regional cooperation is seen as being “key” to achieving the greatest economies of scale that could be generated by offshore wind in these six countries.

On the power production side, it is foreseen that offshore wind could spur market-making economies of scale by building multi-gigawatt complexes in the sea, but as few nations have a need of all of this volume of power, dividing financing and project development costs as well as the energy supply once a wind farm is online, would be “eminently” sensible, says Whittaker.

“Floating wind is particularly interesting in this context. The idea that these economies of scale are possible to get the [levelised cost of energy] prices to drop, and then the power production could



Sean Whittaker

be partitioned off to meet the electricity demand of individual countries.

“Cooperation down the supply chain within a regional market will be very important too, to make sure it develops where it should, where it most economic,” says Whittaker.

Knight adds: “That is one the big lessons that has come out of the European offshore wind industry: ‘You’ve got to work together. No one country can do it on its own. We are trying to reinforce that here is a case where the sum will



Oliver Knight.

be greater than its parts.”

Whittaker sees much of the progress coming from the cross-pollination of neighbouring markets as they evolve. “A lot of the learnings to come will come from between these emerging markets, because much of what is going to develop simply will not look like it does in Europe – ultra-deep water and typhoons, seismic activity, for instance, something Asian nations share but the Germany and France do not.”

The World Bank and IFC is currently working on a handbook for emerging offshore wind markets designed to give best practice guidance on “structuring every aspect of their [offshore wind] industries from the ground up”.

“In the final analysis, floating wind’s potential is still just that right now. We have the first deployments and soon first commercial-scale arrays, but we have so far to go to really get to — in the case of our report countries — get that 2TW of power,” says Whittaker. “But this is another opportunity too, because floating needs to work in emerging markets [as well as in Europe] to fulfil its global promise, [it has] a massive potential to unlock.”

Ørsted targets 1.9GW of Taiwan offshore wind by 2025

BERND RADOWITZ

Global offshore wind leader Ørsted has revealed plans to complete 1.9GW of generation capacity off Taiwan by 2025.

Ørsted is currently building the 900MW Greater Changhua 1 & 2a project, which it expects to commission in 2022. The Danish utility has also been awarded an additional 920MW for the nearby Greater Changhua 2b & 4 project, which, subject to a final investment decision, is expected to be completed in 2025.

Ørsted has just inaugurated the 120MW phase two of the Formosa 1 offshore wind farm (pictured right).

Earlier this year, Ørsted was engaged in a months-long standoff with Taiwan's government over support levels and at some point had declared all its offshore wind plans off the island on hold.

Only after the government in Taipei met the wind industry halfway in a revision of previously agreed upon feed-in tariffs, the company took an investment decision for Greater Changhua 1 and 2a, which will be the first supersized offshore array Ørsted is building in Asia.

Taiwan's Ministry of Economic Affairs after the tariff row has increased pressure on offshore wind developers once more, warning foreign developers that they could be replaced by "second-tier candidates" if they fail to fulfil localisation targets set by the ministry. ☐



Ørsted's offshore wind boss, Martin Neubert



The recently completed Formosa 1 offshore wind farm

Taiwan doubles post-2025 offshore ambition to 10GW

YUKI YU

Taiwan doubled its previous stated plans for the next stage of its offshore wind build-out with a goal to add 10GW of extra capacity from 2026 to 2035.

Taiwan's President Tsai Ing-wen and its Ministry of Economic Affairs (MOEA) this month unveiled a new target for development in the Taiwan strait. The island had only previously laid down ambitions for 5GW after 2025 without specifying a timeframe.

The President made the announcement during her speech at the inauguration ceremony for the island's first offshore wind project, Formosa 1. She urged the MOEA to quickly establish a plan for the "10GW capacity for the next 10 years".

Later, minister of economic affairs Shen Jong-Chin confirmed the figure, adding that the ministry is planning to allocate 1GW per year for the 10GW goal.

The detailed plan of allocation

measures will be released "in the first quarter next year", the minister said.

"The bidding prices of the 10GW projects are likely to lower than the average retail power



President Tsai Ing-wen

rate," MOEA said in a statement.

"Already getting a head start" among Asian countries for offshore wind development, Taiwan "should continue moving forward and plan in advance," the statement added.

Last year Taiwan held two rounds of offshore wind allocation

to award seven companies a total 5.5GW capacity for its initial stage of large-scale development between 2019-25. However, the island had yet to make clear the post-2025 roadmap and the rules for its "third-round" offshore project allocation.

In September, the MOEA announced it would postpone the release of a first draft of the allocation plan from the end of August to "early next year" due to various disagreements among project developers and the supply chain over allocation rules and localisation requirements, *Recharge* previously reported.

Shen today revealed that the energy regulator is considering a two-step selection process, in which the ministry would first pick eligible developers based on their localisation commitments, followed by price-competitive auctions.

Offshore wind has become a live issue in the run-up to Taiwan's next presidential election in January, with Tsai more ambitious than her rival over wind at sea. ☐



Senvion 6.2MW turbine leaves Bremerhaven factory

Last nacelle rolls out of Senvion's closing-down Bremerhaven plant

DARIUS SNieckus

The last of 32 turbines for the 200MW Trianel Windpark Borkum 2 project off Germany has rolled out of Senvion's Bremerhaven plant, with the factory now set to be closed as the failed OEM moves into administration.

The 6.2MW Senvion 6.2M152s — once the most powerful offshore models in the world before being out-scaled by Siemens Gamesa, MHI Vestas and GE's 8-12MW machines, as well as number of ultra-large Chinese

designs — will be installed in a water depths of 25-35 meters at the North Sea project.

"Production Bremerhaven has delivered the last offshore turbine of the Trianel [Windpark Borkum II] project. It is the last turbine delivered from Bremerhaven before the doors close after 11 years of great work," said Benjamin Schmidt, vice-president of production at the Bremerhaven facility, in a LinkedIn post. "I am proud to say that this was a great performance by the team, although the times are very difficult. I am very proud of the team and wish

all colleagues and employees all the best for the future."

In April, Senvion filed for "preliminary self-administration proceedings" under German insolvency legislation after talks with lenders failed.

Siemens Gamesa in October agreed a €200m (\$225m) deal to buy 8.9GW of Senvion's European onshore service business along with its blade factory in Portugal.

Trianel Windpark Borkum 2, owned by 33 municipal utilities and regional energy suppliers, is expected to be commissioned by the end of this year. ☐

Equinor links with ESB for offshore wind in Ireland

ANDREW LEE

Norwegian energy group Equinor will link with Irish state-owned utility ESB to advance offshore wind projects off Ireland, the companies have revealed.

The partnership aims to get large-scale projects up and running by 2030, they added.

Equinor is already a major player in the UK offshore wind sector, where it has several large fixed-bottom projects in the water off eastern England and is advancing the 3.6GW Dogger Bank mega-development with SSE.

The Norwegian group is also a pioneer in floating wind technology, which is tipped to have a role in Ireland's ambitions to build at least 3.5GW of capacity in the next decade, with renewables delivering 70% of power by then.

ESB chief executive Pat O'Doherty told *Recharge* earlier this year that floating projects have potential in the deeper waters off Ireland's west coast.

The Irish group said of the Equinor link: "Equinor's scale and capabilities make them an ideal long-term partner. [This] announcement represents a significant commitment by ESB in offshore wind in Ireland."

The Irish government last year laid the ground for future offshore wind tendering via its Renewable Energy Support Scheme. ☐

Johnny Thomsen named co-CEO of MHI Vestas

DARIUS SNieckus

Vestas veteran Johnny Thomsen has been named co-CEO of offshore wind turbine-maker MHI Vestas, replacing Lars Bondo Krogsgaard, who has resigned the post after a year to "explore other opportunities".

Thomsen, who comes in to new role after 15 years at the Danish OEM, most recently as senior vice-president of product management, has been in the wind industry for more than two

decades, including with sector pioneer NEG Micon.

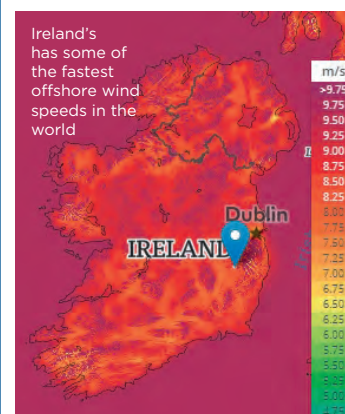
"Johnny combines substantial understanding and experience



of the MHI Vestas platform with business acumen," said chairman of the MHI Vestas board Anders Runevad, who recently stepped down from the chief executive role at Vestas.

Runevad said he "regretted but respected" Krogsgaard's decision to step down and thanked him for having "played an important role in the company and [being] instrumental in expanding our business to Asia and the US".

Philippe Kavafyan remains chief executive of MHI Vestas. ☐



Photography | Senvion | MHI Vestas | Global Wind Atlas

RICHARD A KESSLER

New Jersey governor Phil Murphy has signed an executive order raising the US state's offshore wind procurement goal from 3.5GW by 2030 to 7.5GW by 2035, setting the stage for heated competition in the US Northeast for billions of dollars in future supply-chain investment.

New York leads the nation with a 9GW offshore wind target by 2035, while Connecticut launched its first 2GW of offshore wind request for proposals in August.

"We have an immense opportunity to maximise our potential and make this region — and, specifically New Jersey — the nexus of the global offshore wind industry," said Murphy.

New Jersey's new target will deliver enough power to enable it to meet as much as half of the state's 50% renewable-energy goal by 2030 and a 100% clean-energy economy by 2050, Murphy said.

"There is no other renewable energy resource that provides us with either the electric generation or economic growth potential of offshore wind," he said, forecasting that 7.5GW of offshore wind capacity will power more than 3.2 million homes and generate billions of dollars in investments.

In June, the state's Board of Public Utilities (BPU) awarded Ørsted a contract for an initial 1.1GW at the Danish developer's Ocean Wind offshore project, and proposed a timeline to consider two future 1.2GW solicitations in



New Jersey Governor Phil Murphy

New Jersey doubles 2035 offshore wind goal to 7.5GW

2020 and 2022.

Ocean Wind, which will be located about 24km off Atlantic City, offered a first-year offshore wind energy credit (OREC) price of \$98.10/MWh. Income from the remaining contract tenor was not made public.

The levelised net OREC cost is estimated at \$46.46/MWh over the contract life.

Public Service Enterprise Group, which owns the state's dominant power utility and will build the project's onshore transmission infrastructure, has an option to acquire a 25% equity interest.

Ørsted anticipates it will need up to two years to have all the permits in place, with the 90 GE Haliade-X 12MW turbines spinning by 2024. Ocean Wind

is eligible for a 12% federal investment tax credit.

The present three wind energy areas off New Jersey — under lease to Ørsted, Atlantic Shores (the Shell-EDF joint venture) and Equinor — do not have the project pipeline capacity to meet the new offshore goal, meaning that additional lease areas will be necessary. ☐

Mitsubishi beats Shell in deal for \$4.5bn renewables player Eneco

ANDREW LEE

A Mitsubishi Corporation-led partnership has struck a deal to buy Dutch utility and offshore wind player Eneco, strengthening the Japanese giant's position in European renewables and fighting off competition from oil giant Shell.

Mitsubishi will buy Eneco in an 80/20 consortium with fellow Japanese group Chubu in a deal that values the utility at €4.1bn (\$4.5bn), saying the

Dutch company will become "the European centre for all energy-related activities of Mitsubishi Corporation".

The acquisition — which still requires shareholder approval — will see Mitsubishi transfer its European offshore wind interests, totaling more than 400MW, to Eneco. The Japanese group's forays in Europe so far include the Borssele 3 & 4 Dutch offshore wind project as a minority shareholder with both Eneco itself and Shell, which was also

interested in the utility.

Eneco, the Netherlands' largest utility, already owns 427MW of offshore wind, along with almost

1.7GW of onshore turbines and 300MW of solar. It is seen as one of Europe's most forward-thinking groups in areas such as EVs and energy storage.

Eneco's board said it was attracted by Mitsubishi's plans to leave the Eneco brand and culture intact. The utility was put up for sale in late 2018, with private equity group KKR also said to be interested.

Mitsubishi Heavy Industries is half owner of offshore turbine maker MHI Vestas. ☐



Eneco's headquarters in Rotterdam

BERND RADOWITZ

Chinese efforts to reduce offshore wind costs will “open up more space for international involvement”, according to Fitch Solutions.

The analyst expects China to become the global offshore wind power front runner over the coming decade, with the country for the first time installing more capacity last year than previous market leaders Germany or the UK.

“In line with rapidly falling offshore wind power costs in Western Europe and the rising competitiveness of the technology in markets such as the US and Taiwan, we expect China to substantially boost offshore wind power capacity over the coming decade.

“This will be the result of efforts to decarbonise power supplies closer to coastal consumption hubs and boost Chinese technological expertise with the aim to eventually export technology.”

As an example of international involvement in the Chinese offshore market, Fitch cites Danish company Ramboll, which has played a key role in designing offshore wind farms for State Power Investment Corporation since 2016, culminating in the company designing the world’s



China State Construction unloads an offshore wind tower in Nanjing

Cost falls will ‘open space’ in Chinese offshore for global firms

biggest and heaviest monopiles for the developer’s Guangdong Offshore Wind Power project in 2019.

The researchers expect the downwards pressure on offshore wind prices in China to continue,

and highlight Longyuan’s recent \$88 (€80) per MWh bid for the 200MW Fengxian Phase 1 project in Hangzhou Bay off Shanghai, which came in well below the average of \$105-110/MWh of the bids by its contenders.

Chinese turbine makers have been pushing hard to increase turbine capacity and thus reduce the levelised cost of energy, with Dongfang and CSIC Haizhuang recently unveiling 10MW machines. ☐

Call for tough local-content rules for Australia’s nascent offshore sector

ANDREW LEE

Australian trade unions have urged the country’s government to put tough local-content rules in place for its first big offshore wind project, as they backed renewables to offset declines in the country’s oil & gas and shipping sectors.

A clutch of labour groups focused on the planned first Australian offshore wind farm — the 2.2GW Star of the South off the state of Victoria — as they called for measures “to ensure workers and communities currently reliant on fossil fuels weren’t thrown on the scrap heap”.

Union leaders want Australia’s states and the national government to create an

overarching Offshore Renewables Act to underpin development off the nation’s coasts, while “ensuring renewable energy financing, targets, contracts, licensing and approvals require the maximising of local jobs, including planning for direct

redeployment of workers from fossil-fuel industries”.

Local-content requirements are rapidly emerging as a key issue for the offshore wind sector as it expands into new markets around the world, balancing the need for governments to show

local industrial benefits with the chilling effect on cost reductions of unnecessarily fragmented supply chains.

Taiwan — one of the world’s hottest new markets — is a case in point, with politicians there piling the pressure on developers and the supply chain to commit to local investments, while the UK has also seen controversy over major offshore wind contracts going abroad.

Technical and environmental investigations at the Star of the South site — backed by investor Copenhagen Infrastructure Partners — began earlier this month after the project got an exploration licence from the Australian government this year. ☐

The 2.2GW offshore project Star of the South would feed power to Melbourne



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