

# Wind

## EUROPE

# OFFSHORE

## 2019

26-28 NOVEMBER  
COPENHAGEN

**DAY  
THREE**



Vattenfall wind boss Gunnar Groebler (left) and SGRE offshore wind chief executive Andreas Nauen at the signing ceremony at WindEurope Offshore yesterday

## Siemens Gamesa's 11MW turbine set for 1.5GW zero-subsidy project

**BERND RADOWITZ**

Vattenfall will use 140 of Siemens Gamesa's new 11MW SG11.0 193 DD Flex offshore wind turbines for the Hollandse Kust South 1-4 projects off the Netherlands, the two companies said at WindEurope Offshore yesterday.

The zero-subsidy projects, totalling more than 1.5GW, are Vattenfall's largest offshore wind development.

"By deploying one of the largest and most efficient turbines ever for the first subsidy-free offshore wind farm to date, Vattenfall is underlining its position as a leader in the

offshore wind industry," said Gunnar Groebler, senior vice-president and head of the wind business area at Vattenfall.

The order is still conditional on a final investment decision — soon to be taken after final approval from the Dutch authorities, which is necessary due to the switch to the 11MW model.

Siemens Gamesa was already the preferred supplier for the projects, but Vattenfall previously had announced it would use 76 of the OEM's 10MW model at Hollandse Kust South 1 & 2, and a further 76 of the machines at Hollandse Kust 3 & 4.

The switch to the larger turbine model — which *Recharge* revealed exclusively on Tuesday — will reduce installation, operations and maintenance costs, and thereby contribute to further lower the project's levelised cost of energy.

"The newest version of our largest offshore direct-drive machine is now setting the benchmark for turbines in subsidy-free offshore wind power projects," said Siemens Gamesa offshore wind chief executive Andreas Nauen.

Vattenfall plans to install the Hollandse Kust South projects in 2022, and expects them to be fully operational in 2023. ☐

## Offshore wind 'needs to be grown up about merchant power'

**ANDREW LEE**

The offshore wind industry needs to have a "grown up conversation" about the "inevitable" shift towards merchant sale of power from its projects, said a top executive from one of the sector's biggest backers.

Ed Northam, Europe head for the Macquarie-owned Green Investment Group (GIG), told WindEurope Offshore yesterday that the industry's direction of travel is towards a greater share of merchant sales in future revenue streams.

"I spend a large amount of time thinking about how we're going to finance and support projects in what it is inevitably becoming much more of a merchant model," Northam told a panel discussion on future industry financing.

While continued subsidy support "would of course be useful", Northam said: "The simple facts are, anything that looks or feels like a subsidy will increasingly be politically unsustainable."

The GIG executive said even where support models remain, they are attached to auctions, with the commercial rewards driven down by competition.

"We're going to have to have a grown-up conversation with ourselves as market participants" over merchant exposure, added Northam, who said the European industry's big strides in

*CONTINUED on Page 4*

**VISIT RECHARGE**  
at Stand **E-D20**

## BERND RADOWITZ

Western turbine makers could have more success in the Chinese offshore sector than onshore because of the greater reliability of their turbines, MHI Vestas chief executive Philippe Kavafyan tells *Recharge*.

Onshore wind tenders in China usually have the cost of the turbine as the determining factor, rather than the cost of energy, as is the norm in the West — encouraging developers to install cheap turbines and then fix them when required. Such a strategy will not work in offshore wind, he explained at WindEurope Offshore yesterday.

“The emphasis of [offshore] developers in China will be to secure reliable technology upfront,” he said. “It is easy to fix a machine onshore. But if you start having to fix technology that is not robust offshore... well, I hope you don’t have to sail too far.”

China’s preference for domestic turbines that have a shorter track record offshore may hold back the sector in the short term, Kavafyan added.

He also said that only part of the 40GW-plus of offshore projects vying to be completed by the end-2021 feed-in tariff deadline are likely to be built in time.



## MHI Vestas boss: Western OEMs should have an advantage in Chinese offshore

“This idea that [the Chinese market] is 40GW and it will outpace the UK [in offshore wind capacity], I am very sceptical about that.

“The UK is increasing its targets, and that’s a place where we can deliver more, and we know how

to deliver very cost effectively.

“Saying the UK is not going to stay [as] the first market in the world, in my view, is a very strong extrapolation.

“People are talking about China, but there is much more to do in the UK and over in Europe than

we have to do in China.”

MHI Vestas so far is not present in China, but Kavafyan said: “There is no reason that five years from now, we don’t see one [MHI Vestas turbine] in Chinese waters. We don’t plan to stay out of China forever.” ☐

## New no-legs crane vessel to install supersize turbine foundations

## DARIUS SNIICKUS

Dutch contractor Jan De Nul has moved ahead with plans to build a new supersize floating crane vessel, *Les Alizés*, in its second major investment in an offshore wind installation unit in the past six months. Announcement of the new vessel, which follows the decision to construct the giant *Voltaire* jack-up — to be used at the UK’s 3.6GW Dogger Bank complex, will be built by China Merchants Industry Holdings’ shipyard in Haimen, China, for launch in 2022.

Named after the French word for “trade winds”, *Les Alizés* will have a 5,000-tonne lifting capacity and 9,300-square-metre

deck able to handle 61,000-tonne cargo loads, making it well-suited to transporting batches of the heavier jacket foundations needed

for the coming generation of ultra-large wind turbines.

“By ordering *Les Alizés* today, from 2022 we will have not one,



A computer rendering of Jan de Nul's *Les Alizés*.

but two offshore installation vessels that will be able to install the newest generation of offshore wind farms,” said Philippe Hutse, Jan De Nul’s offshore director, adding that “similar to the *Voltaire*, we have financed this investment by means of a green loan thanks to the green emissions reduction technology on board the vessel”.

Peter De Pooter, the company’s manager for offshore renewables added: “The order of the *Voltaire* was a first step in our strategy to install the newest generation of offshore wind turbines. With *Les Alizés* we want to further strengthen our vision and our belief in the future of offshore wind energy.” ☐



# First offshore wind to be installed in Korea in 3-5 years: SGRE

**BERND RADOWITZ**

Siemens Gamesa is in talks with developers in South Korea, and expects to see the industry's first projects in the country's waters within the next three to five years, a senior executive told *Recharge at WindEurope Offshore* yesterday. "We are in dialogues with different developers in Korea. So we are actively monitoring the market," said Kasper Yttesen, senior vice-president for offshore strategy and regional development. "We have the same situation as with Taiwan. Korea is similar in its needs of energy, and has a very high dependency on gas and nuclear. Both want to be

independent of that."

South Korea has said it aims to develop 13GW of offshore wind by 2030 to drive toward a target of having at least 30% renewable energy in its national mix by 2040.

Unfortunately, winds off South Korea are not as strong as, for example, in the Taiwan Strait, where they can reach 9.5 to 10 metres per second (m/s) — similar to wind speeds in the North Sea in Europe — Yttesen said.

"Wind speeds are around 6-7 m/s off Korea," he explained. "And you also have some soil conditions that are not that suited for fixed foundations. That creates some challenges."



Siemens Gamesa  
senior vice-  
president Kasper  
Yttesen

To compensate for the more difficult conditions, South Korea offers future offshore wind operators higher feed-in tariffs than those granted by Taiwan, he added. "That is also needed to have a business case that flies."

Siemens Gamesa already has more than 2GW of offshore turbine orders in Taiwan, and also sees Japan as one of the coming offshore wind markets, where

Yttesen said first projects may be awarded in about a year's time.

"We expect a tender coming up early next year. And then, I guess it takes six to eight months for the processing of that. Maybe, within a year's time, it would be fantastic to see the first big commercial projects being awarded in Japan."

Japan's upcoming offshore wind tender could be "in the magnitude of" 500MW and 1GW, he said. □

Photograph | Siemens Gamesa

ADVERTISEMENT

## Roxtec presents sealing solutions at WindEurope Offshore in Copenhagen



Roxtec cable and pipe transits ensure safety and operational reliability in offshore wind farms worldwide.

100 applications. Roxtec seals enable high cable density management in control cabinets and electrical enclosures and provide protection against fire, gas, water and vibration in offshore substations and offshore foundations.

The company also offers market leading sealing solutions that protect sensitive equipment against electromagnetic threats.

### Simplifies maintenance and extends project lifetime.

Owners, operators and contractors select Roxtec seals also for other reasons. The seals are quick and easy to install, adaptable to cables of different sizes and openable to provide spare capacity for additional cables.

Thereby they meet requirements for weather window maintenance and upgrades without any need for spare parts or special tools, and help extending the project lifecycle in line with sustainability goals. The seals are area efficient in comparison to traditional cable glands and have excellent cable retention capability. Sealing selection made easy by free transit design tool — Roxtec Transit Designer™.

### Roxtec acts as partner, from early planning through to commissioning.

At WindEurope Offshore, it is for example possible to explore the Roxtec Transit Designer™.

It is a free, online design tool that helps more than 20,000 engineers' worldwide select seals, save time and reduce risk.



Roxtec R transit

### About Roxtec and Multidiameter™

Swedish Roxtec Group is the world-leading provider of modular-based cable and pipe seals for certified protection against multiple risks.

The company's invention for adaptability to cables and pipes of different sizes, Multidiameter™, is based on sealing modules with removable rubber layers and allows for a perfect sealing, regardless of the outside dimension of the cable or pipe. The technology simplifies design, speeds up installation and reduces the need for stock, material and logistics. It also provides spare capacity for upgrades. Roxtec serves and supports customers in more than 80 markets through subsidiaries and distributors.

For more information please visit [www.roxtec.com](http://www.roxtec.com) or [www.roxtec.com/dk](http://www.roxtec.com/dk)



**Visitors are welcome to booth C2-C14, Hall C, at Bella Center in Copenhagen during WindEurope Offshore, November 26-28, 2019.**

**For more information, please contact:**

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**C**able and pipe transit manufacturer Roxtec has more than 20 years of experience providing leading actors in the offshore wind industry with an all in one solution for cable entry sealing, cable management and vibration damping.

At WindEurope Offshore 2019 in Copenhagen, Denmark, November 26 – 28. Roxtec experts from 14 countries will explain why and how their innovative penetration seals can secure so many wind farms around the world. Roxtec is the world-leading provider of seals and sealing related services, from design through to onsite technical support, for the entire green power industry.

The company has built extensive knowledge over the years and now offers certified and flexible cable sealing solutions for more than

## Polish offshore developer eyes green hydrogen

**BERND RADOWITZ**

PKN Orlen, one of Poland's offshore wind developers, is considering producing green hydrogen once its projects are up and running, Jarosław Dybowski, executive director for energy at the state-owned oil refiner and petrol retailer said.

"We think that hydrogen is the future, not only of energy, but also the future of mobility," he told WindEurope Offshore yesterday.

"Today, PKN Orlen produces about 30 tonnes of hydrogen per hour, just for our processes. I would like to see our offshore farms also be used for the production of hydrogen during the time when energy is cheap, or when we are producing surplus energy."

PKN Orlen in September signed a letter of intent with Polish state-controlled utility PGE to cooperate in the development of their combined 3.7GW of offshore wind projects in the Baltic Sea. ☐

## Inevitable rise of merchant power

*FROM Front Page*  
competitiveness, and track records of delivering projects on time and on budget, will in any case help it build confidence among investors.

The role of merchant power sales is a live issue in the industry, with the availability of support diminishing, and the emergence of projects won on a zero-subsidy basis in countries such as the Netherlands and Germany.

In the world's largest offshore wind market, the UK, developers are openly exploring merchant sales as part of the revenue mix of large projects, possibly in conjunction with corporate power-purchase agreements or government-backed contract-for-difference (CfD) deals. ☐



Outgoing Polish energy minister Krzysztof Tchórzewski

## Concern as Poland reveals plan to cut 2040 offshore wind target

**BERND RADOWITZ**

The offshore wind sector is worried Poland's government may waver on its previous offshore wind ambition after the outgoing energy minister, Krzysztof Tchórzewski, released a new draft of the country's energy strategy that lowers Poland's 2040 offshore wind target from 10.3GW to 8GW.

"We are a bit concerned as [an] industry that the last version of the Polish energy policy is not increasing the capacity, but is [instead] lowering it a bit," Janusz Gajowiecki, president of the Polish Wind Energy Association (PWEA), said at WindEurope Offshore yesterday.

With an offshore wind potential of some 28GW by 2050 in Polish waters, according to WindEurope, the country should

have ambitious plans in order to become a leader in offshore wind, he added. Polish offshore wind executives at the conference were appalled by the planned downscaling of the offshore target.

"Was I disappointed, or even angry at the publication [of

### // I was angry enough to cancel some meetings

the new draft]? I actually was angry enough to cancel some meetings when I learned about it," said Monika Morawiecka, chief executive of PGE Baltica, a subsidiary of Polish state-owned utility PGE, which is in talks with Ørsted to sell half of its 2.5GW Elektrownia Wiatrowa Baltica 2 and 3 projects.

But Morawiecka stressed that

even a scaled-down 8GW goal is still a significant amount.

"It is about us investors delivering the first few projects on time, on budget, cost-efficiently, to really show and demonstrate that we can do it in Poland."

PWEA will cooperate with governmental bodies and with the help of its member companies to try to convince the incoming government — which will be run by the already ruling populist Law and

Justice Party following the recent election — to increase the future capacity of offshore wind again, Gajowiecki said.

A final draft of the country's energy strategy is slated to be published in two or three weeks, followed by three or four months of public consultations and parliamentary votes, he estimated. ☐



## CHRISTOPHER HOPSON

The UK could launch a review into the onshore impact of offshore wind farms in the east of England, after local Members of Parliament (MPs) backed the idea of an “offshore ring main” as an alternative to multiple power links and called for a freeze on planning while the matter is settled, *Recharge* has learned.

Andrea Leadsom, secretary of state for business, energy and industrial strategy under the current Conservative government, has promised a group of local Norfolk and Suffolk MPs to look at the environmental impact of onshore infrastructure if her party wins the general election on 12 December.

George Freeman, MP for Mid-Norfolk, confirmed he has secured such a commitment from Leadsom.

“We hope this development will call into question whether ScottishPower Renewables (SPR) onshore planning applications can proceed in the light of an expected review,” he said.

Iberdrola-owned SPR is developing the 3.1GW East Anglia Hub offshore wind project off eastern England, which it expects to complete by 2026.

Instead of multiple connections making landfall, the MPs claim future planning should be based around a “ring main” approach



# UK could freeze offshore planning to consider ‘ring-main’ power link

where wind farms connect at sea, with a single link bringing power ashore.

Freeman claimed that SPR’s onshore infrastructure would set the precedent for more of the same along the Suffolk coast.

“A review has to look at National Grid’s effectiveness as network operator. They provide the grid connection offers, are the

main contributing factor directing these projects and associated onshore infrastructure to specific areas in Norfolk and Suffolk.”

Jonathan Cole, managing director for Iberdrola’s global offshore wind business, told *Recharge* that a strategically planned offshore grid link “makes a huge amount of sense” due to synergies that would reduce the

overall cost of individual projects.

“However to do this would involve changing the regulatory process that currently exists, and would involve multiple stakeholders in order to achieve something which would take several years to implement,” he said, adding that the East Anglia projects should not be disrupted in the meantime. ☐

## First tests of new-look Saitec floater due off Spain ‘in early 2020’

### DARIUS SNIECKUS

Spanish floating wind pioneer Saitec’s plans to develop a 10MW version of its innovative BlueSATH concept have moved ahead with confirmation that a “medium-scale” prototype will be installed off northeast Spain early next year for trials.

The 2MW 1:6 demonstrator — based on a design using joined cylindrical pre-stressed concrete hulls anchored to the seabed via a single-point mooring system that allows the unit to ‘weathervane’ to face the wind — will undergo a 12-month testing programme

version in the Cantabrian Sea off Santander.

“The BlueSATH project [is] an important stepping stone to the ultimate goal of providing a bankable solution for the upcoming commercial floating wind farms,” Saitec chief technology officer David Carrascosa told *Recharge*.

“The main objectives of [the] BlueSATH project cover SATH platform validation of its response and dynamic behavior. The aim is to obtain models that allow for structural optimisation, enabling cost reduction and validating structural turbine integrity.

“Additionally, the variables which better predict damage on different structure elements would be identified so the structural



A computer rendering of Saitec's BlueSath floating wind unit

lifecycle can be appropriately forecasted through a series of sensors.

Learnings from the demonstrator will be used to improve the 10MW floater, to be installed on the Basque Marine Energy Platform in 2021.

Analysts range widely in their 2030 forecasts for floating wind, with estimates spreading from 6GW to almost 19GW, all influenced by how quickly levelised cost of energy can be brought down to below €50/MWh (\$55/MWh) — perceived as the benchmark for competitiveness with conventional offshore wind. ☐

## The second coming of Aqua Ventus, a US floating first

**DARIUS SNECKUS**

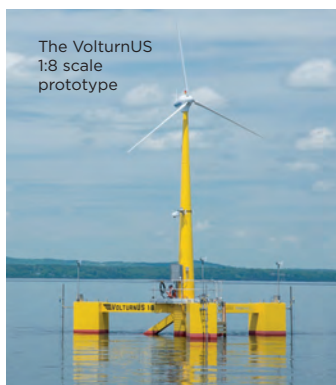
The first US floating wind project, the New England Aqua Ventus 1 pilot off Maine, almost sank without a trace after anti-renewables former governor Paul LePage spiked an agreed power-purchase agreement (PPA) for the 12MW development.

But with the political tide having turned in the Northeast state, the reborn University of Maine-led demonstrator is now fast taking shape, with expectations it will be in the water and turning before 2023 — clearing a path for a 100MW array to follow.

Last month's sign-off of a 20-year PPA by Maine's Public Utilities Commission (PUC) ended long-running uncertainties for a floating wind technology that had already been tested as a grid-connected part-scale prototype offshore in 2013-14.

"Aqua Ventus would have been built by now if for the PPA had been issued as anticipated," said Habib Dagher, executive director of the UMaine Composites Center, the driving force behind the project.

"We will be hoping now to get back as close as possible to the original project schedule", he told *Recharge*, adding that construction of the flagship unit is now targeted for 2021-22 and "hardware in the water a year or so after that". The original 6MW turbines are now due to be replaced by 10-12MW models. ☐



The VoltturnUS  
1:8 scale  
prototype

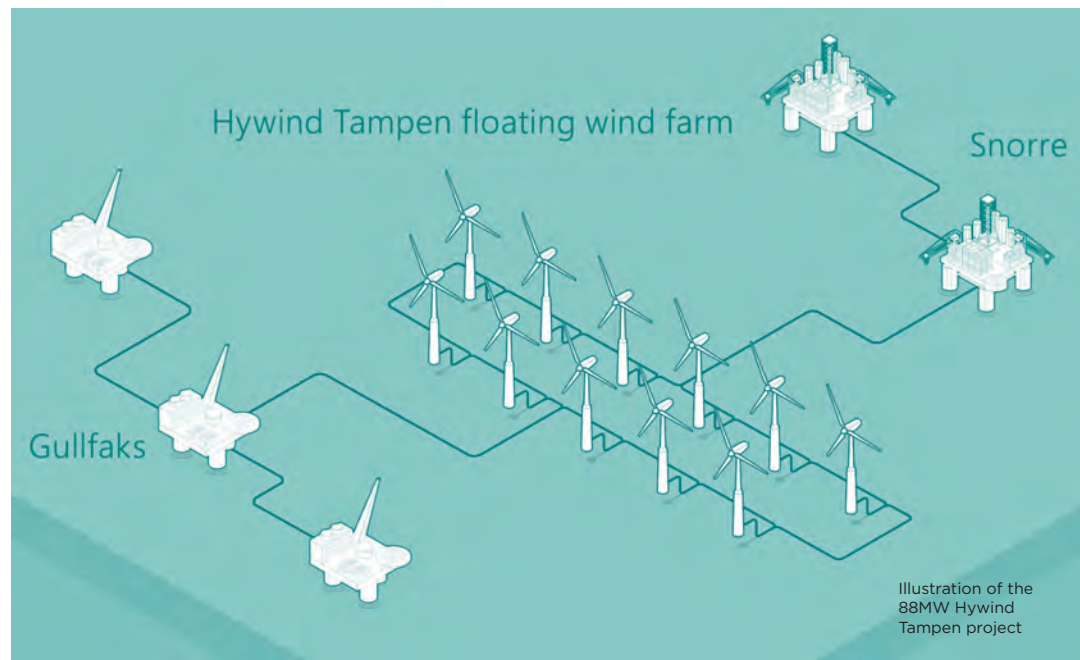


Illustration of the  
88MW Hywind  
Tampen project

## Siemens Gamesa wins order for Hywind Tampen floating project

**CHRISTOPHER HOPSON**

Siemens Gamesa will supply 8MW turbines to a landmark 88MW floating wind farm that is set to part-power five oil & gas platforms off Norway.

The contract led off five major deals worth a total of about Nkr3.3bn (€327m) signed by Norwegian energy giant Equinor for its Hywind Tampen project, which will supply about 35% of the electricity used at the Gullfaks and Snorre offshore oil & gas fields near Bergen.

The platforms currently get all their power from on-site gas turbines, and Equinor expects Tampen to reduce their carbon emissions by 200,000 tonnes per year.

Key project contracts were also signed with construction firm Kvaerner, cable supplier JDR and underwater services provider Subsea 7.

"The signing of five major contracts is a key milestone in realising the Hywind Tampen pioneer project," said Equinor's executive vice president for technology, projects & drilling Anders Opedal.

"Won in international competition, the contracts prove

that the oil and gas industry is also competitive for renewables projects. The awarded contracts will generate considerable spin-offs in Norway."

The 11 SG8.0-167DD turbines will be built at several European locations before transportation to the Gulen industrial harbour for final assembly, with the floating project due to be completed in the



Anders  
Opedal

autumn of 2022.

The turbines' floating concrete substructures will be designed, constructed and installed by Kvaerner under the Nkr1.5bn contract, which will also see the company performing the tow-out and installation of the completed turbines atop the foundations.

"The Hywind Tampen project paves the way for more wind

power farms both in Norway and internationally," said Kvaerner president and chief executive Karl-Petter Loken. "Today's new contract is a very important step in [our] strategy to grow within the renewables business, in addition to our existing business within oil & gas."

Construction of the concrete hulls will begin at a drydock at Kvaerner's specialised yard at Stord, with completion at its Dommersnes site.

The electrical cables will be delivered by JDR and fabricated at Hartlepool in the UK. Subsea 7 will be responsible for installation of cables and connection to the Snorre and Gullfaks platforms.

The final Hywind Tampen investment is expected to be close to Nkr5bn (\$575m). All contracts are subject to final approval of the plan for development and operation by the Norwegian authorities.

The Gullfaks field is co-owned by Equinor (51%) Petoro AS (30%) and OMV (19%), while Snorre is co-owned by Equinor (33.3%), Petoro (30%), ExxonMobil E&P Norway (17.5%), Idemitsu Petroleum Norge (9.6%), DEA Norge (8.6%), and (Var Energi 1.1%). ☐



## RICHARD A KESSLER

Italian-owned developer US Wind is confident of advancing its Marwind project off Maryland, despite objections over its plans to use turbines of up to 12MW and wider delays in the market caused by the federal government's review of Vineyard Wind.

US Wind, a unit of Italian group Renexia, expects to lodge a Construction and Operations Plan (COP) for 1.3GW with the federal Bureau of Ocean Energy Management (BOEM) in the first quarter of next year, country manager Salvo Vitale told *Recharge*.

US Wind plans to develop Marwind in a zone east of Ocean City, starting with an initial 248MW phase that has already been awarded Offshore Renewable Energy Credits (ORECs) by Maryland at a price of \$131.94/MWh over 20 years.

Current plans envisage a 2023 commercial start for the \$1.5-1.6bn first stage.

Vitale said he expects BOEM will accept its COP — which encompasses all issues relating to a project's construction, operation and decommissioning under a commercial lease — and doesn't expect the delays caused by a federal review of the 800MW Vineyard Wind, the first large US project, to last long or seriously affect Marwind.

Analysts believe the developer can overcome objections from



Ocean City, Maryland, where officials are objecting to the nearby offshore project, Marwind

## 'Objections will not hold back 1.3GW US offshore project'

Ocean City officials, who are concerned over the visual impact of the 8-12MW turbines US Wind is proposing to deploy, claiming they are excessive compared to the 4MW machines approved by the state Public Service Commission (PSC) when it awarded ORECs.

"I am a sincere optimist about the future of offshore wind in

the US. Things are already too developed to stop now," said Vitale, who added that Renexia will harness the experience of its wider Italian parent group, Toto Holdings, as developers and constructors of large-scale infrastructure projects such as aqueducts, bridges and tunnels.

"This matters a lot in reducing the risk of construction," said

Vitale, making the project a more attractive financing proposition to lenders.

The developer expects to work with a major US EPC contractor to build out its offshore wind zone, but is not looking to bring an equity partner on board. "We think we have wide enough shoulders to do this project ourselves," said Vitale. ☐

## First 20MW generator ready 'within three years', with no rare earths

## DARIUS SNieckus

Rare-earth-free permanent magnet generators (PMG) for offshore wind turbines with nameplates of 20MW are expected to be a reality "within three years", following trials of a new-generation concept at the UK Offshore Renewable Energy (ORE) Catapult facility.

A 250kW version of the axial-flux design being developed by GreenSpur Wind, which uses ferrites — an iron-rich ceramic — for its magnets, would be part of a four-module 1MW unit that is foreseen to be scaleable to a

power rating roughly twice that of the biggest PMGs in service today.

"It was our intention from the outset to design a generator that could be scaled for the next generation of offshore wind turbines," said Hugh-Peter Kelly, GreenSpur's head of technology.

"The feedback that we've received is that current designs have known limitations and new concepts will be needed to deliver next-generation 20MW offshore wind turbines."

GreenSpur is now moving forward with modelling for "significantly bigger, multi-megawatt generators", with the

target of designing a 12MW-plus concept for offshore turbine created by "stacking" three 4MW units in parallel.



Replacing high-price rare-earth materials with ferrites — a waste material by-product of steelmaking — would cut the cost of PMG magnets from £40 (€47) per kg to around £1/kg, according to GreenSpur calculations, meaning the design could carve around 33% out of the capital cost of direct-drive generators, and so almost 5% off the price of a turbine.

Discussions to use the PMG are "under way" with a number of OEMs, Hine confirmed to *Recharge* recently, but GreenSpur was "unable to disclose names at the moment". ☐

→ Individual session tickets are available at the registration desk!

## Programme overview

### CONFERENCE

08:30 **Energy talk with Makani CEO Fort Felker**  
09:00 **A15**

09:00 **Regional cooperation on offshore grid development**  
10:15 **A15**

10:00 **Poster viewing & Poster Awards Announcement**  
10:45 **Auditorium Foyer**

10:45 **Floating offshore wind:  
markets & projects**  
12:15 **A10**

**Offshore wind, balancing,  
inertia and other ancillary  
services**  
**A11**

**Using data to improve  
planning and operations**  
**A12**

12:15 **Lunch**  
13:30 **Hall B**

13:30 **Floating offshore wind:  
towards industrialisation**  
15:00 **A10**

**Digitalising the system  
integration of offshore wind**  
**A11**

15:00 **Break**  
15:30

**Technical symposium O&M  
and Resource Assessment**  
**A12**

**Cybersecurity**  
15:30  
17:00 **A10**

**Offshore wind and  
electrification**  
**A11**

See the programme online:  
[windeurope.org/programme](http://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

THURSDAY, 28 NOVEMBER

#offshore2019

## Social events



## Poster award ceremony

10:00 – 10:45

Poster area (Auditorium Foyer)

Meet the prize-winning poster presenters and network at this light reception.

WindEurope Electric City 2021  
official launch party

13:30 – 14:30

WindEurope Stand E-D21

The world is changing. So are our events. In 2021 WindEurope welcomes you to Electric City.

## 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.

Wind Harmony Health  
& Safety Workshop

9:00 – 15:15

Meeting room 20, Level 1

Join us for the second edition of the Wind Harmony project.

Training future wind energy  
maintenance professionals  
SIMULWIND virtual reality simulator

10:00 – 12:00

Safety, Skills &amp; Training Zone, Hall E

Find out more about the EU-funded project developing a virtual reality simulator for training professionals on the maintenance of wind farms.



## North Sea Offshore Network

14:00 – 17:00

Meeting room 19, level 1

A 2-part workshop designed for stakeholders and academia working towards an efficient transmission system in the North Sea Region.

New Wind Energy Report: presented by  
KPMG & Siemens Gamesa Renewable Energy

12:00 – 14:00

Meeting room 6, level 1

The socioeconomic impacts of wind energy in the context of the energy transition

## Exhibition halls (HALL E)

Global Markets  
Theatre

Brought to you by



09:30 – 16:00

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](http://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](http://windeurope.org/innovationpark)
Safety, Skills &  
Training Zone

In association with



10:00 – 13:15

A unique 200m<sup>2</sup> area showcasing the industry's commitment to an injury-free working environment in offshore wind.

[windeurope.org/trainingzone](http://windeurope.org/trainingzone)

## DARIUS SNECKUS

Oil supermajor Shell has taken over French floating wind developer Eolfi, in the latest sign of the fossil-fuel industry's intention to broaden its focus in the offshore energy space.

The acquisition, which is subject to regulatory and ministerial approvals and is expected to be completed next month, is seen by Shell as “enhancing [the company's] existing wind team... and [providing] an opportunity to leverage [Shell's] offshore experience and project management expertise”.

“Eolfi has been a pioneer of floating wind development. We believe the union of Eolfi's expertise and portfolio with Shell's resources and ability to scale-up will help make electricity a significant business for Shell,” said Dorine Bosman, vice-president for offshore wind at Shell.

Eolfi chief executive Vincent Fromont told *Recharge* that the ambition of the acquisition was to create “a number one with a global footprint for floating [wind power]”.

“There are pioneers in floating, of course, but there is no true market leader. [Shell acquiring Eolfi] we see as a tipping point,” he said.

“Oil & gas companies are entering the market because they need to accelerate their energy transition. This will change the



## Oil giant Shell buys French floating wind pioneer Eolfi

market, which to this point has been led by the utilities. These [oil & gas companies] know how to work globally, know how to work in international industrial partnerships, they have strong political connections around the world.”

Eolfi, which is staffed by 65 personnel in offices in

Paris, Lorient, Marseilles and Montpellier, has developed more than 200 onshore and offshore renewable energy projects in five countries, and since 2012 has focused on floating wind power.

Eolfi is leading one of four developer consortia building 25MW floating wind array projects that are slated to be on

line off France by 2021, as well as having plans to develop 2.5GW off Taiwan, via a deal with Spain's ACS Cobra, developer of the Kincardine project in the UK North Sea.

Upon completion of the acquisition, Eolfi will be a wholly owned subsidiary of Shell and be fully integrated. ☐

## BP and Shell: ‘We’ve got the balance sheets for no-subsidy offshore wind

## ANDREW LEE

Oil supermajors Shell and BP said their huge balance sheets will help them become major renewable energy players as subsidies fall away and wind and solar plants rely on merchant power sales, leaving existing developers struggling.

The global move away from subsidies for large renewable energy projects — especially offshore wind — plays to the strengths of new entrants from oil & gas with ambitions in the clean power sector, Shell New Energies executive vice president Mark

Gainsborough and Nick Wayth, chief development officer for Alternative Energy at BP, told a recent industry conference.

Gainsborough told a session at the BNEF Summit in London that his company will “have an even stronger role to play in a subsidy-free world”.

“In reality, as the market shifts more away from subsidies and revenue certainty, for sure there will be challenges. A lot of the existing developers will struggle in that world where you need a bigger balance sheet,” Gainsborough predicted.

Echoing his supermajor

colleague, Wayth said: “The trend towards subsidy-free and more merchant generation is a dynamic that in our view plays to some of



the capabilities a company like BP has — the balance sheet, the trading capability.”

Shell has been among the busiest of the big oil groups in entering renewables and associated sectors, with stakes in offshore wind projects, the purchase of German battery group Sonnen and investments in several cutting-edge technologies.

BP's renewable expansion has so far mainly focused on its LightSource BP joint venture, but the UK-based oil group has a US onshore wind fleet and is heavily tipped to enter the offshore wind sector soon. ☐



## RICHARD A KESSLER

**M**ayflower Wind Energy — a joint venture between Shell New Energies and Portuguese utility EDPR — scored a key breakthrough in the fast-moving US offshore wind market after it was selected by Massachusetts in its second tender to supply 804MW capacity.

Mayflower will build an array, sited in a zone about 32km from the state's southern coast, which it expects to enter commercial operation in 2025. Last December, the developer paid a record \$135m in a competitive lease round for development rights and site control in federal waters.

Mayflower anticipates that the project will provide various economic benefits for ratepayers and the state economy. These include long-term prices below the original price cap of \$84.23 (€76.52) per MWh, \$3.7bn in electricity rate reduction over the contract term; creation of up to 10,000 jobs in Massachusetts in both offshore jobs and onshore supply-chain opportunities; and the elimination of 1.7 million tonnes of CO<sub>2</sub> emissions annually.

The developer said it would draw on the “deep skills” of its parent companies and also their experience with developing, permitting, financing, constructing and operating both offshore wind facilities in Europe and those onshore in the US. EDPR is a leading US onshore wind capacity owner.

Mayflower's bid won over those submitted by Bay State Wind — owned by Orsted and Eversource, the largest energy supplier in New England — and Vineyard Wind, a joint venture between Avangrid and Copenhagen Infrastructure Partners, which won the state's first offshore tender and whose eponymous 800MW under-development project is the nation's first at commercial scale.

“During the bid process, Mayflower Wind proposed wind energy at a more competitive price with greater economic development opportunities for the Commonwealth [of Massachusetts] and the South Coast than any other bidder,” the Massachusetts Executive Office

The Brant Point lighthouse on the island of Nantucket, Massachusetts, close to where the Mayflower project will be built



# Shell and EDPR's 804MW US offshore project wins approval

of Energy and Environmental Affairs said in a statement.

Criteria used in the evaluation of bids included an economic evaluation of the benefits for ratepayers; the project's ability to foster employment and economic development in Massachusetts; the project's environmental impacts, and the extent to which a project demonstrates that it avoids or mitigates impacts to regional commercial fisheries.

The distribution companies and Mayflower will now negotiate supply contracts by a 13 December deadline and those must be approved by regulators at the Massachusetts Department of Public Utilities.

“With today's announcement of additional, cost-effective offshore wind energy, the Commonwealth continues to be a national leader in this industry,” said

**“This team will bring regulatory expertise and utilise a supply chain that will expand across America**

Massachusetts Governor Charlie Baker in a statement.

As directed by the state legislature, the Department of Energy Resources released an offshore wind study that recommended the distribution companies to proceed with additional offshore wind solicitations for up to an additional

1.6GW capacity — if found cost-effective at the time of solicitation.

Liz Burdock, chief executive of industry body the Business Network for Offshore Wind, said: “Major oil & gas companies and utilities understand the future of electricity generation along the US Coast is offshore wind.

“The selection of Mayflower Wind, a joint project between oil & gas giant Shell New Energies and the Portuguese utility EDP Renewables, truly demonstrates the rush to fuel supply diversification. This team will bring regulatory expertise and utilise a supply chain that will expand across America.”

In June, Shell took the plunge in the US market by partnering with France's EDF to submit a bid in New Jersey's initial 1.1GW offshore wind capacity allocation but lost out to Ørsted. ☐



## DARIUS SNECKUS

Norwegian offshore contractor Aibel has won an order valued at more than Nkr2.5bn (€248m) to build two high-voltage direct-current (HVDC) converter stations for the giant Dogger Bank offshore wind mega-project being developed in the UK North Sea by SSE Renewables and Equinor.

The “lean design” steel platforms, which will be equipped with ABB HVDC Light technology, are to be installed on the 3.6GW complex’s Creyke Beck A and Creyke Beck B projects, with Aibel in the frame to build another unit for the third Dogger Bank project, Teesside A.

The HVDC stations, which will be normally unmanned, operated from shore and accessed only by service vessels, will make it possible to transport production from the Dogger Bank zone, located some 130km off the northeast coast of England, to the onshore grid without significant power losses.

Though HVDC stations have been used off Germany, this will be the first such project off the UK.

“This is an important milestone for Dogger Bank with a groundbreaking HVDC technology solution enabling a competitive solution for offshore wind at a long distance from shore,” said Halfdan Brustad, vice-president for Dogger Bank at Equinor.

Aibel chief executive Mads Andersen said: “This is an



A rendering of Aibel's design for the HVDC converter stations being installed at the UK's Dogger Bank offshore wind power complex

# UK's first HVDC system ordered for world's biggest offshore complex

important strategic milestone for Aibel. With this award, we strengthen our role in the ongoing energy industry transformation.”

The converter station project for Dogger Bank will be staged out of the Aibel Haugesund yard on

the west coast of Norway, while construction of the two platform topsides will take place at Aibel's facility in Thailand.

The topside for the Creyke Beck A is slated to arrive in Haugesund in the second quarter of 2022, with transportation to Dogger

Bank in first quarter of 2023. The delivery for Creyke Beck B is scheduled for the third quarter of 2024.

Once on line, Dogger Bank, which is sited in 20-35 metres of water, will supply power to some 4.5 million British homes. ☐

## EU-funded group calls for North Sea Treaty for offshore wind

### BERND RADOWITZ

An EU-funded public-private consortium has called upon the countries around the North Sea to harmonise regulatory frameworks and eventually sign a North Sea Treaty to fully exploit the potential of a meshed offshore grid.

The PROMOTioN (Progress on Meshed HVDC Offshore Transmission Networks) project has brought together 33 companies and organisations

from 11 countries, including Dutch-German transmission system heavy-weight TenneT and energy consultancy DNV GL.

“The development of a cross-border HVDC [high-voltage direct-current] grid is one of the most promising opportunities for a sustainable energy future in Europe,” said TenneT chief operating officer Tim Meyerjürgens.

The consortium has released a report summing up key findings on the design of a legal, regulatory

and financing framework for cross-border HVDC offshore connections and provides recommendations for policy makers and other stakeholders to take appropriate measures to



enable the first hybrid assets to be built.

It says that a North Sea treaty would provide a stable governance and decision-making structure, a common interpretation of maritime law, and processes for long-term wind farm and grid planning.

The treaty would also fix the terms of cooperation between national regulatory bodies, and streamline the decision-making process for the HVDC cross-border links. ☐





# Turbine order for 2.64GW US offshore project still up for grabs

**RICHARD A KESSLER**

**D**ominion Energy has not decided what turbine to employ in its planned US industry-leading \$7.8bn, 2.64GW project off the southeast coast of Virginia but is considering models from 8MW to 12MW nameplate capacity, the utility told *Recharge*.

Local press reports and at least one non-governmental organisation, Sierra Club, have written that Dominion is advancing the project with 220 12MW machines for the array that it expects to build in three 880MW stages between 2024 through 2026.

The future award will be among the largest globally for offshore turbines and is already subject to heated competition from GE Renewable Energy, MHI Vestas and Siemens Gamesa, which have all won conditional or firm turbine orders for projects in the young but fast-growing US market.

Siemens Gamesa is supplying a pair of turbines for a 12MW pilot project that Dominion has contracted Ørsted to build

adjacent to its leased wind energy area.

The utility, however, is going to put the large project — 43km from shore — out to bid for construction and is evaluating how best to proceed. No decisions have been made regarding partners, suppliers and related issues, it said.

Given wind speeds at the project site are between 8.0-9.5 metres

with potential reduction in cost and improved efficiencies (higher capacity factors),” the company told *Recharge* in a statement.

“We also see a lot of opportunity to reduce costs as a US-based supply chain is established,” it added.

None of the three OEMs have committed to domestic turbine production although a contract from Dominion could change that.

Analysts see little chance that Chinese OEMs that have 8-10MW models in development could compete for supply deals in the US given tense bilateral trade

ties, and unfamiliarity with the companies and technology among state officials and utility regulators.

Earlier this decade, XEMC sought to enter the offshore market here with its XD115 5MW turbine and the promise of a turbine assembly plant in New Jersey, but regulators rejected the Fishermen’s Energy 24MW pilot proposal and it was unable to advance with a future commercial-scale array. ☐

**/// The future award will be among the largest globally for offshore turbines**

per second, it conservatively estimates a 42% capacity factor for the project versus 50% to 55% for Atlantic arrays in development off New England.

To what extent that could influence turbine selection is unclear, as is the zone’s location in the path of potential hurricanes.

“We continue to see opportunities to improve the levelised cost of energy of offshore wind as the technology evolves,

## US fisheries rebuff offshore wind’s project layout rethink

**DARIUS SNIIECKUS**

The five developers advancing offshore wind farms off the northeast US — Equinor, Mayflower Wind, Orsted/ Eversource and Vineyard Wind — have put forward a proposal to the country’s US Coast Guard (USCG) to use a uniform turbine layout for the projects, in a bid to defuse ongoing objections from the regional fishery industries.

The New England Offshore Wind Leaseholders (NEOWL), advancing more than 7GW between them, said the layout would have rows of turbines spaced one nautical mile apart, and align to the USCG’s requirement for “robust navigational safety and search and rescue capability by providing hundreds of transit corridors to accommodate the region’s vessel traffic”.

But fishery industry body the Fisheries Survival Fund (FSF) poured cold water on the NEOWL’s reconfigured layout saying that the spacing between turbines “neither allows for safe transit nor viable fishing, at least from the scallop fishery’s perspective”.

It is unclear, FSF said, “how this unsupported proposal... will benefit commercial fisheries or promote fishing vessel navigational safety”.

“We were not consulted on this proposal, have not supported this proposal in the past, and do not support it now.” ☐





LEIGH COLLINS

A 700MW green hydrogen plant powered by a dedicated Orsted offshore wind farm and producing carbon-neutral aviation fuel could be up and running in Europe by 2030 if an ambitious project backed by the German government goes according to plan.

The Westküste 100 project — which has nine project partners, including developers EDF Energy, Orsted and industrial giant Thyssenkrupp — has been named by federal energy and economy minister Peter Altmaier as one of Germany's "real-world laboratories of the energy transition" and is set to receive "close to €100m" of government funding.

The project in northwest Germany, at the site of the Heide oil refinery, will be a unique example of cross-sector co-operation and technology, and show local wind farms how they can use their excess energy — about 40% of which was wasted last year due to grid constraints.

For the pilot project, surplus wind energy that would otherwise be curtailed will power 30MW of alkaline electrolyzers that will split water molecules into hydrogen and oxygen. The oxygen will be sold to a nearby cement plant for use as "oxyfuel", with the waste heat from the electrolysis process sold to a nearby district heating system, thus creating additional revenue streams. Most electrolysis projects simply release the heat and oxygen into the air.

The green hydrogen will be combined with carbon dioxide captured from the cement plant to produce synthetic methanol, which would then be refined into carbon-neutral synthetic kerosene (ie, aviation fuel), for use at the nearby Hamburg airport. The airport is hoping that 5% of all fuel used there will be carbon-neutral by 2025.

The Heide refinery happens to have huge salt caverns on its land where up to ten million tonnes of hydrogen can be stored, as well as a dedicated bidirectional hydrogen pipeline to a Linde grey-hydrogen facility 30km away — so large amounts of green hydrogen could eventually be stored and transported via a pipeline for use



# Offshore wind to power 700MW green-hydrogen-fuel plant

elsewhere, including injection into the natural-gas grid.

## Decarbonising an oil refinery

The Westküste 100 project, named after the "west coast" of Schleswig-

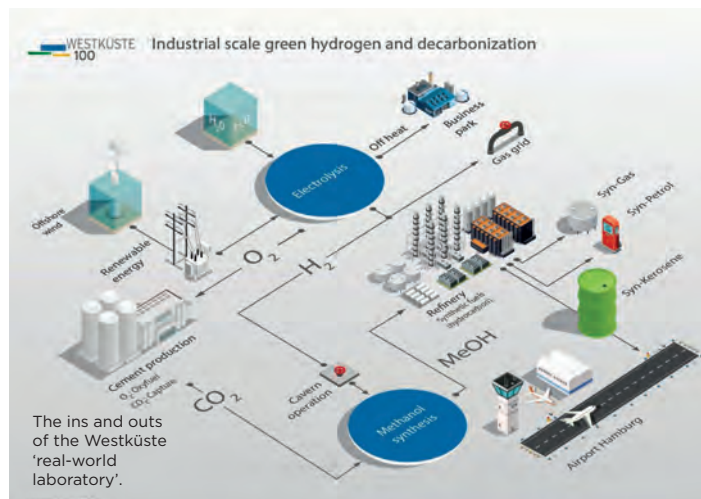
Holstein state where it is located, is the brainchild of Raffinerie Heide, the company that owns the Heide refinery as well as a nearby "tank farm and oil port".

"A couple of years ago, I was strategising with my management

team about our future as a refinery and how does business look like for us in 10, 20, 30 years, given that the amount of fossil fuel is dropping," Raffinerie Heide chief executive Jürgen Wollschläger tells *Recharge*.

The company realised that their site was located in the wind capital of Germany, and that about 40% of the local wind energy generated was not allowed onto the grid, resulting in €500m of taxpayer money being paid to wind producers for curtailed power.

"So we were thinking, 'there must be something we can do with this electricity'. As a refinery, we are a hydrogen consumer... and actually operating a hydrogen pipeline, which connects with our hydrogen source, which is a Linde steam-methane-reforming plant, some 30km away from the





Heide oil refinery in northwest Germany, which will host the offshore wind-to-hydrogen Westküste 100 project



refinery,” explains Wollschläger.

“So we have experience with hydrogen and we have the excess of wind energy, so we were wondering as well, having decarbonisation in mind, whether embarking on green hydrogen isn’t one of our future [business] avenues. And we explored and looked into it and realised that our ultimate goal is to turn the refinery into what I would call a green refinery.”

### Details of the plan

The ten-year Westküste plan is split into two five-year stages.

The first is to scale up to 30MW of electrolysis capacity by 2025 — which would supply enough green hydrogen to meet the needs of the site’s refinery. (NB: The world’s largest existing green hydrogen production facility is 5MW, with a 10MW electrolysis plant currently

being built by Shell in Cologne.)

“Obviously in that 30MW step, there are a number of aspects we want to learn,” says Wollschläger. “What are the scaling effects, the learning curves to best optimize the system, the cost digressions that are obviously needed and required for scaling up?”

“I’m pretty sure that once we’re working on it, there will be solutions and aspects we have never even thought about, they will just come to light in the moment you work on them.”

After the lessons have been learned from the five-year 30MW pilot project, “the vision is to build a 700MW electrolysis unit,” he explains.

“Orsted, one of the partners in the consortium actually has licenses to build the equivalent offshore wind park next door. And that’s actually why they’re invested and interested. They want to monetise on that license, which they currently can’t do as the electricity grid is so congested.”

So would this be a dedicated offshore wind farm that only supplies energy to the electrolyzers, rather than the grid?

“Yeah, it could very well be,” says Wollschläger.

Orsted did not seem so confident that this would be possible. “In Germany the offshore wind build-out is strictly regulated and such a project is not part of the current federal build-out plan. Unfortunately, we do not see any signs that the government intends to revise their approach,” the company said in a statement.

Orsted vice-president for hydrogen, Anders Christian Nordstrom, told *Recharge*: “While it’s still early days for renewable hydrogen, we do see that it has significant potential to help decarbonizing sectors such as heavy industry, shipping and heavy road transportation. Large-scale renewable power from offshore wind is ideal for production of renewable hydrogen, and which makes it a natural fit for Orsted.”

### How would the green hydrogen be used?

Wollschläger explains that the

project partners could sell the green hydrogen to local industries, including chemicals producers, for which there is about 1GW of demand within a 30-40km radius around the refinery.

“That’s one avenue you could follow. Our idea is actually a slightly different one,” says Wollschläger. “We want to scale up to 700MW, we want to take that hydrogen and take the CO<sub>2</sub> from the cement factory and turn it into synthetic fuels.

“And there’s obviously two



reasons for this. One is obviously that then we are back in our core business in the sense of we are working with hydrocarbons, just that in this case, hydrocarbons are not coming from crude oil but from other sources and we can supply our existing customers.

“Now I acknowledge that a number of those customers, most likely in 10 years time will have moved to different applications and solutions for their specific problems. But there are a couple of areas and sectors which are very difficult to decarbonise. And for them, synthetic fuels I would argue are a solution. And those sectors

**■ We’re already paying €500m a year for not producing electricity [from curtailed wind farms]**

are definitely aviation, and most likely heavy-duty trucks and deep-sea shipping.”

Wollschläger also acknowledges that if the latter two sectors shift towards using green hydrogen as their fuel, the refinery would be able to meet that demand.

### Utilising excess wind power

Wollschläger explains that he would like the price of the project’s green hydrogen to be cost-competitive with the grey hydrogen that Raffinerie Heide is currently buying from Linde.

He says this will only be possible if regulations are changed to enable them to buy cheaper wind energy.

In the current German system, wind farms are paid a set amount for the power they generate, regardless of whether that electricity is allowed onto the grid. And unlike other markets, the local electricity price does not fall when the supply of wind power is high, meaning there is no incentive for consumers to buy that excess wind energy. Instead, it is simply curtailed, costing the German government about €500m annually.

“If we’re already currently paying half a billion euros a year for not producing electricity, why can’t I have a different price for electricity? Because my current price for electricity is what everyone has to pay. I’m in a location where we have this curtailment regime and this excess electricity. It costs the German taxpayer money — I have a solution for a better usage for it and yet I have to pay market prices for it.”

Wollschläger believes that the five-year pilot project will break even, when including the injection of government funding, which is due to be finalised over the next six to eight months. The second-phase from 2025-30, he believes, will pay for itself.

“Our expectation is that at that point in time, the economics will work out much better,” says Wollschläger. “You have the learning curve and the cost digression on the electrolysis unit, I would argue, which simply will come out of the project. You obviously are five years further in, which means you will have different levels of crude [oil] price, natural-gas price, CO<sub>2</sub> ticket price [within the EU Emissions Trading System].

“If we currently think it’s smart to pay €500m to not produce electricity, there must be a way to use this half a billion better and create a sensible business case for [green hydrogen].” ■



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