

# THE FUTURE OF ENERGY SUPPLY IS OFFSHORE



## Key players know which way the winds blow

The energy and resource transition is one of the greatest challenges of our time, with the shift from fossil fuels to sustainable energy sources at its core. Offshore wind is an important pillar in this transition. There are plenty of opportunities, but also bottlenecks. This and more in this whitepaper.



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## The future of energy supply is offshore

**The energy and resources transition is one of the greatest challenges of our time, focusing on the transition from fossil fuels to renewable energies. Offshore wind is an important pillar in this transition. There are plenty of opportunities, but also bottlenecks. That is the outcome of a round-table discussion with three key players in the sector on the role of offshore wind energy in the energy transition, trends and developments in Europe, and the pivotal role of ports. After all, the future of our energy supply is offshore.**

Offshore wind provides a sustainable and renewable source of energy that is essential to reduce dependence on fossil fuels. Sea-based wind farms contribute to the reduction of CO<sub>2</sub> emissions, which is crucial for achieving national and international climate goals. Diversification of energy sources also increases energy security and makes countries less dependent on imported fossil fuels. Furthermore, this sector creates jobs in construction, installation and maintenance of wind turbines, contributing to economic growth and the development of new manufacturing and service industries..

### Ambitious goals

In 2022, Germany, Denmark, Belgium and the Netherlands signed the Esbjerg Declaration. Just one year later, France, Ireland, Luxembourg, Norway and the United Kingdom joined and the countries agreed on a declaration of intent that paves the way for further expansion of offshore wind energy and aims to develop the North Sea into a green energy powerhouse for Europe. The countries around the North Sea have set ambitious goals. Together, they want to generate at least 65 GW of offshore wind capacity by 2030. To visualize: the Netherlands alone currently generates less than 5 GW of offshore wind energy. And by 2050, the combined capacity should even more than quadruple to at least 300 GW.

“With this, offshore wind energy contributes significantly to achieving climate neutrality in the EU,” indicates Huygen van Steen, program manager at the Rijksdienst voor Ondernemend Nederland (RVO). RVO is part of the Ministry of Climate and Green Growth (KGG) and advises and supports companies and organizations in becoming more sustainable, by means of knowledge, subsidies and financing, among other things. When it comes to offshore wind, RVO supervises the implementation of the ‘Roadmap Offshore Wind Energy 21 GW’, to be completed by the end of 2032.

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**“Offshore wind energy makes an important contribution to achieving climate neutrality in the EU.”**

“We are on the right track,” says Jan Vos, chairman of industry association Nedzero, with about 300 member companies in the wind industry - both onshore as well as offshore. When Vos assumed the portfolio in 2012, it had been decided to achieve 6 GW of energy through onshore wind and 4.5 GW through offshore wind by 2023. Vos: “Agreements were made in the energy deal. And those have been fulfilled; on time and within budget. That is impressive, especially considering the large investments required. 1 GW requires an investment of approximately € 1.5 billion. Given investments that have already been made, it would be at the very least illogical if that line would not be continued.”

By 2050, 70 GW of offshore wind energy must be generated solely in the Netherlands. “That may seem a lot, but it will only be half of our country’s total energy needs by then,” Vos continues.



## Threats

At the same time, he sees some threats: “The price for wind energy is actually too low to produce at the moment, while the costs to purchase the green energy are too high for companies. Partly as a result of increasing uncertainty, not all developers of offshore wind farms are able to make the business case.” This is also what Ward Gommeren, Owner at Windward Advisory BV, observes. He finds that the number of parties bidding for tenders to build offshore wind farms is decreasing. “On top of that a lot of money is being asked at a very early stage once you win one of these tenders. More and more companies are wondering whether it is still attractive.”

Gommeren also feels that what he calls the technological rat race poses a threat: “The technological evolution we have seen in recent years has been far too fast. In 2014, we were still building turbines with a capacity of 6 MW and a rotor diameter of 150 meters. Now, just ten years later, it is 12 MW and sometimes even more than 14 MW, while a diameter of 220 meters is no longer an exception. It constantly needs to be bigger and bigger in far too short a time frame, leaving manufacturers with no return of experience. As a result, many companies are in trouble. We need to slow down that technological rat race.” Whereas the increasing number of Chinese manufacturers in particular are still setting their sights on developing ever-larger turbines, with more power and growing rotor diameters, GE Vernova decided to reduce risk and focus on producing and supplying a workhorse for the market.

Van Steen emphasizes that size and power of wind turbines are definitely not decisive: “From the government’s perspective, we will continue to ensure that the playing field is and remains fair.” In doing so, it is not always automatically that the company with the highest bid wins a tender. Van Steen: “In the Netherlands, we work with a scoring system and take into consideration a lot more than the mere financial picture. Innovative plans in terms of ecology and system integration weigh in as well. This involves, for example, looking at how the generated power is integrated into the Dutch energy system. That is one of the big issues in the ongoing development of a sustainable energy system,” Van Steen explains. In addition, the tenders also increasingly focus on issues such as international socially responsible enterprise, circularity and cybersecurity. The bar is high.”

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## Port capacity shortage

The three see a bigger bottleneck in the available capacity in almost every European port. “Ports are essential for the realization and operational phase of offshore wind farms,” Vos continues. “With the enormous growth in the number and size of these offshore wind farms, current port capacity falls hundreds of hectares short. Especially with the increasingly larger and heavier turbines. Larger turbines provide a higher energy yield, but also require larger infrastructure capacities at the ports. If we really want to make the energy transition possible, more investments in available capacities will have to be made on a European scale.”

Moreover, the larger and heavier the turbines and rotors, the more complex the work. As a result, projects may also take longer to implement. In other words, more time is taken up with the already scarce space and port capabilities.

“Shortages are only getting more acute. That scarcity is very much alive among our members,” Vos says. “Fortunately, support for offshore wind is extremely strong. Also from politics and certainly since the war in Ukraine. We are more aware than ever that clean, locally produced energy is desperately needed not only because of climate goals.” Furthermore, ships must be equipped with newer, larger cranes to safely handle the turbines and rotors of the future. That too requires investment and in turn imposes greater demands on seaports.



## Strategic hub

To be optimally prepared for the future, OEMs and wind farm developers are comparing ports worldwide and mapping out future expectations. “Rotterdam is the most strategic hub for offshore wind. Even for projects along for example the British coast,” Gommeren summarizes the conclusion. “No other location is as flexible and as cooperative as Rotterdam. Everything fits: deep waters, large quays, no tidal restrictions, good hinterland connections, the right industrial cluster and the right offshore expertise. That is undisputedly the added value of Rotterdam. The expertise in the Netherlands and Belgium is also regularly called upon in the US and in Asia. An additional advantage is that the Netherlands has a good innovation climate, and the industry has close ties to universities, such as the University of Technology in Delft and in Eindhoven.”

Nevertheless, additional space is also appreciated in Rotterdam; partly because of - again - larger turbines. The Port of Rotterdam Authority has the ambition, the projects and the long-term scenarios to shape the energy transition in the Netherlands and achieve the climate goals. "Expansion is desperately needed, because the current port capacity in the North Sea countries is too low to realize the envisaged peak in the construction of wind farms in the North Sea around 2030," Van Steen says.

This is what other countries around the North Sea are realizing as well. For example, the Danish investment company CIP (Copenhagen Infrastructure Partners) announced in 2024 that in the coming decades it will invest 150 billion euros in artificial energy islands in the North Sea, on which gigantic wind turbines will be placed. Such investments, however, are not a threat to Rotterdam's position, according to Gommeren. He expects Europe's largest port to remain the hotspot for offshore wind, even if wind farms are planned further and further offshore in the future.

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## Smarter, safer and more inclusive

What the three key players do foresee is a potential further specialization of ports on certain sub-activities within the sector. "For example, Den Helder already claims to be the service and maintenance port for offshore wind. It is quite possible that for example other ports will focus more on decommissioning offshore wind farms in the future," Vos explains. "That is by no means a priority at the moment, though. New projects have an expected operating period of 40 years. The main focus right now is to roll out those new projects. Also to meet the set targets."

Van Steen adds: "To make offshore wind future proof, we must continue to invest and make wind farms smarter, safer and more nature inclusive. In the meantime, we can of course learn from the decommissioning of first-generation wind farms, such as Offshore Windpark Egmond aan Zee (OWEZ) and the Princess Amalia Windpark (PAWP), which are reaching the end of their operating phase over the next decade. In the long term, the rollout of offshore wind energy will only be successful if it is done sustainably and circularly."

Overall, the industry experts are optimistic. There are bottlenecks. And there is a need for additional capacities, especially in the ports. But the intent is firm. And the vision is sound. "I've been working in the energy business for 36 years now. If I've learned one thing, it's that it will always be both/and anyway. Offshore wind by itself will not be enough to meet future energy needs, but we are on the right track. And there is no turning back," Gommeren concludes. "It is important that major industrial energy consumers get behind offshore wind and that the entire chain jointly takes the lead."

