Offshore wind farms: A key for Europe's energy independence

Globally, the offshore wind industry enjoyed its best-ever year in 2021. For Europe, it is considered a key player for its energy independence. Christoph Zipf, Press and Communications manager at WindEurope, explains why

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Wind is a home-grown energy resource. Wind energy reduces Europe's energy imports from Russia and elsewhere. Wind energy also reduces Europe's exposure to the volatile fossil fuel prices we are seeing today for gas. The war in Ukraine and the consequent cuts in Russian energy exports to Europe are a painful reminder of how dependent Europe currently is on energy imports. At the beginning of 2022, Europe imported 58% of its energy – mostly fossil fuels and often from countries posing serious geopolitical risks. Every wind turbine built in Europe strengthens our energy security and reduces the need for costly imports.

When including the UK, Europe today has 29 GW of offshore wind capacity under operation — 16 GW without the UK. We expect this to grow to 160 GW by 2030 and the European Commission wants this to be 450 GW by 2050. In practice this means that offshore wind will become the biggest contributor to the EU's electricity mix. Overall, wind energy provides 15% of Europe's electricity demand today. In some countries, this is much higher. Wind covers 44% of electricity demand in Denmark, 31% in Ireland, 26% in Portugal, 24% in Spain and 23% in Germany.

Benefits, coexistence and immense potential

Offshore wind turbines tend to be larger and have higher capacity factors than onshore turbines. Wind speeds at sea are generally higher than on land. This means offshore wind turbines are more efficiently and steadily producing electricity from wind. Building turbines at sea also offers additional space to build large-scale wind farms, especially in densely populated countries like Belgium or the Netherlands.

> The geographic characteristics of the Mediterranean Sea complicate traditional offshore wind development

Also note: The European offshore wind industry is making rapid improvements in combining electricity production with fishing, aquacultures and measures to protect the surrounding marine ecosystems. We are actively discussing such innovative solutions to biodiversity restoration with the NGOs and transmission net operators in the Offshore Coalition for Energy and Nature (OCEaN coalition).

Many European countries have come up with ambitious targets for offshore wind. To realise them, they now need to take the right practical steps. Governments need to invest in optimising and reinforcing both onshore and offshore grid connections by doubling the rate of investments in their grids from €40bn to €80bn per year. Grids are the backbone of the future energy system. They ensure that the electricity produced by offshore wind turbines is distributed to Europe's households and businesses.

The right infrastructure in ports is also necessary to build offshore wind, especially floating offshore wind turbines which are typically assembled in the port facilities. Governments need to invest €6.5bn to successfully expand their ports for the expected offshore wind expansion.

The further expansion of offshore wind will also require more skilled workers. We also see a sharply growing need for additional vessels both for the installation of offshore wind farms and for service and maintenance.

Cross-border cooperation will also be important. Cross-border hybrid off-

European countries have paved the way for delivering 111 GW of wind capacity by 2030 in their National Energy and Climate Plans, but reaching this will require an annual installation of almost triple the 3.6 GW of offshore capacity that was installed in 2019 (source E. Commission, Maritime forum)

shore wind projects will ensure more energy security. These are projects that are both electricity generation units and interconnectors. The first such projects, the Kriegers Flak wind farm, connects Germany and Denmark. Hybrid offshore wind farms save space, improve electricity flows between countries and reduce the impact on the environment as they require less cable connections. They have the potential to bring down consumer electricity prices by reducing grid bottlenecks and curtailment of wind farms.

Global leaders

Europe is the global leader in offshore wind technology. Europe is home to complete supply chains for both onshore and offshore wind in Europe. This includes operators, project developers, turbine manufacturers, suppliers, logistics companies, vessel operating companies and many other companies. Together, these offshore wind companies employ 77,000 Europeans. By 2030, it will be 200,000. Between 2017 and 2019, European turbine manufactures made up 43% of the global market.

Looking at wind energy capacity in total (onshore and offshore wind combined), China has overtaken Europe. China now has 328 GW of offshore wind turbines. The EU has 189 GW. Within Europe, Germany has the highest installed capacity with 64 GW, followed by Spain and the UK with each 27 GW. The UK has the most offshore wind in the world with 13 GW. The biggest offshore wind farms in the world are also located there.

WindEurope

WindEurope is the voice of the wind industry in Europe with over 400 members from across the whole value chain of wind energy: wind turbine manufacturers, component suppliers, power utilities and wind farm developers, financial institutions, research institutes and national wind energy associations. It is a member of the Global Wind Energy Council (GWEC)

Greece's hurdles

Greece hasn't built any offshore wind farms yet, but the Greek Parliament recently passed the country's first-ever Offshore Wind Law. Greece wants to build at least 2 GW of offshore wind by 2030. The Greek Government has now appointed the Hellenic Hydrocarbons and Energy Resources Management Company S.A. (HEREMA S.A.) to undertake the processes of concessions, development, site investigation, site allocation, technical studies and the organisation of future auctions. The national transmission system operator (TSO) was appointed to connect offshore wind to Greece's national electricity grid. In the next steps, the Greek state will adopt a series of decrees in the coming months to assign possible zones for projects. These zones will be "wide envelope areas" where developers could ask for technical studies.

The geographic characteristics of the Mediterranean Sea complicate traditional offshore wind development. Traditionally, offshore wind turbines are "bottom-fixed," meaning that they are drilled into the seabed. In Greece, this is not always possible as the water depths are often too deep. We will therefore rather see floating offshore wind turbines in Greece. These are turbines that are not drilled into the seabed, but mounted onto an anchored but floating substructure.

Europe is a global leader for this young technology. Around 100 MW of floating wind turbines have been installed in Europe so far. Now it is essential to further invest in the production capacities along the whole floating wind supply chain as well as the research and development for floating wind technologies. bf