Boosting offshore wind energy in the Baltic Sea

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WindEurope

WindEurope's Baltic Taskforce is a network of Industry representatives and National Associations promoting offshore wind energy in the Baltic States. The Taskforce regularly engages with governmental institutions – at both national and international level – and organises targeted workshops in the Baltic countries.

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Baltic 1 Wind farm. Copyright: EnBW

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CONTEXT

Offshore wind energy greatly contributes to containing global warming and it is fundamental to reaching Europe's 2030 and 2050 Climate and Energy targets in a cost-effective way.

Today there are over 20 GW of offshore wind installed in European waters, of which around 2 GW are in the Baltic Sea (Denmark 872 MW, Finland 68 MW, Germany 1,074 MW and Sweden 192 MW). By 2030, WindEurope expects that 9 GW could be easily deployed in the Baltic Sea. With the right ambitions from Governments and intensified regional cooperation, this could increase to more than 14 GW.

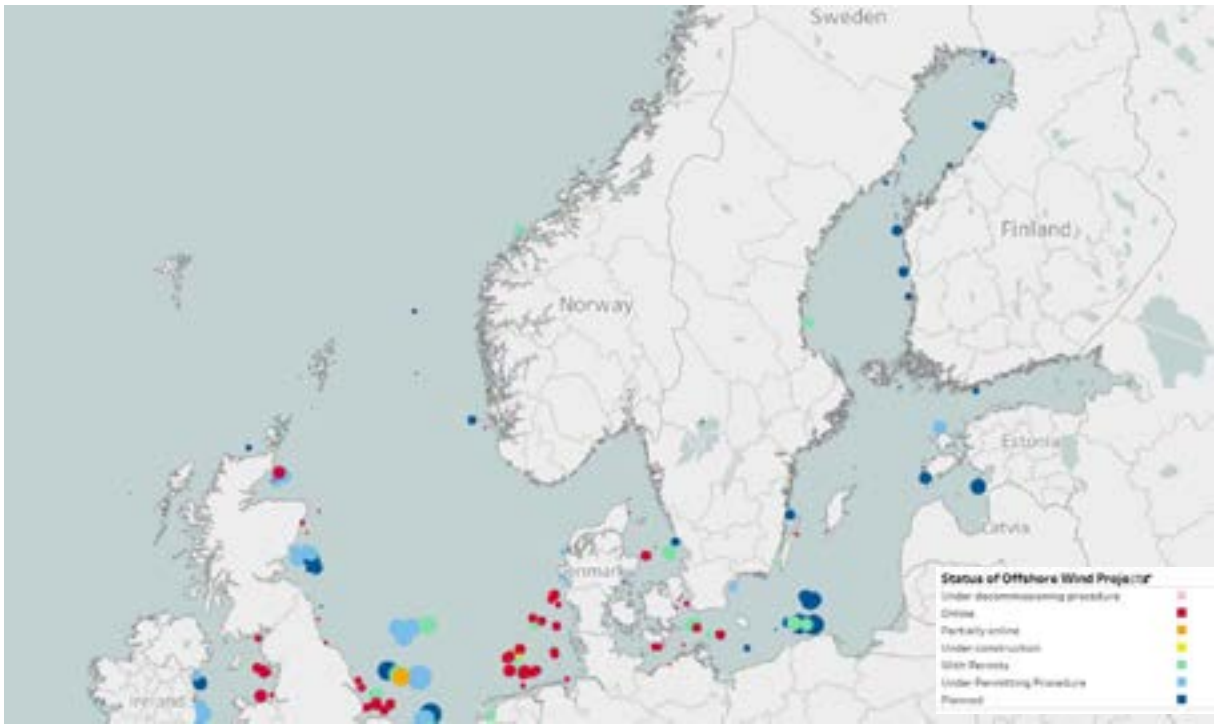
In its recent 2050 Long Term Decarbonisation Strategy, the European Commission has identified wind energy as the dominant power generation technology by 2050, with projections of up to 450 GW of offshore wind capacity installed (EC - A Clean Planet for all, 2018). Installations in the Baltic Sea could reach 85 GW by 2050, according to WindEurope's latest scenarios. This would make the Baltic Sea the second-largest basin for offshore wind in Europe, after the North Sea.

The cumulative potential capacity identified in the Baltic Sea by the European Commission (BEMIP Final Report, 2019) exceeds 93 GW, with a generation of 325 TWh/year (around 30% of the total energy consumption of the Baltic countries in 2016).

Members States shall define clear climate and energy targets to build the basis for the expansion of the internal offshore markets and exploit the added value that the sector brings.

FIGURE 1

Map of online and planned projects (October 2019). Source: WindEurope interactive offshore map (www.windeurope.org)



HOW CAN THE BALTIC SEA BECOME A RENEWABLE ENERGY HUB

The wind energy industry is contributing to a fundamental transformation of the European energy sector. It provides clean, competitive and reliable energy while creating local and international value in terms of jobs and economic growth. This is now a critical moment: Member States have the possibility to take a big step forward in decarbonising the energy sector and increase security of supply. But to exploit these benefits, actions must be taken fast.

This document provides an overview of benefits and actions needed to exploit the full potential of offshore wind in the Baltic Sea.

1. Jobs and economic growth:

Offshore wind energy stimulates the economy by boosting import and export, attracting significant international investments which support economic growth.
Offshore wind energy provides jobs. The industry already employs over 60,000 people all around Europe and this number is expected to increase significantly with more installations.

Other businesses, active in the supply chain, also benefit from the sector maturity and the experience acquired over two decades of growth.

The supply chain requires stable rates of manufacture and installation for a minimum of 10 years in order to make final investment decisions. In this way the supply chains for components, vessels, ports services and Operation and Maintenance Services (OMS) can amortise investment over a reasonable period.

2. National Energy and Climate Plans:

EU Member States will plan their energy transition towards 2030 through the adoption of National Energy and Climate Plans (NECPs). These plans are a fundamental instrument to provide stable conditions and visibility for investments by defining clear volumes and timelines for offshore wind.

Individual countries are responsible for their own planning, consenting and overall development
of their internal markets.

Governments should provide visibility on future offshore volumes with appropriate support mechanisms and ensure an increase in site allocation development and consenting from 2020. It typically takes about eleven years to get from the start of wind farm development to the completion of installation and start of electricity generation (See Figure 2).

3. Regional cooperation:

Regional cooperation will be key in supporting national growth in offshore wind through coordinated policy-making, especially in relation to grid development. A long-term regulatory framework and the streamlining of administrative requirements will give certainty to the market, enabling cost reduction and ensuring the stable deployment of projects. Regional cooperation makes even more economic sense in the Southern part of the basin, where sites are more attractive due to higher market values for offshore wind power generation.

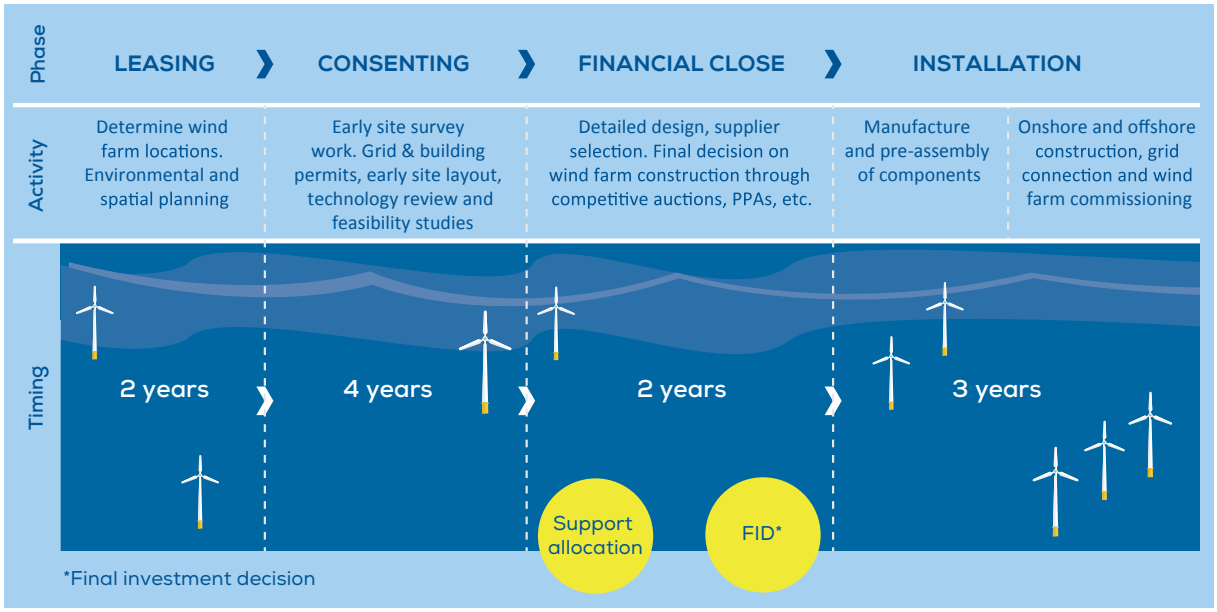
Grid development should anticipate major growth in both offshore and onshore wind energy. International coordination and cooperation is a major challenge. Governments should foster hybrid offshore projects to optimise the space at sea and promote the progressive development of meshed offshore grids.

4. EU Funding:

To support this growth the European institutions are making funding available. Different funding schemes allow both governments and the private sector to boost technological innovation, strengthen cooperation and share knowledge. Different funding schemes are available. Between 2014 and 2020, the EU has provided almost €80bn in funding for research, mainly through its flagship research programme Horizon 2020. Another large part of EU budget is managed in partnership with national and regional authorities through shared management, largely through the Structural & Investment Funds.

Together with the European Commission, Member States should exploit the potential of EU funding mechanisms for receiving support in deploying cross-border projects.

FIGURE 2
Offshore wind farms development stages



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1. HOW DOES THE LOW CARBON TRANSITION TRANSLATE INTO ECONOMIC GROWTH, JOBS AND INDUSTRIALISATION?

Offshore wind energy enhances energy independence and security as it prevents exposure to the volatility of oil, gas and coal prices and dependence on supply from other countries. Offshore wind will also be key in the desynchronisation from the Russian power grid.

Offshore wind energy brings concrete advantages in terms of local development, jobs and growth. All countries surrounding the sea basin would greatly benefit from developing offshore wind. In 2016, the wind energy industry, and the activities related to it, added €36.1bn to EU GDP in total. €22.3bn of this was a direct result of activity within the wind energy industry: onshore and offshore wind energy developers, turbine manufacturers, component manufacturers, service providers and offshore wind energy substructures.

Wind energy creates jobs, not only in turbine manufacturing and electricity production, but also in many other industries and economic sectors. It is estimated that, in the scenario of 32 GW of offshore wind installed by 2050 in the Baltic Sea, around 10,000 person-years annually will be employed in planning and construction of wind farms, while 29,000 person-years annually will be employed in O&M-related activities (BEMIP – Final Report, 2019).

In Germany alone, offshore wind has created some 25,000 jobs during the past decade, according to numbers from the Ministry of Economy and Energy, as well as industry studies.

As the global wind supply chain develops, the Baltic countries need to continue offering an attractive market proposition with a long-term strategy that guarantees enough volume. This will send a strong signal to the manufacturing industry, resultsing in local jobs and a positive trade balance. New jobs in the countryside provide new possibilities and increased stability in Europe.

Offshore wind to boost Polish economy

Wind energy already constitutes an important element of the Polish energy mix. At the end of 2018, onshore installed capacity in Poland amounted to almost 5.9 GW, which corresponds to more than 14% of cumulated generation capacity in the National Power System. And the government has shown positive signs to support further growth.

The first Polish offshore wind farms will start producing electricity around 2025; more than 10 GW of capacity installed in the Polish Exclusive Economic Zone is planned to be commissioned by 2040. These ambitious plans attract substantial interest among national and foreign investors.

Expert calculations demonstrate that the construction of 6 GW of offshore wind farms will create 77,000 jobs in Poland, in particular on the coast, bringing approximately PLN 60 billion (€ 14 billion) of added GDP value and PLN 15 billion (€3.5 billion) of Corporate Income Tax (CIT) and Value-Added Tax (VAT) revenues by 2030.

A typical wind turbine tower requires 300–400 tonnes of steel, with further 750–1,200 tonnes for its supporting structure. 6 GW of offshore wind investments in the Polish EEZ in the Baltic Sea will require one million tonnes of steel to be completed, creating a great opportunity for the Polish smelting and shipbuilding industry.

Furthermore, the entire supply chain may also work for export. The construction of a strong industry supporting the offshore wind energy sector will consolidate the position of Poland at regional scale. This also opens new cooperation opportunities for the business and scientific sectors in terms of R&D and educational projects.

Source: PWEA Report (2019) The future of offshore wind in Poland

2. HOW CAN NATIONAL PLANS BOOST THE ENERGY TRANSITION?

Europe needs to increase its yearly installation rate of offshore wind to continue developing its supply chain, maintain its global leadership and reach 2030 and 2050 climate targets. But Member States' current level of ambition and clarity is not sufficient to reach this. The Baltic Sea region can play a great role in this process. Offshore wind energy represents an untapped potential in the Baltic region and needs to be clearly incorporated in the National Energy and Climate Plans (NECPs).

It is important that Member States give clear details on policies, such as volumes and targets, access to sites, long-term revenue certainty and auction schedule. This will give market certainty to project developers and investors, bringing greater competition while providing the offshore wind supply chain with the right signals and visibility.

Members States should also aim at simplifying and reducing cost associated with the permitting procedures, including a review of the current set back distances and exclusion zones.

Finally, NECPs should include a clear commitment to regional cooperation. Time is crucial: the alternative to a planned energy transition is climate change with incalculable effects, risks and cost.

KEY ASKS FOR NECPS: A PLEDGE IS NOT A PLAN!

Member States should now focus on the implementation of NECPs. They need to:

- *Give detail on support schemes and auction schedule;*
- *Give detail on how to incentivise corporate renewable PPAs;*
- *Simplify administrative procedures;*
- *Act quickly on repowering;*
- *Improve system flexibility, demand response and storage;*
- *Increase regional cooperation;*
- *Strengthen R&I and competitiveness.*

COUNTRY	KEY ASKS FOR NATIONAL ENERGY AND CLIMATE PLANS
GERMANY	Should step up in enabling new sites. Crucially Germany has to immediately start its grid enhancement, particularly the onshore grid from north to south. It will have to cooperate with its neighbours for interconnection expansion, and to build offshore hybrid projects.
DENMARK	Should step up its grid enhancement for trade, so interconnection to other countries will be key. Needs to accelerate its international cooperation in order to develop offshore hybrid projects and to address the cumulative environmental impacts of large-scale offshore wind.
NORWAY	should increase its interconnection capacity. Should also enable more sites in the southern areas of the North Sea. The currently planned sites in the north of the country are too far from the demand centres, and would require expensive grid investments.
SWEDEN	Should enable sites for offshore wind by solving the current exclusions due to military radar issues. Needs to cooperate internationally to address possible environmental impacts of large-scale offshore wind deployment in the Baltic Sea.
FINLAND AND ESTONIA	Need to enable sites for wind energy by solving the military radar issues leading to current exclusion zones. Estonia needs to address their interconnection and system synchronisation with central Europe and possible environmental impacts of largescale offshore wind deployment.
LATVIA AND LITHUANIA	Need to address their interconnection and system synchronisation with central Europe. Timely investment in port infrastructure is a major challenge and should be addressed as early as 2025.
POLAND	Needs to accelerate the enhancement of its national grid. Poland's interconnection capacity must also improve if it is to trade electricity with other Central and Eastern Europe countries.

3. HOW CAN INTERNATIONAL COLLABORATION SUPPORT MEMBER STATES' OFFSHORE WIND GROWTH?

Working closely together Member States can achieve more than individually. A structured regional cooperation approach should cover: maritime spatial planning, offshore and onshore grid planning and development, finance frameworks and technical standards. Collaboration in these fields – involving manufacturers, developers, NGOs, regional authorities and local communities – makes it possible to build and operate wind farms in the most cost-efficient way, at the most efficient sites, and streamlines the consenting process for cross-border projects.

Cross-border cooperation becomes even more relevant in the Baltic Sea, where an interconnected market would help to overcome the issue of different power pricing zones with different patterns and technical standards. This will allow decreasing system costs caused by congestion and ensure the grid readiness for future offshore installations.

The Baltic Energy Market Interconnection Plan (BEMIP) is a trans-European initiative led by the European Commission and the governments of the eight countries surrounding the Baltic Sea. BEMIP recently developed (Aug 2019) a roadmap for the implementation. This includes the identification of offshore wind concession zones based on existing national plans and other scenarios on the transformation of the power sector. The initiative also focuses on grid expansion, energy security and the synchronisation of the Baltic system with the central European electricity network.

In parallel, the Baltic Sea Offshore Wind Forum (BaSOF) is an initiative that advocates the development of offshore wind energy and its industry in the Baltic Sea region to realise a regional energy transition. WindEurope, together the national wind energy associations from Estonia, Denmark, Finland, Sweden, Latvia, Lithuania, Poland and the German Offshore Wind Energy Foundation signed the Baltic Sea Declaration in 2017 with the objective to work together in developing a well-functioning integrated energy market, regional cooperation in maritime spatial planning, grid development, capacity planning and support schemes.

Member States should re-launch the Baltic Sea Declaration and secure equal competition conditions among countries to maximise efficiency.

In Europe, the North Sea Energy Cooperation, launched in 2016, showed that industrial leadership and regional cooperation are key to achieving EU and Member State targets and ensuring a smooth deployment of offshore wind. The Cooperation relies on a voluntary basis, but Member States of the North Sea showed a strong commitment. This led to the creation of four Support Groups, which convene at technical level to coordinate the actions of regulatory and planning authorities and TSOs.

The sector has learned from the North Sea: the primary focus of a regional cooperation needs to be on Maritime Spatial Planning, onshore and offshore grid development, above all. In particular, this must be achieved through short-term coordination and long-term cooperation.

The Baltic Integrid Project (2016-2019) – European Regional Development Fund

The project Baltic InteGrid explored the potential of meshed offshore grids for the Baltic Sea region to promote the integration of regional electricity markets and to enhance the security of supply around the Baltic Sea.

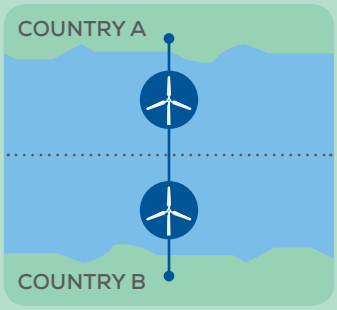
The project analyzed policy, administrative, technological, planning and market-related issues affecting the design of meshed grid solutions. The results showed how a Baltic meshed offshore grid would be the best method to safeguard power supply, strengthen interconnections between countries, help decarbonize the economy and better integrate the EU energy market.

OFFSHORE HYBRID PROJECTS: COLLABORATION AS KEY TO ENHANCE ENERGY SECURITY

A hybrid offshore project is one where an offshore wind project connects into an offshore electricity interconnector. Hybrid offshore wind projects therefore allow the offshore wind power to be used by more than one country and allow for more efficient use of space in the sea. They could potentially enable the integration of innovative technologies like Power-to-x.

The Kriegers Flak – Combined Grid Solution

The Kriegers Flak – Combined Grid Solution is the world's first offshore interconnection project, using the national grid connections to offshore wind farms in the Baltic Sea. It will connect the Danish region of Zealand with the German state of Mecklenburg-Western Pomerania via two offshore windfarms, German Baltic 2 and Danish Kriegers Flak. It is the world's first project combining grid connections to offshore wind farms with an interconnector between two countries. The interconnector will allow electricity to be traded in both directions thanks to two onshore serially connected voltage source converters (VSC).



The new interconnection will increase the security of supply and enhance the integration of regionally produced renewable energy and ultimately contributes to both **countries' energy transitions**. Construction work began at the turn of 2016/17. The Combined Grid Solution is scheduled to become operational in the fourth quarter of 2019.

In 2015, the European Commission confirmed the eligibility of the Kriegers Flak project as a Project of Common Interest (PCI), which is now granted financial support of up to €150 million from the European Energy Programme for Recovery (EEPR). The total project cost is €900 million.

Kriegers Flak will be the first of many hybrid projects deployed in the Baltic Sea. These will form the basis for a meshed offshore grid. Members States should act decisively in removing barriers to offshore hybrids. Key actions include starting regional cooperation between countries at an early stage and, together with the European Commission, enhancing the allocation of different funds to de-risk projects. Hybrid projects could improve the efficient use of space in the North Sea, ensuring that both the offshore wind volumes and interconnection targets are met on time.

4. WHAT FUNDING TOOLS ARE AVAILABLE TO SUPPORT THE GROWTH OF WIND ENERGY IN THE BALTIC SEA?

The European Union has a world-leading public R&D budget to stimulate, in different areas, the deployment of renewable energy across the EU.

From 1998 to 2018 wind energy received €565.43 million in EU funding through the Framework Programmes (FP5-Horizon2020) which supported a total of 225 wind energy projects. Also thanks to this support, the offshore wind energy sector developed into a strong industry significantly contributing to the decarbonisation of electricity consumption.

Framework Programmes (FPs) are the EU's funding programmes for research & innovation. Horizon 2020 is the current FP and runs from 2014 to 2020. Compared to other RES technologies, wind ranked fourth as beneficiary. Wind got 16% of all RES funding support, 23% of funding went to component development (e.g. large turbines), followed by fixed-bottom offshore (20%) and grid integration (20%). Floating wind was also funded with about €70 million. Solar PV received 23%, Bio-energy 19% and Bio-fuels also 16%.

Another funding mechanism that could importantly support wind developments in the Baltic Sea is the Connecting Europe Facility (CEF). It is a key EU funding instrument that invests in European energy, transport and telecoms infrastructure. In particular, the new funding window under the next CEF (2021-2027) - cross-border projects in the field of renewable energy - will promote cooperation between Member States through the joint planning, development and cost-effective exploitation of renewables and by facilitating their integration through energy storage and conversion facilities.

The budget of these projects will amount to 15% of the CEF energy funding subject to market uptake. The final decision on the budget will be taken at the end of 2019 but it will indicatively amount to €1.2 billion.

The rest of the CEF energy budget (85%) will go to the so-called Projects of Common Interest (PCIs). PCIs are key cross-border infrastructure projects that link the energy systems of EU countries and which facilitate the development of a common European energy market. These projects must have a significant impact on energy markets and market integration in at least two EU countries, boost competition on energy markets and help the EU's energy security by diversifying sources. In addition to CEF funding, PCIs may benefit from accelerated planning and permit granting, a single national authority for obtaining permits, improved regulatory conditions, lower administrative costs due to streamlined environmental assessment processes, increased public participation via consultations, and increased visibility to investors.

All renewable generation technologies are eligible across electricity, heating and cooling and transport. There are no predefined capacity thresholds or locations for projects and allocation is technology-neutral.

Connecting Europe Facility (CEF) – Budget and eligibility

The final decision on the new CEF budget will be taken at the end of 2019 but indicatively it will amount to €1.2 bn. Co-financing rates will amount to up to 50% in the form of grants, but allows for blending with instruments from financial institutions (e.g. guarantees, project bonds).

In order to get CEF grants, the project's cash balance needs to be positive at all times and the project must be unprofitable without CEF grant or CEF grant is the last gap-filler needed for project realization. Projects that can receive funding include:

- Pre-feasibility studies to help identify/set up cooperation projects (e.g. high level cost-benefit analysis, mapping of potential sites);
- Studies (e.g. environmental impact assessment, technical and feasibility studies);
- Construction works.

WindEurope is the voice of the wind industry, actively promoting wind power in Europe and worldwide. It has over 400 members with headquarters in more than 35 countries, including the leading wind turbine manufacturers, component suppliers, research institutes, national wind energy associations, developers, contractors, electricity providers, financial institutions, insurance companies and consultants. This combined strength makes WindEurope Europe's largest and most powerful wind energy network.

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