Ministry of Foreign Affairs

Offshore wind in the Baltic States

Commissioned by the Netherlands Enterprise Agency

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Offshore wind in the Baltic States

A 2023 update to the export markets assessment for the Dutch offshore wind sector in Estonia, Latvia and Lithuania.

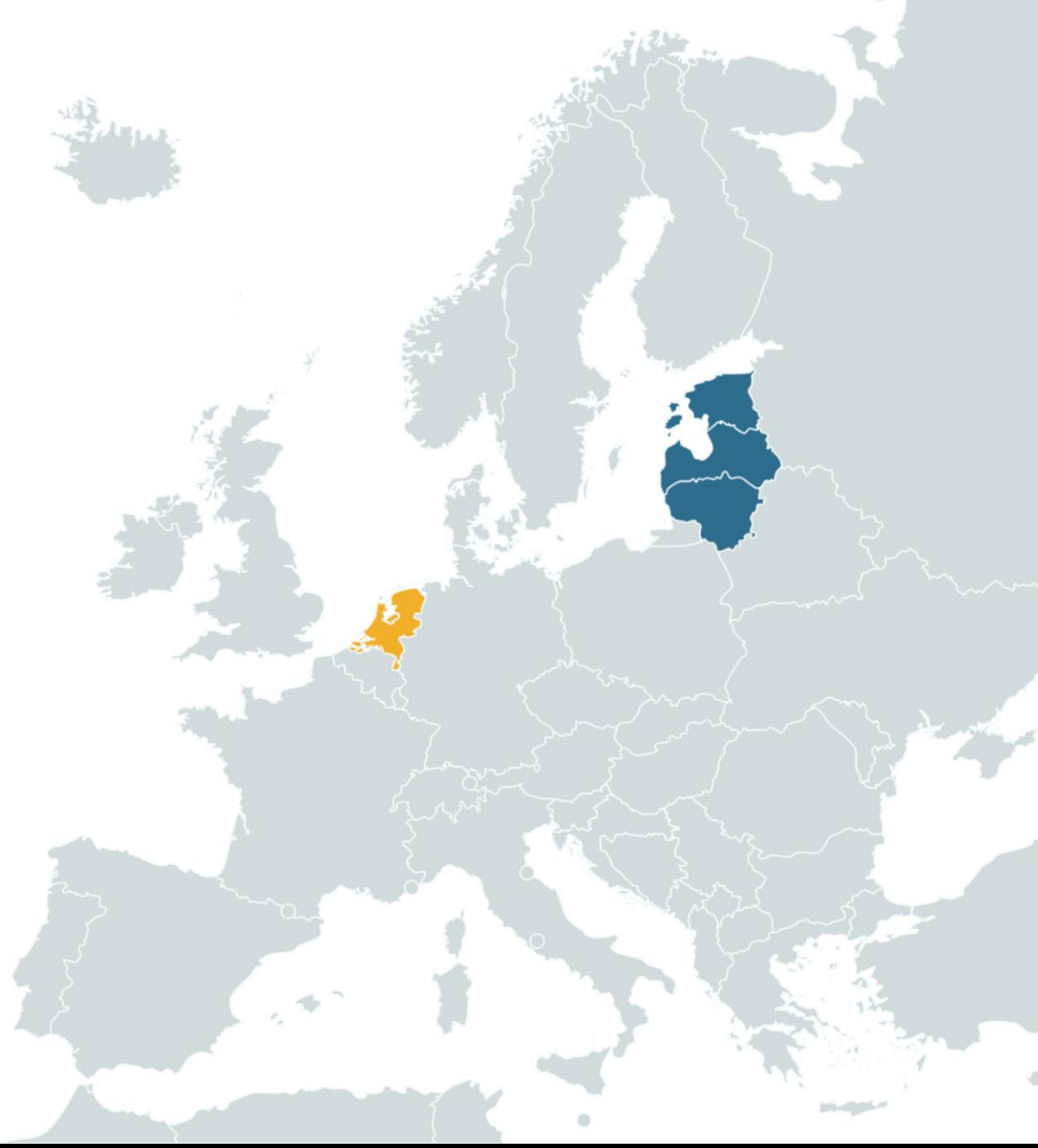
Report by Pondera Consult, June 2023.

Commissioned by the Netherlands Enterprise Agency and the Embassies of the Kingdom of the Netherlands in the Baltic States

PONDERA

Scope of report

This 2023 report presents a market research on the export opportunities for the Dutch offshore wind sector in Estonia, Latvia and Lithuanian for the short and medium term (1-3 years), commissioned by the Embassies of the Kingdom of the Netherlands in the Baltics, and executed by Pondera Consult. The market research is an update to the existing Blix market study 'Export Markets Assessment for the Dutch Offshore Wind Industry – Estonia, Latvia and Lithuania' published in 2021.



Baltic 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 20GW of offshore wind installed in European waters, of which around 2.8 GW in the Baltic Sea. But currently none yet in the Baltics.

2023 is gearing up to be an exciting year for offshore wind in the Baltic States. With the first tenders due within the next months, the project pipeline includes several offshore wind projects due to be commissioned within this decade, totaling up to 6-8 GW with a potential market value that may reach well over EUR 20bn. The Baltic States region offers great market opportunities for the Dutch industry across the offshore wind manufacturing and service sectors such as research, site studies, technical design, transport and installation, foundations, operations and maintenance, and R&D services.

Dutch context

This report is part of a one-year activities programme financed by the Netherlands government with the ultimate goal to set up a Dutch private sector consortium and Partners for International Business (PIB) programme focused on offshore wind in the Baltic countries. Other activities this year comprised of a trade mission to Estonia and Latvia in April and an incoming visit of delegates from the Baltic countries in May 2023, as well as a trade mission to Lithuania (Vilnius / Klaipeda) after the summer, and participation of delegates from the Baltic countries in the OEEC event in November 2023.

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Introduction

The Baltic Sea is bounded by 8 EU member states and stretches from Lapland to the North of Germany. The sea has a total area of more than 380.000 km² and is the largest expanse of brackish water in the world. The Baltic Sea is bounded by Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden. The Baltic Sea has enormous potential for offshore wind, but today it has just over 2.8 GW of installed capacity (mostly in Danish and German waters). The 8 countries have in 2022 committed to increase the capacity to 19.6 GW by 2030 and they plan to consider a 2040 target at a later stage.

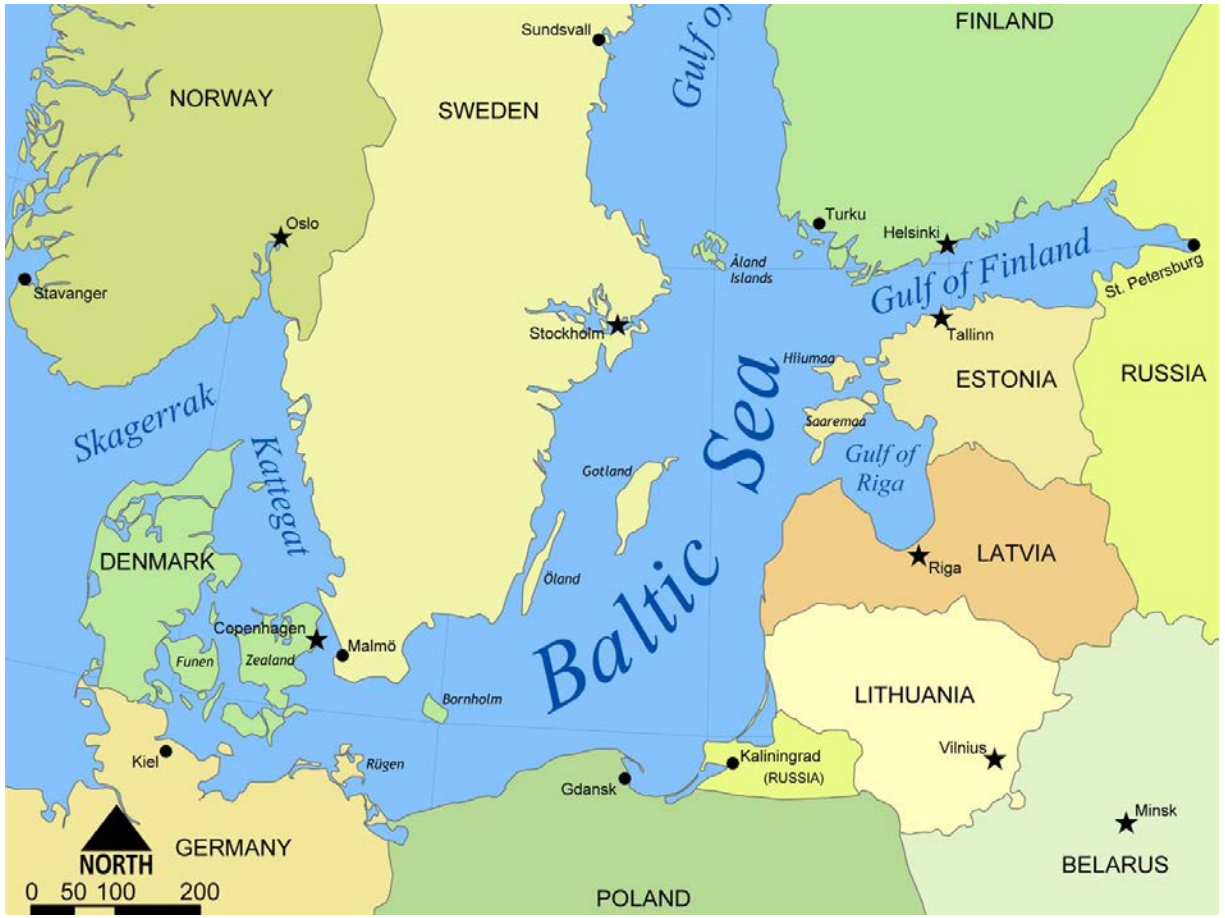
Currently, none of the installed wind farms in the Baltic Sea have been installed in the Exclusive Economic Zones of the three Baltic States. Estonia, Latvia and Lithuania have agreed to commission the first offshore wind farms before 2030 with tenders starting in 2023.

The Baltic States jointly have an estimated area of 18% of the total Baltic Sea, Estonia being the largest with 36,500 km² (9.2%), followed by Latvia with 28,500 km² (7.2%) and Lithuania with 6,400 km² (1.6%).

Offshore wind potential

According to the European Commission, the Baltic Sea has a high potential for offshore wind energy due to shallow sea depths (< 50 meter) and high wind speeds with an average around 10 m/s at a height of 150m.

The Baltic Region will be a key part of Europe's offshore wind industry and cross-border cooperation will play a large role, especially between the Baltic States. Cross-border cooperation with other European countries is in its initial phase. The joint Latvian and Estonian project ELWIND, which might result in 1 GW of capacity, is an example of such cooperation. The need for more offshore wind is present but how to reach this potential is subject to policy changes and supply chain challenges.



Source 1: https://enseccoe.org/data/public/uploads/2022/05/offshore-wind-farms_2.pdf
Source 2: https://maritime-spatial-planning.ec.europa.eu/sea-basins/baltic-sea-0
Source 3: https://windeurope.org/newsroom/press-releases/baltic-sea-countries-sign-declaration-for-more-cooperation-in-offshore-wind/
Source 4: https://estonianworld.com/opinion/how-the-baltic-sea-countries-can-shield-europe-from-russias-energy-weapon/

Baltic States and the Baltic Sea

Maritime spatial plan

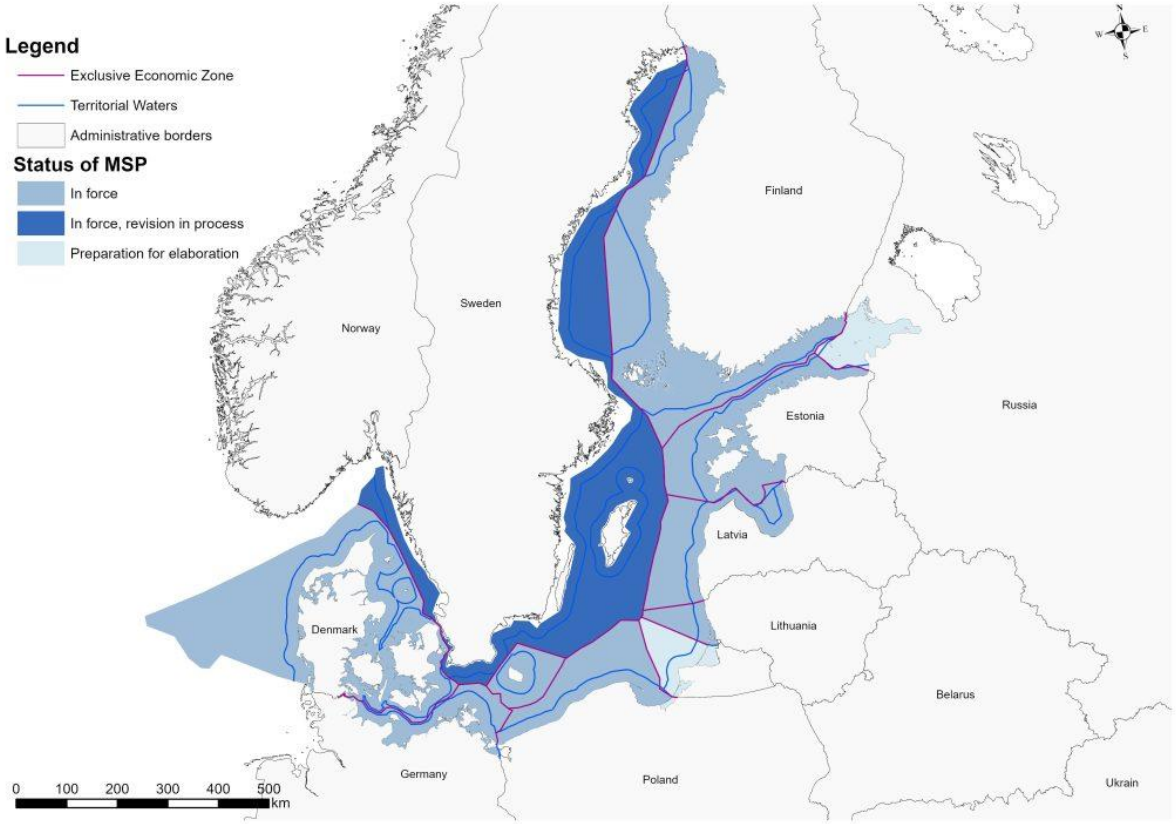
The European Union (EU) maritime spatial plan (MSP) directive required coastal Member States to submit their Maritime Spatial Plans to the European Commission by March 31st, 2021. This plan gives an indication on the proposed offshore wind development areas in each Exclusive Economic Zone and provides information regarding zones in which offshore wind cannot be developed to stimulate marine protection. Areas where NATO radar systems are present have been considered in cooperation with the Helsinki Commission (HELCOM) and Visions and Strategies Around the Baltic Sea (VASAB).

Under the MSP, areas have been located and energy security has become even more important following the Russia-Ukraine war. NATO is aware of the challenges, but routinely assesses security trends in the region and is now checking energy security as well, especially following offshore wind development under the MSP. The Baltic States are planning to become a giant in green technology with a mix of innovation and green technology which should lead to the reduction of the ecological footprint of the region.

The Baltic States handed in very ambitious targets for 2030, and Estonia and Lithuania are amongst the top five highest relative ambitious countries for renewable energy development in the next 10 years. According to VASAB the Baltics States could even raise their ambitions to:

- Estonia could allocate 1,850 km2 (5% of its EEZ) to develop 9 GW of offshore wind
- Latvia could allocate 300 km2 (1% of its EEZ) to develop 4 GW of offshore wind
- Lithuania could allocate 644 (9.4% of its EEZ) to develop 2.4 GW of offshore wind potentially leading up to 3.3 GW

The Baltic States are planning to improve energy security, reduce the dependence from energy imports and match the increasing demand following heating electrification, transport electrification and electrification of the industry.



Source 1: https://vasab.org/wp-content/uploads/2019/06/BalticLINes_project_findings_2019.pdf
Source 2: https://www.espon.eu/sites/default/files/attachments/ESPON%20BT%202050%20_%20Main%20Report_0.pdf
Source 3: https://vasab.org/theme-posts/maritimespatial-planning/msp-country-fiches/

Baltic States and the Baltic Sea

Offshore wind energy policy

All the countries surrounding the Baltic Sea have signed the “Baltic Declaration for Offshore Wind Energy” in 2022. The goal is to accelerate the development of offshore wind energy and to coordinate and optimize activities leading to the full energy potential of the Baltic Sea. The declaration is also known as the Marienborg Declaration. The goal is specifically to 1) electrify industry, 2) increase renewable fuels, 3) diversify and decarbonize gas-networks, 4) increase sector integration, 5) a green hydrogen economy and 6) necessary transmission and pipeline infrastructure.

The countries recognized that speeding up the permitting process is crucial and that long processes slow down the realization of the targets. The permitting processes will be simplified, and the first tenders are launched in 2023.

On top of this, a Letter of Intent was signed between the governments of Estonia, Latvia and Lithuania on the one hand and the government of Denmark on the other hand. This letter extends the cooperation term from 2023 until 2025 with the focus on developing offshore wind by initiating multi- and bilateral cooperation. The goal is to share knowledge, experiences, data and best practices. All Baltic Countries could benefit greatly from knowledge sharing, institutional collaboration and international partnerships.

These ambitions acknowledge the importance of the Baltic Sea. The Baltic Sea is of international importance as well for breeding and wintering birds. It is part of a system of worldwide migration routes through which tens of millions of birds transit each year while flying from their breeding sites to their wintering grounds. To protect and preserve habitats and bird population, all European countries including the Baltic States have obligations under national and international legislation to preserve and protect bird populations.

Offshore wind targets in the Baltic Sea

One of the main goals of the Marienborg Declaration is to reduce energy dependency from Russian gas. The countries will be working together to increase the installed offshore capacity from the current 2.8 GW to around 19.6 GW by 2030, which is an increase in the target of around 10 GW compared to 2020. Along with offshore wind capacity the focus will be on cooperation for international grid systems and LNG as a fuel in the short term.

The total potential for wind energy capacity is up to 93 GW according to the Declaration and the goal is to use the first stages of offshore wind farms to attract investors and developers and to identify how the targets can at best be reached.

Germany and Denmark are determined to further increase their capacity, Poland wants to realize 6 GW by 2030 and 11 GW by 2040. Finland wants to have its first-large wind farm by 2026-2027 and another one by 2028. In Sweden, 15 GW of offshore wind projects are currently applying for permits. Estonia, Latvia and Lithuania all want to commission their first offshore wind farms before 2030.

Source 1: https://www.iea.org/policies/12652-baltic-declaration-for-offshore-wind-energy
Source 2: https://kefm.dk/Media/637975446760224128/Letter%20of%20Intent_310822.pdf

Baltic States and the Baltic Sea

Grid infrastructure

Coordination between the Baltic States and grid operators to create offshore infrastructure is needed. The Baltic States Transmission System Operators (TSO) AS Elering, AST and Litgrid entered into an agreement to establish a Baltic Regional Coordination Centre (RCC) based in Tallinn. The aim is to perform tasks related to planning of power systems, especially offshore. The RCC shall complement the role of the TSOs in a cross-border cooperation by moving from a national focus to a cross-border focus. Following these ambitions, German TSO 50Hertz and the three Baltic TSOs have signed a Letter of Intent to agree on a joint hybrid submarine cable project called Baltic WindConnector in the Baltic Sea between Estonia and Germany. This cable will be around 750 kilometers long and should secure supply and could allow Baltic States to become an exporter to the German market.

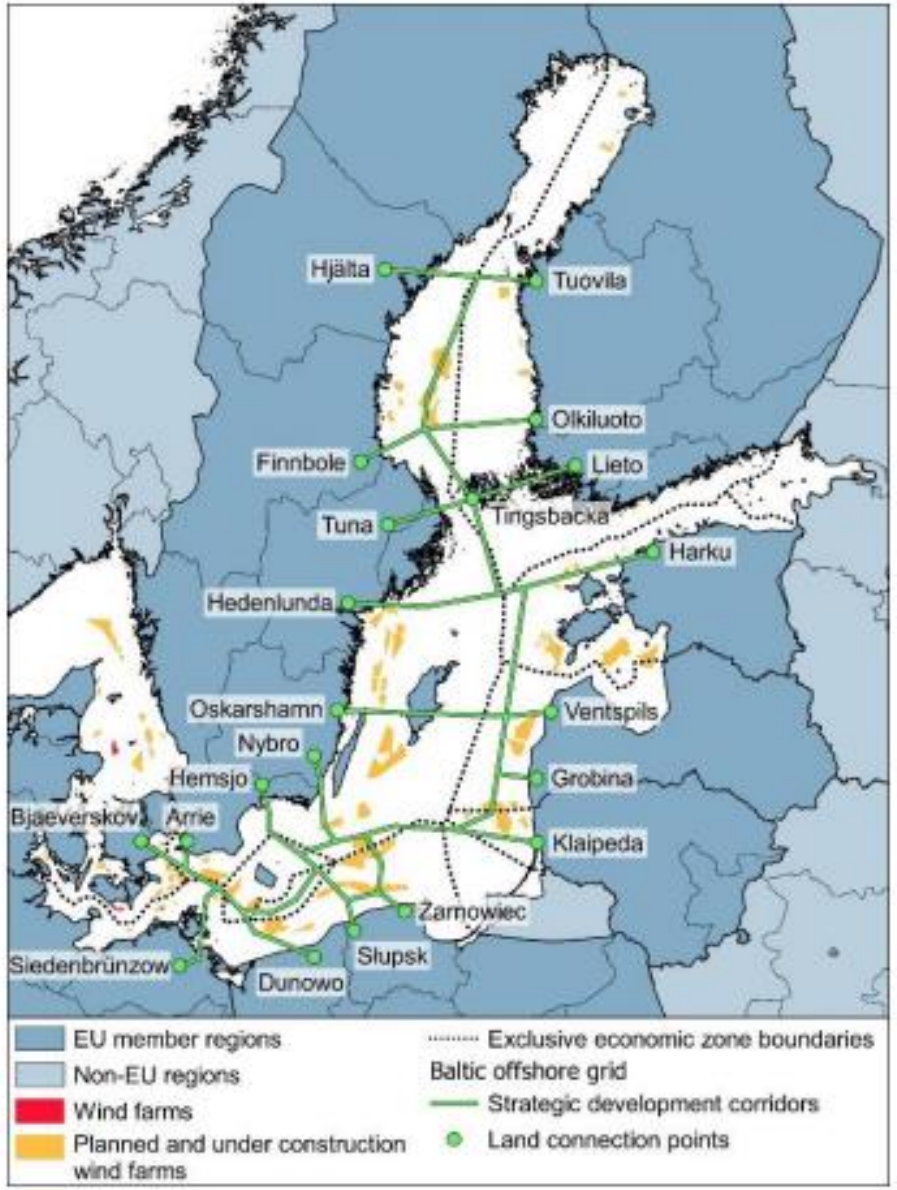
European TEN-E Regulation

In June 2022, the European TEN-E Regulation was adopted to establish the rules for EU cross-border energy infrastructure. One of the intentions is to develop integrated offshore electricity grids and related interconnectors in the North Sea, Irish Sea, English Channel and the Baltic Sea. According to the TEN-E regulation TSOs must publish offshore grid development plans for the Baltic Sea area at the beginning of 2024. Under the new regulation, permitting provisions to accelerate the implementation of offshore grid for the target of 300 GW in 2050 are being prepared and facilitated.

Baltic Energy Market Interconnection Plan

According to the Baltic Energy Market Interconnection Plan (BEMIP), interconnection between Member States in the Baltic region will be developed. It is a priority corridor for the EU to end the energy isolation of the Baltic States, to improve the internal grid and to foster market integration.

The TSOs of the three Baltic States are de-synchronizing from the Russian and Belarussian electricity system and instead synchronize their grids with the Continental European Network (CEN) through the existing interconnection between Lithuania and Poland and through the Baltic WindConnector mentioned before.



Source 1: https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2022/public/RegIP-2022-BS.pdf
Source 2: https://energy.ec.europa.eu/topics/infrastructure/trans-european-networks-energy_en
Source 3: https://www.50hertz.com/en/News/FullarticleNewsof50Hertz/13472/50hertz-and-estonian-transmission-system-operator-elering-to-build-submarine-cable-between-estonia-and-germany
Source 4: https://energy.ec.europa.eu/system/files/2022-12/Infrastructure_factsheet_BEMIP.pdf
Source 5: Studzieniecki (2022)

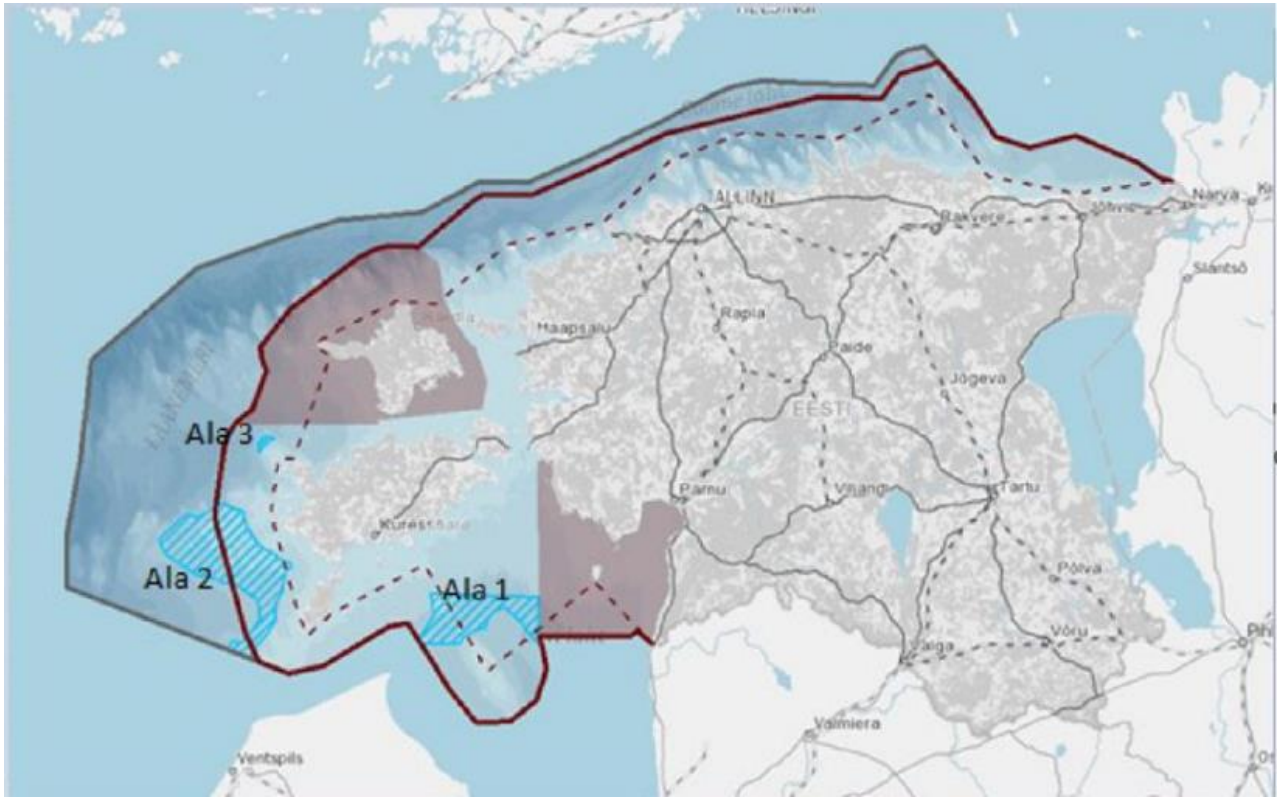
Estonia

Policy plan

In the past years, Estonia has developed specific offshore wind energy targets in its policies and strategies.

The “National Development Plan of the Energy Sector until 2030” from 2017, set out a target for the use of renewable energy sources accounting 40% of total expected annual electricity demand in 2030. At the end of 2022, the Estonian government endorsed a list of activities to facilitate and speed up the country’s transition to the use of renewable energy, with the focus on wind energy, and set this goal to 100%.

The “Estonia’s 2030 National Electricity and Climate Plan” published in 2023, names the development of windfarms (including offshore windfarms) as one of the main actions for the energy sector until 2030. The key issue mentioned for the energy sector, concerns the connectivity to the European grid network. The report highlights the offshore wind potential of Estonia: in the upcoming years until 2030, 14 offshore windfarms with a total installed capacity of 7 GW and an annual energy production of 26 TWh can be developed and realized around the coast of Estonia. The western coastal area of Estonia has been identified as the key offshore wind energy development area (see map to the right). The potential for wind energy development for these areas is roughly 7000 MW in total (area 1: 3000MW, area 2: 4000 MW and area 3: 150 MW). However, the above mentioned total installed capacities is an indication since much will depend on the future developments between the areas.



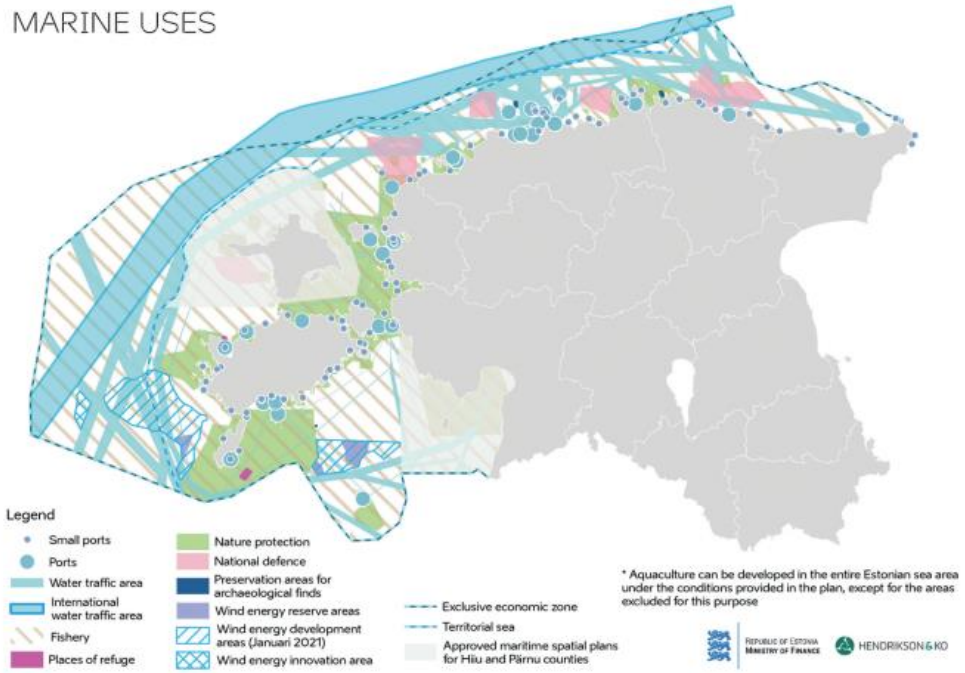
Source 1: https://faolex.fao.org/docs/pdf/est199996.pdf,
Source 2: https://news.err.ee/1608695428/estonia-sets-2030-target-for-renewable-only-electricity
Source 3: https://www.mkm.ee/en/energy-sector-and-mineral-resources/energy-economy/national-energy-and-climate-plan
Source 4: https://op.europa.eu/en/publication-detail/-/publication/9590cdee-cd30-11e9-992f-01aa75ed71a1/language-en

Estonia

Maritime spatial plan

The Estonian Maritime Spatial Planning is part of the “National Spatial Plan Estonia 2030+” published in 2022. In the Maritime Spatial Planning, the Western coastal areas have been mapped as the most suitable offshore wind areas (see map above to the right). The Northern coastal areas of Estonia were excluded for offshore wind purposes, due to national-defense interests. Offshore wind farms may be planned in the mapped areas by providing the offshore wind farm sufficient distance to mainland and permanently inhabited islands, preserving heritage and nature conservation assets, migrations corridors and by ensuring the national-defense interests. Within the national MSP, two regional MSPs cover specifically the Hiiu islands and Pärnu Bay area.

The Maritime Spatial Plan is currently focusing on the principles of the spatial development instead of focusing on a detailed scale.



Offshore grid infrastructure plans

AS Elering is the Estonian state-owned national company responsible for the development of the grid infrastructure. AS Elering, together with the other Baltic TSOs, is currently integrating Estonia and the other Baltic countries to the European grid infrastructure. Moreover, Estonia is currently synchronizing its power grid with the other Baltic countries. According to the current plan, Estonia will be completely decoupled from the Russian system and integrated to the European grid system in January 2026.

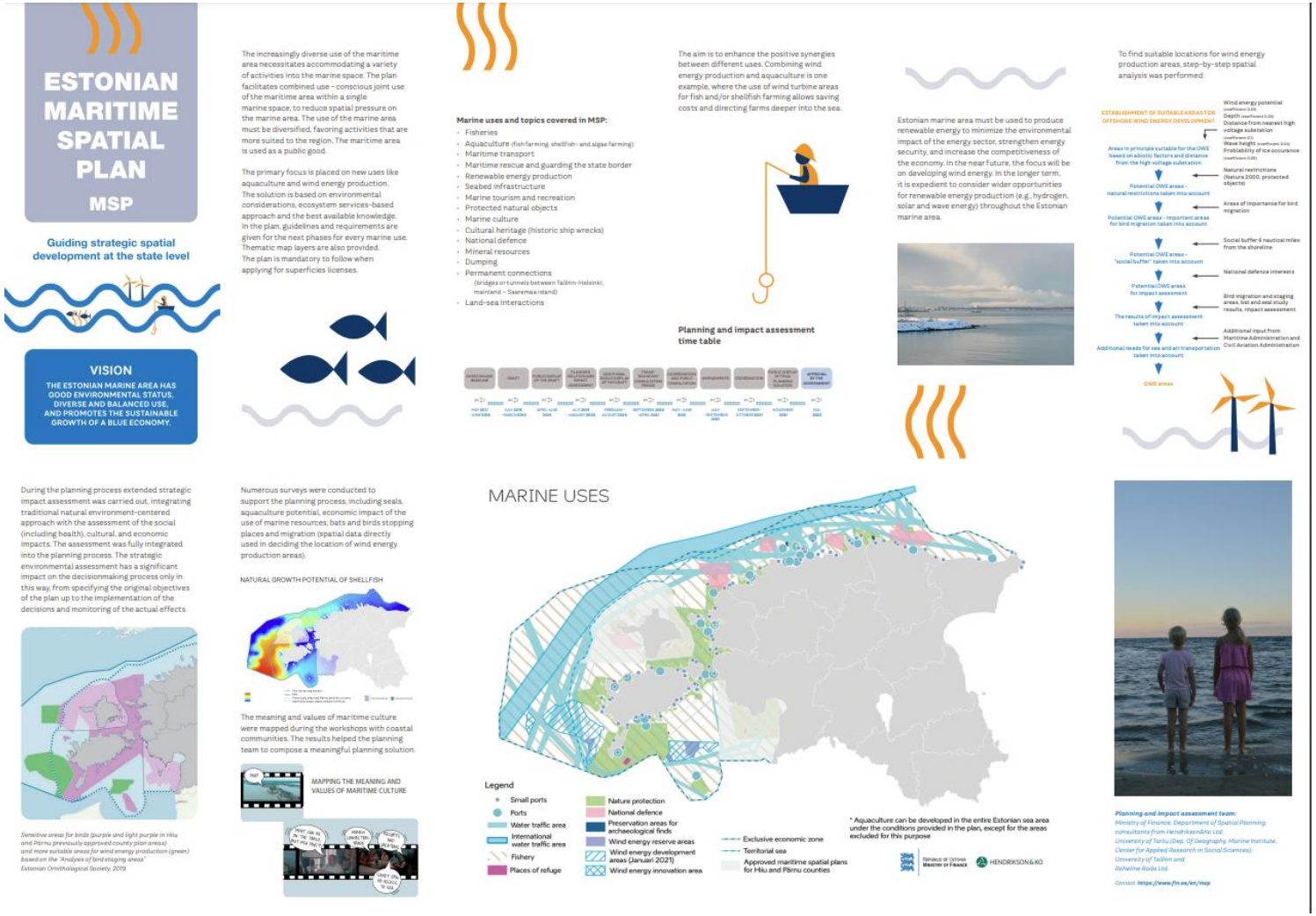
The grids on the largest islands of Saaremaa and Hiiumaa need to be upgraded to be able to integrate larger amounts of renewable energy. Grid upgrades on Saaremaa could be classified as ‘overriding public interest’ in line with REPowerEU. Since the national stakeholder meeting (NSM) in September 2022 this recommendation has been followed by the Ministry of Economic Affairs and Communications, who has issued guidelines to the transmission system operator Elering for planning a 330kV transmission line to Saaremaa.

Source 1: https://www.fao.org/faolex/results/details/en/c/LEX-FAOC197091/,
Source 2: https://www.fin.ee/en/state-local-governments-spatial-planning/spatial-planning/maritime-spatial-planning
Source 3: https://news.err.ee/1608666562/economy-ministry-wants-special-plan-from-hiiumaa-offshore-wind-developer
Source 4: https://planeerimine.ee/hiiu-mereala-ruumianaluus/

Estonian maritime spatial plan

The Estonian Maritime Spatial Plan is characterised by the following long-term trends:

- The use of marine area will intensify.
- New uses, such as renewable energy and infrastructure, will emerge.
- Traditional uses will diversify.



Source: https://maritime-spatial-planning.ec.europa.eu/sites/default/files/download/estonia_november_2022.pdf

Estonia

Policy plan and projects waves

To further enable offshore wind energy projects, the government is combining expert groups of ministries and market participants with the purpose of mapping possible cooperating countries. Lists of possible joint projects and measures with a clear overview of all the possible project in Estonia will be shared with the cooperation parties and will be updated in the upcoming years based on the development plans.

The set of offshore wind farms will be done in two phases. The first phase projects are planned to be completed in 2028 and consists of three large projects being:

- The project by Saare Wind Energy & Van Oord (6 TWh yearly)
- The project by Enefit Green (4 TWh yearly)
- The project by Utilitas (6 TWh yearly)

Second wave

The second wave of projects holds several tenders and permit applications. In March 2023, the Ministry of Economic Affairs and Communications stated that the permit application procedure time will be reduced, and the current three permits will be combined to one permit for the development of an offshore windfarm. In 2023, the Ministry invited developers to apply for an area within the proposed areas following the MSP.

When a developer applies for an area with a proposed size, the Ministry will take this as a base and the Ministry will send it back to the developer after assessing the area. The developer improves the application and re-applies. This happens in the period of May 2023 to August 2023. Most of these applications will overlap. The applicants are qualified based on 12 points that focus on the environmental considerations, the economic strength of the application and the period of developing and construction.

After the assessments and the qualification of participants, the tenders will be carried out in the form of auctions where price will be the only criteria and in November 2023 the superficies license procedure starts. The tender periods of multiple areas is expected to be between September and October. The competitive tender minimum requirements are:

- A 75 sq km area
- A Starting price of €15 000

The actual size and number of turbines of these areas is thus not decided upon yet and is decided upon by the winning developer.

Sources: The Ministry of Economic Affairs and Communication and the Estonian Wind Power Association

First and second wave projects

First wave

The first wave projects consist of the three areas of Saare Wind Energy, Utilitas and Enefit Green.

Second wave

The second wave projects consist of the other areas with many wind farm applications overlapping because the applications are smaller than the originally proposed areas as drawn in the figure on the right. The ELWIND project belongs to this second wave of projects.

In April 2023, there were more superficies license areas applications than the 35 that correspond to the MSP. The government and wind farm development dashboard can be accessed via the link in the sources.

Source: The Estonian Wind Power Association
The wind farm dashboard can be accessed via: https://xgis.maaamet.ee/xgis2/page/app/TTJAhoonestusload

Estonia

Relevant authorities

Stakeholder	Role
Ministry of Economic Affairs & Communications	The Consumer Protection and Technical Regulatory Authority (CPTRA) manages the state consent process
Ministry of Finance	Manages the process of spatial planning
Ministry of Environment	Responsible for the Strategic Environmental Assessment (SEA)
AS Elering (grid operator - TSO)	Issues grid connection permits

Permitting procedure

1. State consent: The consent is given by the Consumer Protection and Technical Regulatory Authority (CPTRA). In case more than one party is interested, a tender for state consent shall be organized. A state consent is valid for 3 years (extension of 2 years possible). Within this time period the developer is obliged to commence the construction activities of the offshore wind farm.
2. Permit for the special use of water & Environmental Impact Assessment (EIA): The permit is granted by the Ministry of Environment. The Water Act is the most relevant legislation affecting the development and planning of offshore wind farms. An EIA is mandatory for offshore wind farm development under the Environmental Impact Assessment and Environmental Management System Act.
3. Construction permit: The permit is granted by the Ministry of Economic Affairs & Communications based on the Building Act.
4. Permit for use of the construction and generate electricity: The Electricity Market Act enacts the authorization to use a site in an area of public water and generate electricity.

The Estonian government has announced that they are intending to simplify the permit granting process and development process of renewable energy projects. The timeline of this development is yet to be set.

Source 1: https://blixconsultancy.com/wp-content/uploads/2021/06/Offshore-wind_Market-study-Baltics_Results.pdf
Source 2: https://op.europa.eu/en/publication-detail/-/publication/9590cdee-cd30-11e9-992f-01aa75ed71a1/language-en

Estonia

Offshore wind projects

The following table provides an overview of the offshore projects currently being planned/developed in Estonia:

Project name/area	Status	Comment	Capacity	Expected operation date	Owners
ELWIND	Tender will be held 2026. Connection is secured by the States. Pre-studies have been carried out by the governments.	The total area consists of an Estonian area and a Latvian area.	700-1000 MW	2030	Governments of Estonia and Latvia for now. Tender winners later
Hiiumaa / Hiiu	Permitting on hold. Preliminary design and technical analysis completed at the end of 2022. EIA near completion.	Wind area was reassessed but with current developments the permits are expected to be granted. Project was already initiated in 2006.	1100 MW	2030	Enefit Green
Kihnu Islands / Tuuletraal	Awaiting permit. EIA programme proposed in 2020, including FS on hydrogen production.	Kihnu Island residents are worried about the developments.	350 - 1050 MW	2028	Tuuletraal OÜ
Liivi Offshore OÜ (Gulf of Riga)	EIA currently on-going and to be completed by 2024. Analysis of technical solutions was finished in 2022. National specific plan for grid connection to be completed by 2026.	The most advanced offshore wind development in the Baltic States to date. The construction permit was already submitted in 2010.	1000 MW	2028	Enefit Green (Before: Eesti Energia) in joint venture with Ørsted

Source 1: https://elwindoffshore.eu/
Source 2: https://balticwind.eu/the-preliminary-design-of-the-hiiu-offshore-wind-farm-will-be-completed-by-autumn/
Source 3: https://www.4coffshore.com/windfarms/estonia/tuuletraal-estonia-ee12.html
Source 4: https://liivimeretuulepark.ee/en/projekti-info

Estonia

Offshore wind projects

The following table provides an overview of the offshore projects currently being planned/developed in Estonia:

Project name/area	Status	Comment	Capacity	Expected operation date	Owners
Saaremaa	In permitting application process.	Construction activities start in 2026. Van Oord is a shareholder as well.	1400 MW	2028	Saare Wind Energy and Van Oord
Saare-Liivi 1-5 (Gulf of Riga)	EIA approved by CPTRA. Technical and financial preparation is ongoing. Aim to obtain construction permits in 2025.	Potential largescale hydrogen development.	1200 MW	2028	Utilitas
SW 1-13	Concept/Early planning Submitted applications.	13 submitted applications near Hiiumaa and Saaremaa islands.	Up to 1000MW+	-	Sunly OÜ

Source 1: https://www.swe.ee/en/
Source 2: https://saareliivituulepark.ee/en/
Source 3: https://www.4coffshore.com/windfarms/estonia/
Source 4: https://investinestonia.com/estonias-emerging-offshore-wind-tech-innovation-and-manufacturing-hub/

Latvia

Policy plan

“Latvia 2030 - Sustainable Development Strategy of Latvia until 2030” was published in 2010 on behalf of the Ministry of Regional Development and Local Government. In the report, it is mentioned that in 2030, 50% of Latvia’s total final energy consumption will come from renewable energy sources and that wind power (mainly onshore) will account up to 15% of the electricity production. In the report it is also stated that potential offshore wind farms may be hindered due to lack of regulation and due to the high costs of wind farms, therefore implementation of wind farms shall be done gradually.

“Latvia’s National Energy and Climate Plan 2021-2030” was published in 2020 and states the principals for the long-term planning concerning energy and climate policy (see map). In the plan the task of implementing an international project for the construction of the Estonian-Latvian offshore wind farm (ELWIND) in the period up to 2030 has been confirmed.

Due to financial reasons, Latvia aims to use its onshore potential first and the offshore potential will possibly be developed in the future. Following an estimate in the plan, Latvia has the potential to develop 29 offshore wind farms with a capacity of 15.5 GW and an annual production of 49.2 TWh. Before high-capacity wind projects can be implemented in Latvia, the limiting factors need to be considered such as: the spatial planning conditions, administrative barriers and the limited capacity of the transmission system need to be remedied.

Some offshore developments are moving slowly, but regulation is missing as of now. Estimates by the Latvian Wind Energy Association states that the Ministry of Climate & Energy is gathering information on how auctions work. The State will not execute prior sea-bed research or environmental assessments or use a Contract for Difference system because the offshore wind energy will almost all be exported.

Source 1: https://www.pkc.gov.lv/sites/default/files/inline-files/LIAS_2030_en_1.pdf
Source 2: https://www.em.gov.lv/en/national-energy-and-climate-plan-2021-2030

Latvia

Offshore grid infrastructure plans

Augstsprieguma tīkls (AST) is a state-owned company responsible for the grid infrastructure in Latvia. Currently, AST is building two transmission lines between Latvia and Estonia as a part of the grid synchronization with Europe. The transmission line between Valmiera (LV) and Tartu (EE) is estimated to be ready this year (2023) while the second transmission line between Valmiera (LV) and Tsirguliina (EE) is estimated to be finished next year. According to AST, the synchronization of the Latvian grid to the European electric power networks is planned for 2025 (see figure to the right).

Latvian and Estonian transmission system operators AST and AS Elering are responsible for infrastructure development and connections to the electricity transmission networks in each country respectively and are also together involved in the implementation of the ELWIND project. In 2021, AST and AS Elering conducted a route study for possible project infrastructure connection options, as well as a marine technical catalogue study for possible offshore infrastructure options and costs. AST is involved in all the development processes of this project.

Maritime spatial planning

The “Maritime Spatial Plan for Internal Waters, Territorial Waters and Exclusive Zone of the Republic of Latvia” lays down the maritime spatial planning until 2030. In the report, the Northern part of Gulf of Riga as well as the high sea near the cost of Kurzeme are identified as the most suitable locations for offshore wind. Theoretically, it is possible to develop an offshore wind farm with an installed capacity of 800 MW in each research area with a total of 4 GW (see next slide: areas marked in orange are considered as research areas for wind development).

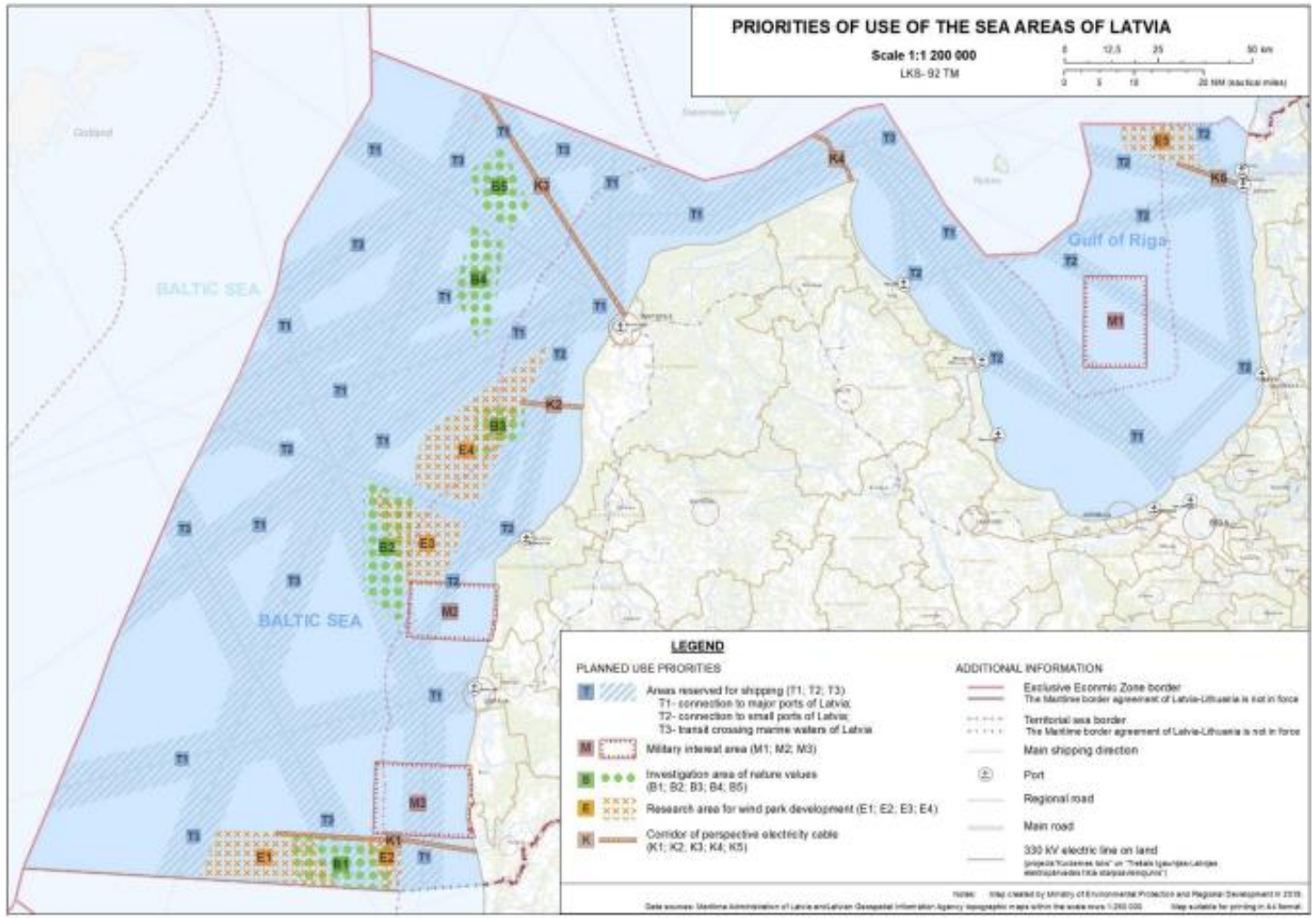
Project	The Kurzeme ring	Line Riga CHP-2 - Riga HPP	Latvia - Estonia third interconnection	Synchronisation, 1st phase			Synchronisation, 2nd phase
				Line Valmiera (LV) – Tartu (EE)	Line Valmiera (LV) – Tsirguliina (EE)	System synchr. and inertia equipment	
Completion of the project	2019	2020	2021	2023	2024	2025	2025
Total costs, including:	128 MEUR	15 MEUR	83 MEUR	23 MEUR	22 MEUR	32 MEUR	100 MEUR
EU co-financing	55 MEUR	7 MEUR	51 MEUR	17 MEUR	17 MEUR	24 MEUR	55 MEUR
Overload charge revenue	11 MEUR	7 MEUR	31 MEUR	6 MEUR	5 MEUR	7 MEUR	25 MEUR
Line length	214,3 km	13 km	180 km	49 km	49 km		

Source 1: https://ast.lv/lv
Source 2: https://www.varam.gov.lv/en/maritime-spatial-planning
Source 3: https://ast.lv/sites/default/files/editor/AST_10GAP_2023_2032_ENv6.pdf

Latvian maritime spatial plan

The Latvian Maritime Spatial Plan is characterized by the following long-term trends:

- Issues with shipping, ports, nature conservation, coastal tourism, cables and scientific activities will arise in the sea
- New uses, such as renewable energy and infrastructure, are emerging
- Marine aquaculture and oil extraction are also feasible.



Source: https://maritime-spatial-planning.ec.europa.eu/sites/default/files/download/latvia_nov2022.pdf

Latvia

Relevant authorities

Stakeholder	Role
Ministry of Climate and Energy	Responsible for area determination, tendering and licensing. Manages the process of spatial planning
State Construction Control Bureau	Responsible for construction process and its legality
Augstsprieguma tīkls (grid operator - TSO)	Issues grid connection permits

Permitting procedure

As a first step, the developer is required to apply for a site which must be included in the areas designated for offshore development in the MSP. After the application is accepted by Ministry and the Cabinet Order and the area has been approved, the Ministry will announce a tender concerning the right to use the area in the sea. The winner of the tender receives the following licenses:

1. License for Use of Area in the Sea: The license is valid for 30 years.
2. License for Research Area in the Sea: The license is required for the obligatory Environmental Impact Assessment and is valid for 2 years.
3. License for Exploitation: This license is issued after the constructed wind farm is approved by the State Construction Control Bureau. The license has the same expiry date as the license for use of area in the sea.

Source 1: https://blixconsultancy.com/wp-content/uploads/2021/06/Offshore-wind_Market-study-Baltics_Results.pdf
Source 2: Study in Baltic offshore wind energy cooperation under BEMIP countries (2019)
Source 3: Embassy of the Kingdom of the Netherlands in Latvia (2023)

Latvia

Offshore wind projects

The following table provides an overview of the offshore projects currently being planned/ developed in Latvia:

Project name/area	Status	Comment	Capacity	Expected operation date	Owners
ELWIND (= Research Area E4)	Tender will be held 2026. Connection is secured by the States. Pre-studies have been carried out by the States.	The total area consists of an Estonian area and a Latvian area	700-1000 MW	2030	Governments of Estonia and Latvia for now, tender winners later
Kurzeme offshore wind project	Application has been submitted. The area will be subject to an upcoming tender process.	EIA will be conducted once the research license is obtained.	1000 MW	2030	Eolus and PNE
To be announced	Memorandum of Understanding signed between the parties. Initial studies conducted by Eolus.	Development of offshore projects outside the Latvian coast.	1000 MW	2030	RWE and Latvenergo
Research areas E1, E2, E3, E5 (E4 = ELWIND)	Areas determined. Research shall be issued by Ministry of Economics.	-	At least one area up to 800 MW		

Source 1: https://elwindoffshore.eu/
Source 2: https://www.rwe.com/en/press/rwe-renewables/2022-09-16-rwe-and-latvenergo-team-up-on-offshore-wind-in-the-latvian-baltic-sea/
Source 3: https://www.pne-ag.com/en/newsroom/news/article/eolus-and-pne-start-co-developing-offshore-wind-in-latvia

Lithuania

Policy plan

The Lithuanian government prepared in 2018 the "National Energy Independence Strategy" which defines Lithuania's long-term goals for renewable energy. The targets of this strategy for Lithuania's final electricity consumption sourced from renewables is 30% by 2020, 45% by 2030 and 80% by 2050. For power generation alone, the country aims for a renewables share of 45% by 2030 and 100% by 2050.

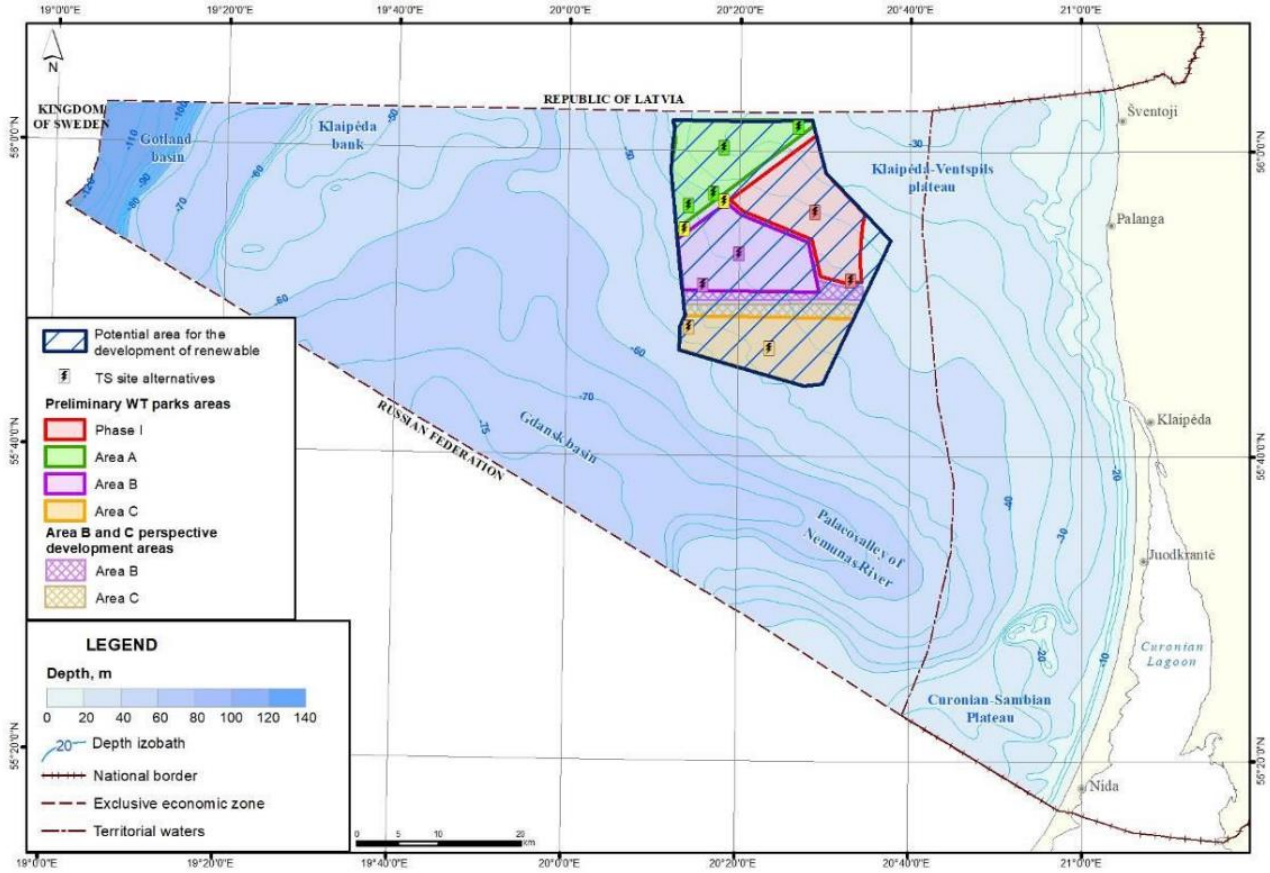
Offshore wind policy

It is expected that wind power (mostly onshore) will cover more than half of the renewable energy sources for electricity generation in 2030 and 2050. In the "National Energy and Climate Action Plan of the Republic of Lithuania for 2021-2030" from 2019, 700 MW of installed offshore wind capacity is predicted by 2030. To achieve this, a Government Resolution was adopted in June 2020 to build and start operation of the first 700 MW offshore wind farm by 2030.

On 31 March 2022, the Lithuanian parliament adopted a package of legislation approving the development of offshore wind energy in its territorial waters. The amended Law on Renewable Energy and Electricity sets out the conditions for the offshore wind tenders.

The National Energy Regulatory Council (VERT) launched the first tender on the 30th of March 2023 and the second is expected in September 2023. The EIA for the first tender should be executed by the winning developer. The EIA for the second tender is almost finished.

The Ministry of Energy has identified four offshore windfarm areas that could eventually be developed off the Lithuanian coast (see map to the right). The capacity and timing of these potential projects will depend on future research and completion of infrastructure and other preparatory work.



Source 1: https://www.iea.org/articles/lithuania-electricity-security-policy
Source 2: https://www.rivieramm.com/news-content-hub/news-content-hub/lithuania-adopts-offshore-wind-law-paving-the-way-for-2023-auction-70495
Source 3: https://www.vpvb.gov.lv/lv/media/3585/download

Lithuania

Offshore grid infrastructure plans

Pursuant to the Law on Electricity, LitgridAB is the state-owned TSO of Lithuania, responsible for the development and operation of the national grid infrastructure.

In June 2022, Litgrid AB released The Development Plan of the Electric System and Transmission Grid 2022-2031. The Plan is prepared in accordance with the National Energy Independence Strategy (NEIS) and the National Energy and Climate Action Plan for 2021-2030 (NECP). Like the TSOs of the other Baltic States, Litgrid is currently focusing on the works of desynchronization from the Russian power grid and synchronization with the European power grid. The main goal is the connection of the Lithuanian electric power system with the continental European networks (CEN) for synchronous operation and renewable energy sources integration.

Another goal of the state is the rapid increase in electricity production from renewable energy sources. For this purpose, the generation of green electricity is promoted and expanded. It is planned for 2030 to have a network of 1.4 GW of offshore wind power plants, 3.6 GW of onshore wind power plants and 2 GW of solar power plants.

Considering the approved NEIS, the development of the two planned 700 MW offshore wind farms with an installed capacity of 1400 MW is anticipated. The connection of these offshore wind farms developed in phase I (planned until 2028) to the 330 kV network does not require additional 330 kV TS development on land. Since the ownership boundary is planned at the Darbėnai switchyard on the rear coupling, the entire marine (including part of the land cable) infrastructure (marine cable and platform) will be owned and developed at the producers' expense. LitgridAB will not own or operate this (part of) infrastructure.

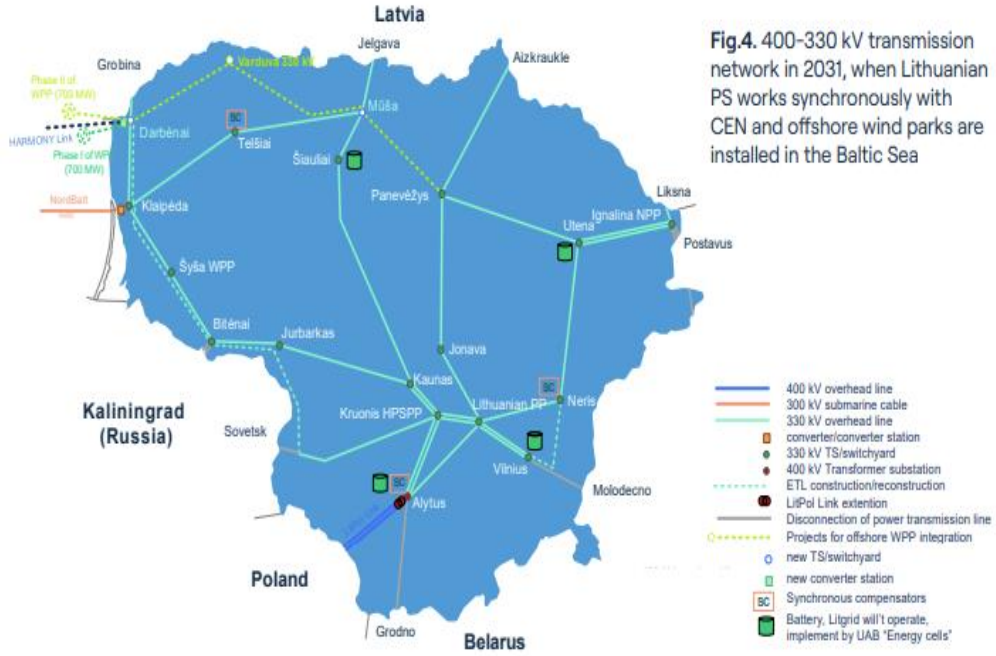


Fig.4. 400-330 kV transmission network in 2031, when Lithuanian PS works synchronously with CEN and offshore wind parks are installed in the Baltic Sea

Source 1: https://blixconsultancy.com/wp-content/uploads/2021/06/Offshore-wind_Market-study-Baltics_Results.pdf.
Source 2: https://www.litgrid.eu/index.php/grid-development-/-electricity-transmission-grid-ten-year-development-plan/3851
Source 3: https://www.litgrid.eu/uploads/files/dir618/dir30/dir1/12_0.php

Lithuania

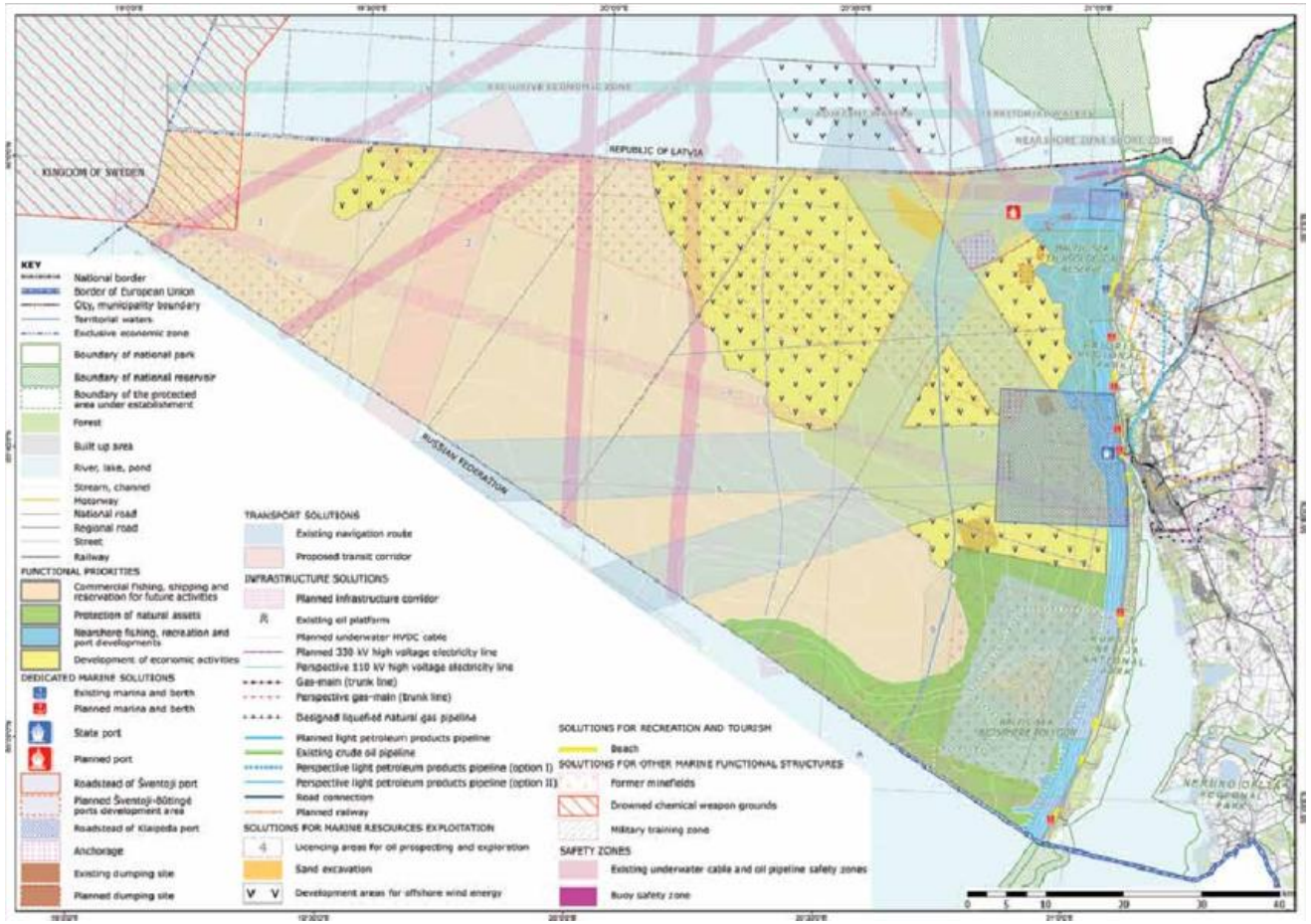
Maritime spatial plan

In September 2021, Lithuania has adopted its new Comprehensive Plan (its second) that includes maritime spatial planning. The Lithuanian version is available at the portal of spatial planning documents (see link below). The strategic section called the Concept of Comprehensive Plan for the territory of the Republic of Lithuania (CPRL) was approved by the Parliament on 4 June 2020.

The first maritime spatial plan was elaborated as a part of the Comprehensive Plan for the Republic of Lithuania by including a section on “Maritime territories“. The “Maritime territories” section was adopted by the Parliament of the Republic of Lithuania in 2015. This plan expired in 2020 and the new Comprehensive Plan is now in force.

The objectives of the first MSP were: to ensure the transparent, known conditions of the uses of the territory in the whole state and in the space under responsibility of the Republic of Lithuania, and consequently, to implement a plan for the land and sea territory in one document.

In the former plan, various suitable areas for offshore wind development are identified within the borders of the Exclusive Economic Zone of Lithuania. Currently, the upcoming two tenders are in the largest yellow area as seen to the right.

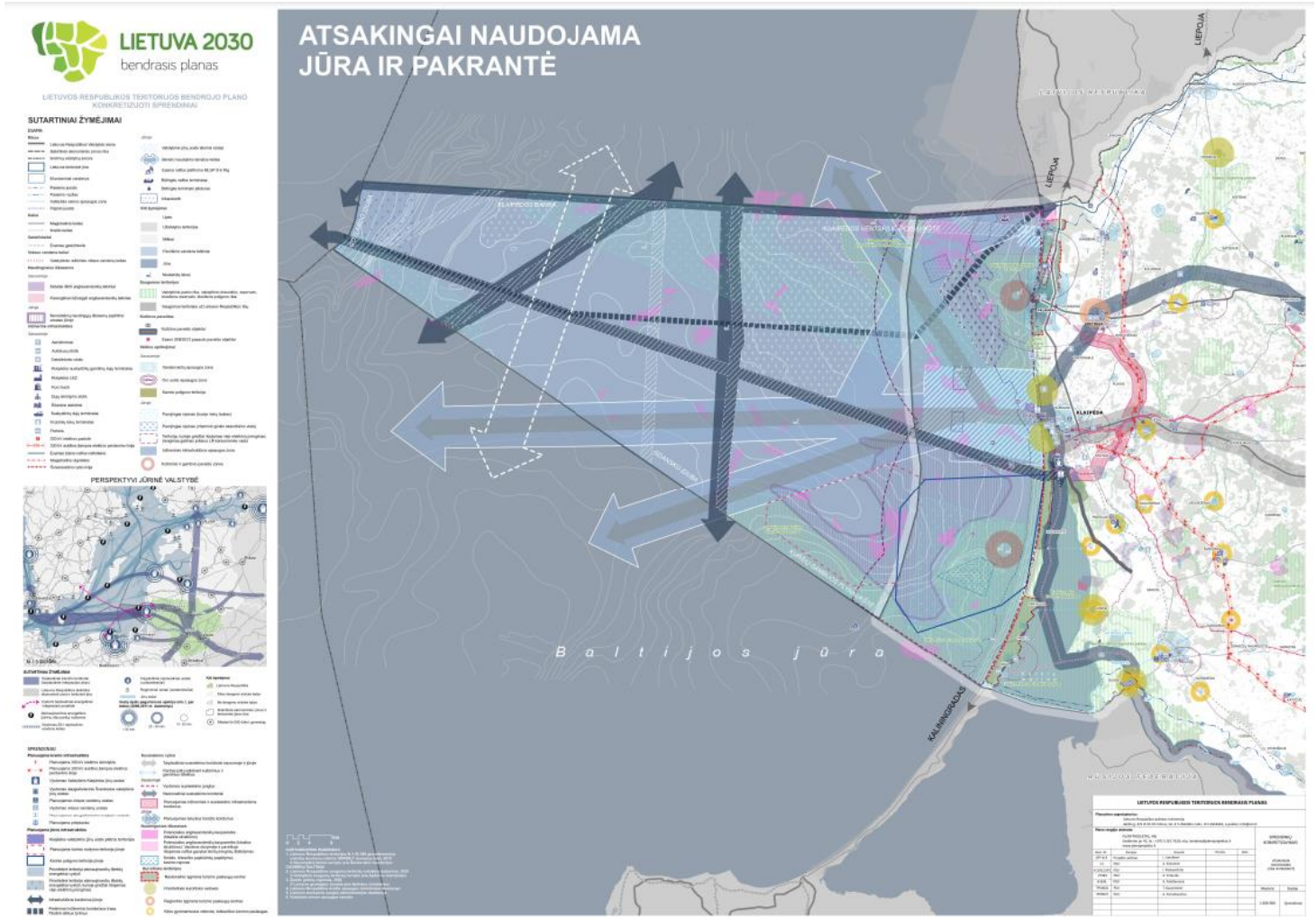


Source 1: https://maritime-spatial-planning.ec.europa.eu/countries/lithuania
Source 2: https://www.litgrid.eu/index.php/grid-development-/-electricity-transmission-grid-ten-year-development-plan/3851
Source 3: https://www.tpdris.lt/lt_LT/web/guest/sarasas by entering plan number: K-NC-00-17-288, choosing “Rengimo etapas“ and then “TPD sprendiniai (aiškinamasis raštas ir brėžiniai)“
Source 4: https://www.researchgate.net/figure/Concept-of-development-of-maritime-activities-Compiled-by-V-Jurkin-2014_fig5_268218585

Lithuanian maritime spatial plan

The Lithuanian Maritime Spatial Plan is characterised by the following long-term trends:

- The relatively small area accommodates four main navigation routes, several ports, a UNESCO World Heritage site, Natura 2000 sites, offshore military areas, near shore fishery bars and offshore fishing areas
- Future uses such as planned underwater high voltage electricity link to Sweden and offshore wind energy areas or sand extraction areas
- The balance between nature protection and recreation



Source: https://maritime-spatial-planning.ec.europa.eu/sites/default/files/download/lithuania_july_2022.pdf

Lithuania

Relevant authorities

Stakeholder	Role
Ministry of Energy	Coordinates and assigns parties to prepare EIA, wind and geotechnical studies
Ministry of Environment	Authorizing of the MSP, sets the environmental requirements for the development permit and EIA, grants construction permit
National Energy Regulatory Council	Assessment and granting of the development permit
Litgrid AB (grid operator - TSO)	Responsible for the onshore grid and possible also for the future grid.

Permitting procedure

Even though legislative ground for offshore wind development was laid in May 2011 and the Government criteria for the first offshore wind tender by January 2013, there was no legislation that allowed developers to perform seabed surveys and technically this prevented any development works for offshore wind projects until the amended Law on Renewable Energy and Electricity. Figures on the next two slides present the timeline of the first two 700 MW offshore wind tenders in Lithuania.

Before the expected auction with state-aid later in 2023, the Ministry of Energy ensures the preparation of technical studies such as: the Strategic Environmental Assessment (SEA), the Environmental Impact Assessment (EIA), detailed maritime plan for the area, wind energy studies and seabed surveys. After all these necessary studies are prepared, all the interested developers need to follow the following permitting steps to develop their project for the specified area:

1. Development Permit, developers will bid in the auction for the right of the Development Permit for a period of 41 years, including a Contracts for Difference subsidy for a period of 15 years (currently under discussion by the Parliament).
2. Construction Permit, the developer needs to apply with their own offshore wind farm design for a construction permit from The State Territory Planning and Construction Inspectorate under the Ministry of Environment.
3. Generation Permit.

Source 1: https://blixconsultancy.com/wp-content/uploads/2021/06/Offshore-wind_Market-study-Baltics_Results.pdf
Source 2: Study in Baltic offshore wind energy cooperation under BEMIP countries (2019)

Lithuania

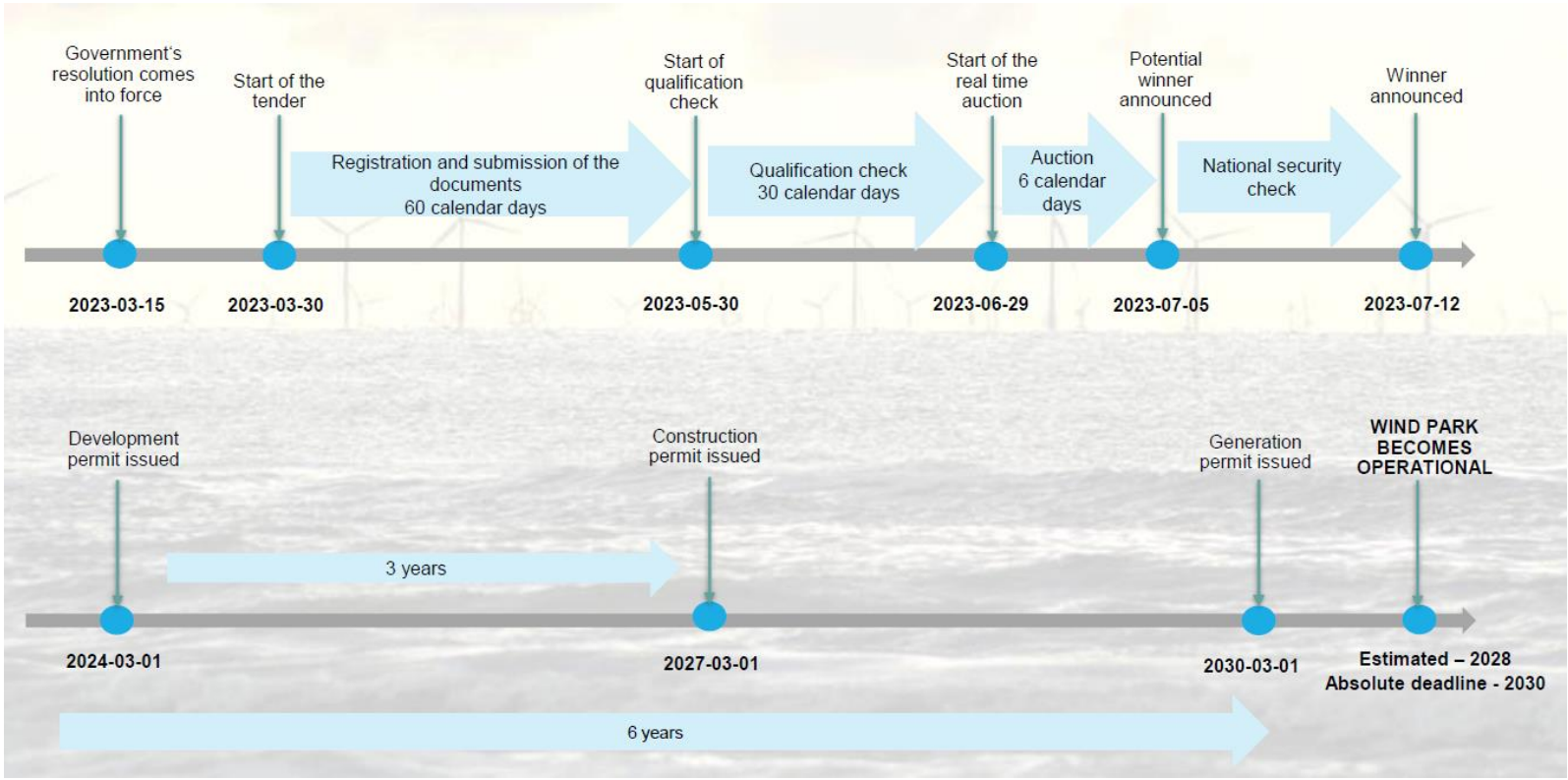
Preliminary timeline offshore wind project (Lithuanian tender 1)

For this tender, developers had until the end of May 2023 to register and submit the documents.

The tender winner gets a 41-year development and exploitation permit, and is required to build the offshore wind farm, substation and electrical infrastructure till the TSO connection point and should compensate the TSO for reaching this connection point. The winner must build a substation as well.

A Contracts for Difference system is not applied as opposed to the next tender but there is a possibility of state-aid. If developers refuse state-aid, they bid for a certain fee.

The maximum production capacity is 700 MW for this tender, so the installed capacity may be higher.



Source: Lithuanian Wind Energy Association

Lithuania

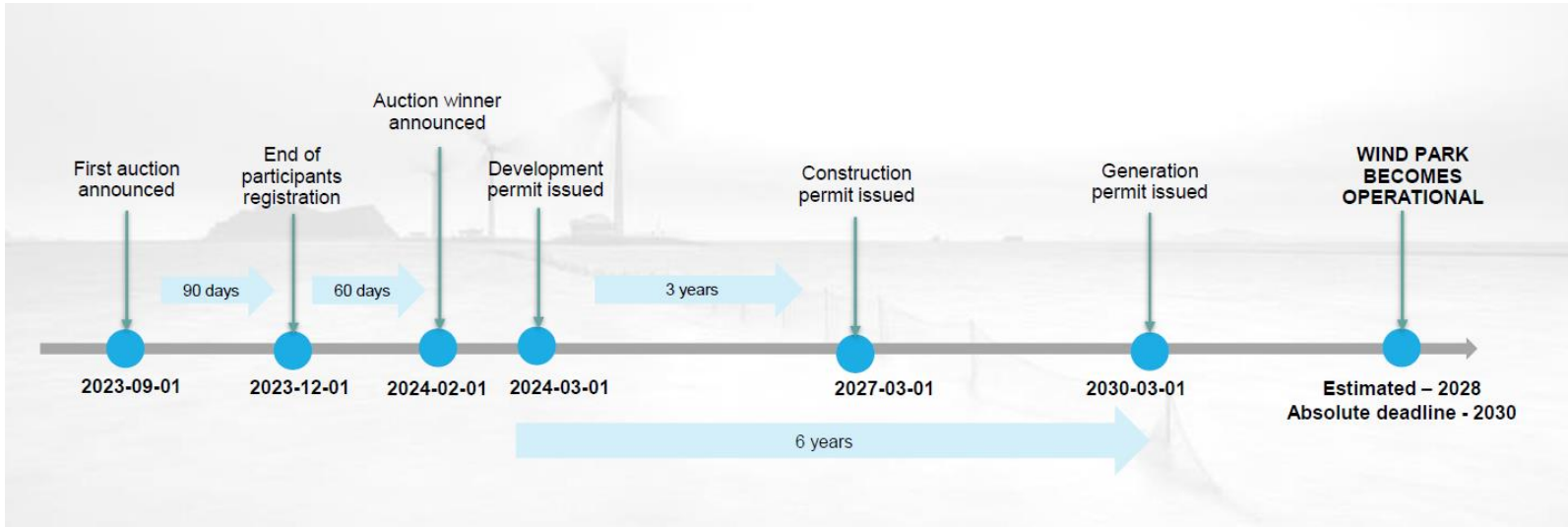
Preliminary timeline offshore wind project (Lithuanian tender 2)

For this tender, developers have until the end of 2023 to register and submit the documents. The tender is expected to be opened by September 2023.

The tender winner gets a 41-year development and exploitation permit, and is required to build the offshore wind farm, substation and electrical infrastructure till the TSO connection point and should compensate the TSO for reaching this connection point. The winner must build a substation as well.

A Contracts for Difference system is applied. The maximum installed capacity for this tender is 700 MW.

Contrary to the previous project, state-aid in the form of subsidies from the Lithuanian government is potentially available for this tender.



Source: Lithuanian Wind Energy Association

Lithuania

Offshore wind projects

The following table provides an overview of the offshore projects currently being planned/ developed in Lithuania:

Project name/area	Status	Comment	Capacity	Expected operation date	Owners/Initiators
Lithuanian Tender 1 Offshore wind farm in the Baltic Sea (near Palanga)	Tender issued	The National Energy Regulatory Council (VERT) launched tender on 30 March 2023. Deadline for bidders is 60 calendar days from the date of publication of the competition notice.	580 - 700 MW	2028	Government of Lithuania (Ministry of Energy)
Lithuanian Tender 2 Offshore wind farm in the Baltic Sea (near Palanga)	EIA finished. Wind measurement, geological and geotechnical studies on-going	Tender expected to be launched in autumn 2023 (September). On 19 April 2023 EIA public presentation and information event in Palanga.	700 MW	2028	Government of Lithuania (Ministry of Energy)

Source 1: https://www.vert.lt/elektra/Puslapiai/J%C5%ABrinis%20projektas/Konkursas-organizuojamas-pagal-AIE-istatymo-221-str--nuostatas-(netaikant-skatinimo).aspx
Source 2: https://offshorewind.lt/en/

Port Analysis

Baltic States

In order to develop offshore wind energy, massive investments are needed in offshore grid, vessels and port facilities. The presence of port infrastructure is a prerequisite for manufacturing, assembly and installation infrastructure to deliver offshore wind farms.

In the Marienborg Declaration for offshore wind farms, the Baltic States recognize the need for port improvements and the possibility to use the EU Recovery Funds for this is taken into consideration. Port infrastructure investments will be able to create local income and employment and other Baltic countries could also make use of the ports. This will strengthen regional cooperation.

To secure a short-term supply, four projects in the Baltic States are proposed for the role of regional LNG import terminals. The proposed projects are in the ports of Klaipeda (Lithuania), Skulte (Latvia), and Paldiski and Tallinn (both Estonia). These developments show that ports are subject to several developments and offshore wind development is one of them.

As can be seen on the right, almost all major ports are located on the Western coast. For marshalling, assembling, installation, and maintenance and operations these locations are strategically located in the Baltic Sea region. However, in order to be competitive these ports need to develop in a specific niche of the offshore wind farm development instead of wanting to do it all. It is expected that only 1 or 2 marshalling ports are needed in the Baltic States, if even developed with regional Baltic Sea port competition.

Source 1: https://www.skultelng.lv/en/regional_lng_terminal/
Source 2: https://www.ts.ee/en/port-of-tallinn-will-build-a-new-quay-in-paldiski-south-harbour-to-service-wind-farms/
Source 3: https://www.nationsonline.org/oneworld/map/Baltic-Sea-map

Port Analysis

Estonia

The Port of Tallinn will build a new multipurpose 310-m quay with a 10-hectare area beyond the existing quay in Paldiski South Harbor. 53 million euros will be invested in this, and the investment is co-invested by the European Commission with an amount of 20 million euros. The new quay will be used for military purposes and for construction and subsequent maintenance of offshore wind farms and is expected to be completed in 2025.

The Port of Tallinn further wants to be the base port to provide services. The Port of Saaremaa is less suitable to be a marshalling/assembly base port but could be used an operations & maintenance port. The shipping company in the Port of Tallinn, TS Shipping, owns the ice breaker vessel.

Latvia

According to the Latvian MSP, there is a desire for future development of the shipping sector, and this shall be matched by the development of large ports and optimal shipping conditions. Latvian ports will have to adapt to technological developments and until now have no experience with offshore wind farms. The Latvian ports call on the energy sector to provide them with support and contribution to the development of ports. Furthermore, the Latvian ports have been meeting and discussing with ministry representatives about their future roles and strategy regarding offshore wind.

The Liepaja port has the best position for working in the offshore wind sector and being the base port. The Liepaja port is connected with the gas pipeline network. However, Ventspils and Riga ports recently have been focusing in a more strategic way on renewables as well. The geopolitical context has forced Latvian ports to reprofile themselves in order to remain competitive and offshore wind belongs to this reprofiling.

Source: https://portofklaipeda.lt/en/port-2/

Port Analysis

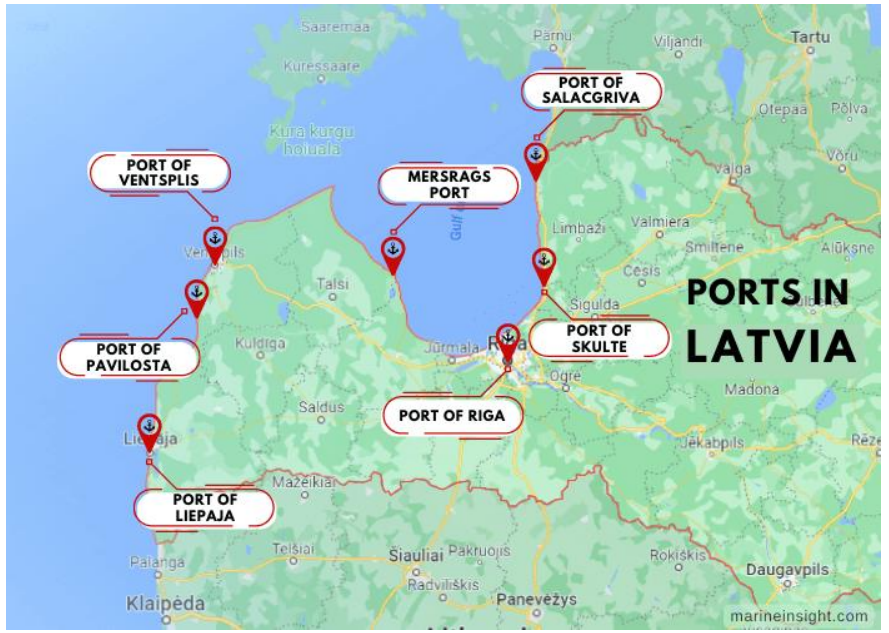
Latvia

Latvia has three major ports: Liepaja, Riga and Ventspils as wel as seven small ports – Skulte, Mersrags, Salacgriva, Pavilosta, Roja, Jurmala and Engure located among the entire Latvian border. With its central location and multiple ports, Latvia could become an important hub for a marshelling/assembly port and operations & maintenance ports of offshore wind farms.

For example the ELWIND farm area is located in the Kurzeme region, between Liepaja and Ventspils, offering great opportunity for the ports to develop capacities supporting OW.

The port of Salacgriva is the closest port for 2 Estonian OWF that are in EIA process (Enefit Green/Orsted and Utilitas). Salacgriva has a very good location to support the construction and O&M activities of wind farms in Gulf of Riga. Notwithstanding that currently the port does not fit with port requirements to support OW yet.

By collaborations between ports and the neighboring countries, the use of its ports could be optimized. Ports in Latvia seem to move ahead of Latvian offshore wind farms as they are planning to get funding and finalize improvements before 2027.



Lithuania

In Lithuania, the port of Klaipeda is investing 27 million euros to upgrade its infrastructure to support the construction of the country's planned 700 MW offshore wind farm. The developments will be carried out together with Klaipeda Sea Cargo Company. Lithuania does have ships that can import goods and can be used to maintain wind farms, but Lithuanian ports will need more improvements.

According to the Lithuanian Wind Power Association, developing port infrastructure will be the biggest challenge in the development of offshore wind energy in Lithuania.

On the Smelte peninsula, the quays will be reconstructed to accommodate for the loading and assembly of wind turbines. Around 20 hectares of land will be used for these activities. Klasco, for its part, undertakes to build the relevant superstructure

Source 1: https://vasab.org/wp-content/uploads/2019/06/BalticLINes_project_findings_2019.pdf
Source 2: The Embassy of the Kingdom of the Netherlands in Latvia (2023)
Source 3: https://portofklaipeda.lt/en/naujienos/the-port-of-klaipeda-launches-the-creation-of-infrastructure-needed-for-an-offshore-wind-farm/

Dutch supply chain assessment

Supply Chain offshore wind farms

Government and institutional support:

- Wind measurements
- Workshops on tender systems
- Site selection
- Route map creation
- Regulation consultancy
- Knowledge sharing via institutions and universities
- Trade mission and network creations

Infrastructure support:

- Port improvements

Feasibility, design & development	Technology supply, engineering & development	Transport & Installation	Operations & Maintenance	End-of-life solutions
• Tender proposals • Consortium • Contracting Structure • Financing • Environmental Impact Ass. • Power Purchase Contracts	• Wind turbine foundation supply • Support structure supplier • System engineering • Intra array cabling • High Voltage Offshore Station • H_2 production, storage, pipelines	• Logistics on land • Logistics offshore • Transport & Installation, mooring, wind turbine, inter array cables, export cables, HV station • Commissioning	• Access systems for personnel, small components and heavy components • HSE protection system • Maintenance planning system, performance monitoring • Environmental monitoring	• Re-use of foundations • Recycling/Re-use • Remanufacturing

Technical total project design

• Site characterisation • Integrated wind farm design: wind farm lay-out, wind farm control, wind turbine rating & dimensions	• Intra array cabling • Export connection • Grid connection • Integrated support structure & transport concept	• H_2 production & storage • Inter array piping • Export pipelines

Pre-competitive R&D. Education & Training

• Wave and wind characterization	• H_2 Systems • H_2 – Electricity integration

Source: Dutch Wind & Water Works

Dutch supply chain assessment

In the table below, the Dutch supply chain is assessed and Dutch companies, company groups and product services are stated below. From this, the opportunities have been derived in the following chapter. Dutch companies have a strong (international) market presence which has the potential to grow even further. To compare, a benchmark is set with companies in the UK and in Denmark. The framework is based on the study by BLIX (2021) and the Wind & Water Works Manual.

Service	Status Dutch companies	Benchmark UK & Denmark
Feasibility, design and development: Development (consultancy) and project management	Dutch companies have offered national and international parties their knowledge on project management, legal advice, early stage consenting and tender support. Offshore wind consultants have significant knowledge on planning and engineering consultancy as well and this knowledge is of use for Baltic and international developers. Especially contracting management between (Dutch) construction & installation companies and developers can take projects to the next phase.	Denmark and the United Kingdom both have several major offshore wind project developers, such as Ørsted A/S, Copenhagen Infrastructure Partners A/S, Copenhagen Offshore Partners A/S, and Shell, BP, SSE Renewables, E.ON UK, Centrica plc. These developers have extensive experience in developing offshore wind projects in Europe and can be strong competitors from Dutch companies in the Baltic States.
Feasibility, design and development: Environmental Impact Assessment and Ecological Surveys	Dutch companies have executed EIAs for the Dutch government and for developers and can assist in, or fully execute EIAs for Baltic governments or for developers as well, depending on the country and offshore wind policy. Offshore wind farms in the Baltic States are in early phases thus Impact Assessments are important for current and future plans. Special focus needs to be put on seabirds in this area, and Dutch bird-detection systems are capable of detecting birds to temporarily stop wind farms.	For EIAs and Ecological surveying, the Dutch firms can expect strong competition from particularly Danish consultancies like COWI A/S, K2 Management, Ramboll and Niras. Besides, UK firms are among the market leaders in undertaking survey work for UK wind farms, such as ESS Ecology and Gardline, and have a long-standing strength in offshore surveying.
Feasibility, design and development: Site investigation	Estonian companies have applied for all sorts of sites, including overlap. However, more specific geotechnical and geophysical studies need to identify specific sites and Dutch companies have a strength in offshore site surveying, resulting from offshore oil and gas operations. Dutch companies can deliver seabed analysis and geotechnical analysis, cable routes and wind measurements which are important in the upcoming years.	The UK have a good understanding of site investigation, however the international scope of the companies offering the services is limited. For site investigation, moderate competition can be expected from Danish firms. For geotechnical surveys, Dutch companies have a strong record and were awarded contracts in Denmark.

Dutch supply chain assessment

Service	Status Dutch Companies	Benchmark UK & Denmark
Design and manufacturing: Turbine foundation and component supply	Dutch suppliers can supply parts of wind farms and assemble those at the offshore site. Moreover, Dutch companies have a strong presence in monopile supply and have good experience with shallow water depths.	Denmark has a world leading position in the construction and engineering of wind turbines with Vestas Wind Systems A/S, LM Wind Power and MHI Vestas Offshore Wind. Contrary to Denmark, the United Kingdom has no major wind turbine manufacturers.
Design and manufacturing: Sealing, corrosion protection and subsea cabling	Due to a history with oil and gas and installed offshore wind farms, Dutch companies can provide solid steel protection and bolting fixation to decrease the possibility of damage. Dutch companies have experience with connecting turbines to an offshore station from which the power is transmitted to onshore. This experience is of help in the Baltic States where developers are mostly responsible for subsea cabling.	A key competitor in the UK is CWIND, who has expertise in subsea survey solutions, corrosion protection, and they perform subsea IMR. CWIND has a fleet of 17 vessels supporting this. However, they are not active in the Baltics. In terms of sealing, corrosion protection and subsea cabling there are a few big players in the Danish market that focus on more than offshore wind and other markets than the Baltic market.
Design and manufacturing: Substations and foundations	Dutch suppliers and engineers have a strong position in terms of knowledge and engineering and supplying ability to provide offshore wind farms with substations. Dutch companies can support in substations and foundations from the design of the substation and platform to the construction using foundations.	Smulder Projects is a UK subsidiary from one of the dominant players for design, engineering and production of foundations and substations. Other companies are subsidiaries as well. Strong competition can be expected from the Danish substations and foundations sector which knows a few large and internationally operating firms such as Bladt Industries, SemcoMaritime and Welcon.

Dutch supply chain assessment

Service	Status Dutch Companies	Benchmark UK & Denmark
Transport and installation: Turbine and foundation installation	Due to the oil and gas history, Dutch companies are world leaders in the installation of offshore turbines and foundations. Installation companies are even working on faster development and higher efficiency. Some Dutch heavy lift vessels are used exclusively in offshore wind and the expectation is that there will be a coming shortage of installation vessels due to high ambitions.	Although the Dutch supply chain is strong in this area, some competition can be expected as Danish firms, such as Cadeler and Global Wind Service operate internationally as well. The foundation fabrication market is partly dominated by the Dutch supply chain.
Transport and installation: Substation installation and cable laying	Dutch suppliers of substations are the same as turbine and foundation installation as these structures are similar to offshore oil and gas platforms. Dutch companies can provide engineering and installation of substations. Moreover, Dutch suppliers have a good track record in undertaking cable installation and engineering. In the Baltics, such knowledge is of use.	The UK market knows some dominant players with JDR for cable laying and HVSS for substation services. Danish firms operate internationally and provide cable laying services and design of substations. Competition is to be expected.
Transport and installation: Installation tools, vessel design, ship building and deck equipment	Dutch suppliers are well-known for their installation tools and designing and delivering all types of vessels and this role will even grow. Dutch companies have a lot of knowledge on how to put cranes and cable-handling equipment on vessels and how to use this in the offshore wind sector. Crane companies, lifting equipment companies, hammers and customized installation equipment can be found in the Dutch offshore sector.	The UK knows some large offshore supply chain vessel companies such as Clarksons and a UK subsidiary of Spanish company Navantia. The UK has some high-speed building ship-building companies as well. A Danish firm such as Knud E. Hansen operates in Vessel Design, but dominance in this area of the Dutch market can be expected.

Dutch supply chain assessment

Service	Status Dutch Companies	Benchmark UK & Denmark
Operations and maintenance: O&M and inspection and repairs	Dutch suppliers have significant experience in using crew transfer vessels from onshore to the wind farm to transport technicians and spares. Dutch companies provide both crew transfer vessels and service operations vessels and are able to identify issues with wind farms to repair these on time. Dutch knowledge on how to repair different sorts of maintenance issues is large.	The O&M supply chain is growing as installed capacity grows, but firms are expected to focus on the UK market. Competition can be expected from Danish firms as the industry is executing O&M services for decades, with companies such as Harco and Niras.
Operations and maintenance: Port development and logistics	Dutch ports are in public ownership and have timely developed master plans that incorporate offshore wind installations facilities. Dutch ports have been improved with manufacturing, assembly and installation infrastructure. Dutch companies can provide consult on how to develop and improve ports and can decide which ports need certain improvements based on the location and role of the port.	The Dutch market regarding Port development knows some very strong players that can deliver port improvement and developments. UK ports invest a lot in port improvements but are privately operated and focus more on commercial factors than supply chain improvement. The Danish company Niras (UK-based as well) provides assist in planning, design and delivery during port developments with a focus on offshore wind.
Government and institutional support	To foster knowledge sharing it is important to establish networks and create public-private partnerships. Dutch companies and institutions work well together and create consortiums. Moreover, Dutch Enterprise Agency RVO, the Ministry of Foreign Affairs and the Ministry of Economic Affairs gather and invite companies for international trade missions to establish close links with (inter)national partners.	The UK and the Netherlands operate in trade missions to the Baltic States and Denmark is creating world's first energy island. Denmark is able to provide support on supply chain improvements following a long history, whereas Dutch companies and universities can help deliver institutional support to Baltic governments and universities.
Key Dutch companies: Leading offshore installation contractors are Heerema, Boskalis, and Seaway7. Also Huisman, supplier of most offshore cranes, monopile grippers and other offshore tools is Dutch, as well as hammer supplier IHC. Companies like Bargemaster and Seaqualize are supplying state-of-the-art motion compensation tools.		

Opportunities in the Baltics

Opportunities in the Baltics

Estonia

First wave projects of Enefit Green, Saare Wind Energy & Van Oord, Utilitas:

First wave projects are progressing in the first project phase (as described in the Dutch supply chain chapter) of Feasibility, Design & Development. The Environmental impact assessments (EIAs) are ongoing and nearly completed (2/3 months in between them). Opportunities for Dutch firms are in the later stage of this first phase with services such as project management, additional ecological surveys and site assessments, and in particular with services and products (as described on page 36) for the Technology supply, Engineering & Development phase in the short term (2023-2025). Followingly, in the midterm (onwards from 2025) major opportunities lie in the Transport & Installation phase, due to supply chain restraints and full order books installation vessels need to be booked much earlier in 2023/2024 (this applies to all three countries).

Second wave projects (47 superficies, 13 different developers identified so far):

The tendering process starts in 2023 with price as key requirement. Opportunities for Dutch firms lie in the near future (2023-2025) in the first project phase of Feasibility, Design & Development with for example wind measuring campaigns/ wind resource assessments, environmental impact assessments and surveys, wind farm layouts and technical design support, etc. Furthermore, opportunities are in port developments and logistics and government and institutional support (as described on slide 38).

Source: The Estonian Wind Power Association

Opportunities in the Baltics

Latvia

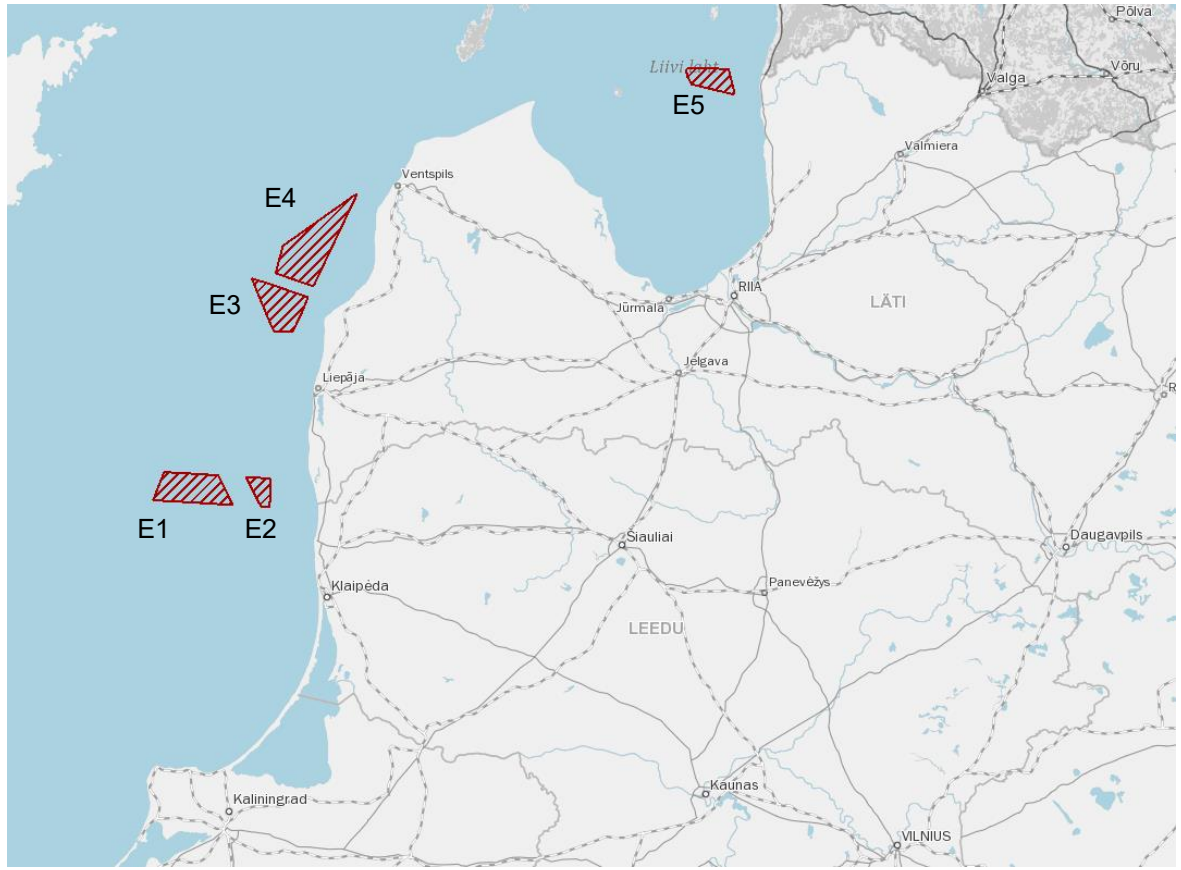
ELWIND project (research area 4):

The project is currently in the process for approval of its feasibility study phase. And followingly, the process of the sea-bed and environmental impact assessments will commence. Opportunities for Dutch firms in the short term (2023-2025) are in this first phase of Feasibility, Design & Development, such as in technical consultancy, owner's engineering, tender management.

Research areas 1, 2, 3, 5:

The project phases of these areas are still in its infancy and the development of national regulations and auction model is yet to be finalised by the Latvia government. Opportunities for Dutch firms lie in the near future (2023-2025) in offering support to the Latvian government about the Dutch approach and in the Feasibility, Design & Development phase (as described on slide 35). In particular, wind measurement campaigns, surveying, scanning and identification of new wind farms areas within these 4 research areas, and feasibility studies.

Revision of the Maritime Spatial Plan is worked on by the Ministry and the Latvian Wind Energy Association is suggesting to go beyond the 5 research areas that have been selected. Currently, however, projects have to operate within the 5 existing areas. The auctions will not happen at the same time and tendering is expected to take place by the end of 2025/2026. Opportunities for Dutch firms in the Technology supply, Engineering & Development phase, and Transport & Installation phase are not expected before 2025. In the meantime, opportunities do lie in supporting port developments and logistics and government and institutional support (as described on slide 38).



Source: http://mereala.hendrikson.ee/kaardirakendus-en.html

Opportunities in the Baltics

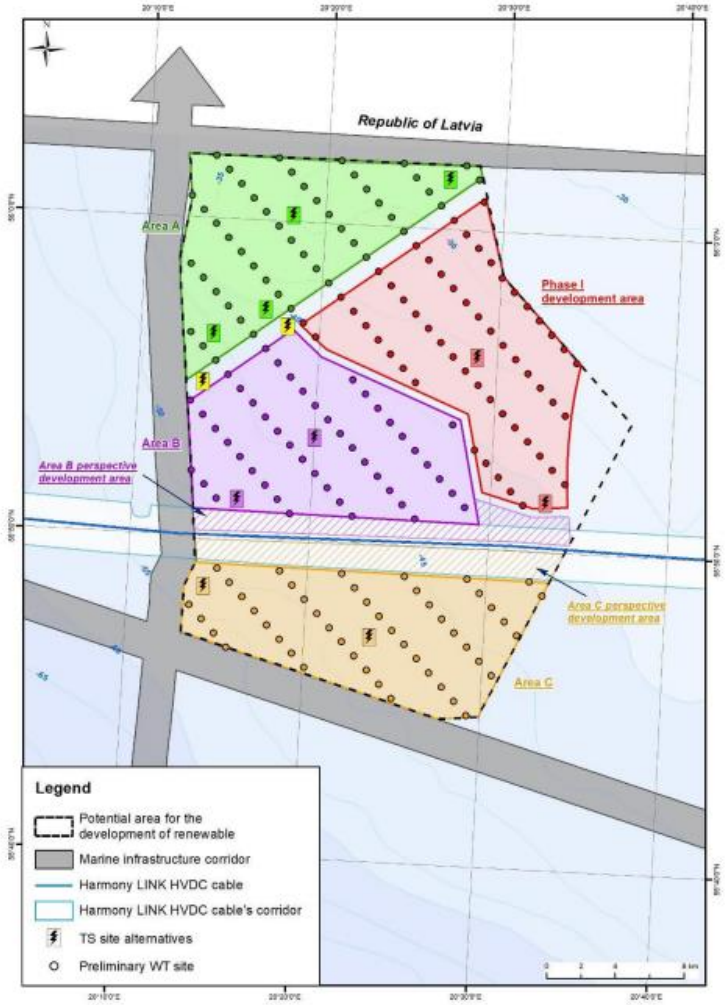
Lithuania

Lithuanian tender 1 (green area):

The tender has closed at the end of May 2023. In the short term (2023-2025), opportunities for Dutch firms lie with the developer who wins the auction this summer (expected to be Ignitus) in the first project phase of Feasibility, Design & Development. For example, in wind measurement campaigns, surveying, EIA, wind farm layouts, feasibility studies, technical design support, project management, and site assessments. Additional opportunities lie in the midterm (2025 onwards) in the Design and manufacturing project phase (as described on slide 37).

Lithuanian tender 2 (red area):

For this project, the environmental impact assessment is finished and wind measurement, geological and geotechnical studies are on-going in the first project phase of Feasibility, Design & Development. In the short term (2023-2026) opportunities for Dutch firms are in the later stage of the first phase (as described on slide 35) with the auction scheduled for September 2023 in services such as site assessment, technical consultancy, auction and tender management, and owner's engineering, and the Technology supply, Engineering & Development phase for foundations and subsea cabling as examples. In the midterm (2027-2030), opportunities arise in the Transport & Installations phase.



Source: https://www.vpvb.gov.lv/lv/media/3585/download

Recommendations

Recommendations

Dutch Embassies in the Baltic States

- Keep offering bilateral policy support on best practices and learned lessons in offshore wind from the Netherlands and presenting the insights of the Dutch Approach to the relevant ministries of the Baltic States related to offshore wind development and regional authorities and TSOs, and build on the recent offshore wind trade missions to the Baltics and the Netherlands in 2023 to facilitate both the three domestic markets and the regional cooperation in the Baltics.
- Run a series of events/ webinars/ conferences dedicated to offshore wind developments in the Baltic States with Estonian, Latvian, Lithuanian and Dutch experts, with a short-term focus (2023-2025) on Dutch companies in the first (Feasibility, design and development) and second (Design and manufacturing) project phases, inviting the Dutch firms in the Transport and installation and Operations and maintenance third and fourth project phases (see Dutch supply chain chapter).
- Run a series of B-2-B and K-2-K events in the Baltics with Dutch experts and researchers, in collaboration with local counterparts, from ports such as Port of Rotterdam, Groningen Seaports, and the Ports of Den Helder, IJmuiden, and Vlissingen, and technical research universities (the 4TU) and universities of applied sciences in the Netherlands.

Promotion of the Baltic States offshore wind opportunities

- Invite the various Baltic developers (such as ELWIND, Enefit Green, Latvenergo, Ignitus, Saare Wind Energy, Utilitas) to dedicated study tours and business mixers in the Netherlands and organize factfinding trips to the Baltics and follow-up meetings between the Baltics and Dutch industry after the recent trade missions organized in 2023.
- Support the Baltic developers and Baltic TSOs in finding business interest in the Netherlands for their project developments in the Baltics by finding partners, investors, financers, contractors and consultants from the Netherlands who have services, products and expertise matching their needs.
- Organize for the Dutch industry business and matchmaking events/ webinars in the Netherlands with the support of NWEA, the Baltic States Wind Energy Associations and the Baltic States Embassies to discuss the offshore wind developments and opportunities in the Baltic States.

Promotion of Dutch companies and offshore wind expertise in the Baltics

- Engage with the three Baltic States authorities, local offshore wind and renewable energy industries, port authorities and wind energy associations to promote the Dutch offshore wind industry.
- Join key offshore wind and renewable energy conferences, events and roadshows in the Baltics and present the Dutch offshore wind industry and expertise.
- Organize site visits to Dutch offshore sites and harbours for a variety of Baltic States stakeholders: regional and state authorities of the three Baltic States, TSOs, local developers and other stakeholders.
- Organize matchmaking and supply chain meetings in cooperation with networks such as NWEA, HHWE, Wind & Water Works, Northern Netherlands Offshore Wind (NNOW) and AYOP with local Baltic States networks.

About Pondera

Pondera is a globally operating planning and development consultancy. We support our public and private sector clients in developing renewable energy projects, from the initial feasibility phase of the project throughout contracting, construction to successful operations. Pondera has extensive experience in small & large onshore and offshore wind energy projects. With our experience in offshore wind projects worldwide totaling over 16 GW in capacity, we believe we are a good partner for international and Baltic States developers, consultants, and governments.

Eric Arends
Director international markets
+31 6 53372130
e.arends@ponderaconsult.com

Matthijs de Haan
Renewable energy consultant
+31 6 46020128
m.dehaan@ponderaconsult.com

Bastiaan Bor
International business developer
+31 6 577882227
b.bor@ponderaconsult.com

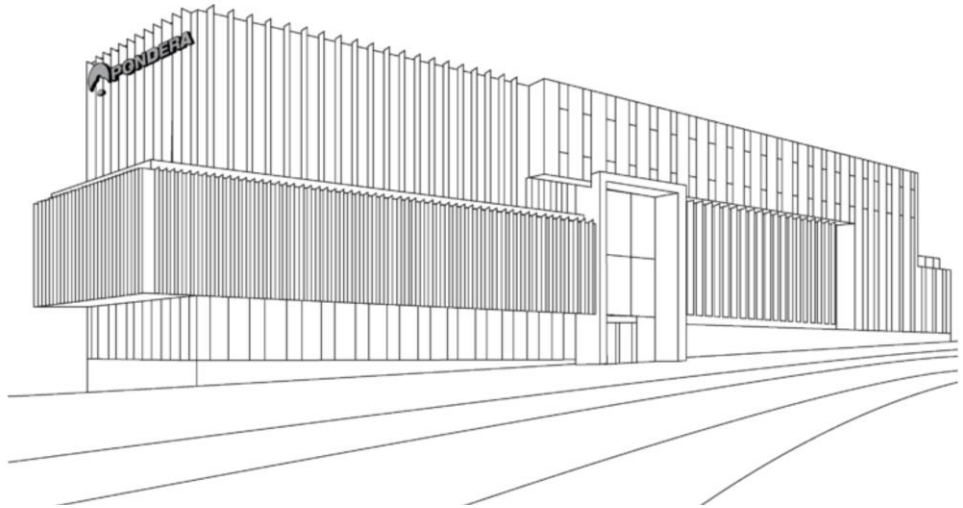
Pondera
Amsterdamseweg 13
6814 CM Arnhem
088 – pondera (088-7663372)
info@ponderaconsult.com
www.ponderaconsult.com/en/

Mailing address
Mailbox 919
6800 AX Arnhem

Office North East Asia
Seoul, Republic of Korea

Office South East Asia
Jakarta, Indonesia

Office Pondera Vietnam
Ho Chi Minh City, Vietnam



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Netherlands Enterprise Agency
Prinses Beatrixlaan 2
PO Box 93144 | 2509 AC The Hague
T +31 (0) 88 042 42 42
Contact us
www.rvo.nl

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