Baltic LINes

Coherent Linear Infrastructures in Baltic Maritime Spatial Plans

Project Findings

Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

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Key questions

- What are the main trends in the shipping and energy sector that maritime spatial planners need to take into account?
- What are good ways to integrate stakeholders in national and transnational MSP processes and projects?
- Which data do we need to achieve transnational coherence within the shipping and energy sector, and how can we gather it efficiently?
- What kind of new tools and methods can be used to improve transnational planning?
- In which cases are the current MSPs not coherent? Where is there a need to improve planning, and what could be the planning solutions?
- What are our national planning criteria and how do they vary?
- Which steps should planners follow in designating areas for offshore wind, grids and interconnectors as well as shipping lanes in order to plan in a coherent way?
- What future steps should be taken by the HELCOM VASAB MSP working group and other organisations to better accommodate for shipping and energy developments as well as data sharing in MSP?

Baltic LINes project findings

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Open the section 'Project outputs' under www.balticlines.eu to find the project reports

Planning the national sea area is a complex task where the different sectoral interests need to be carefully weighed against each other, conflicts have to be solved and planning solutions need to be found. Although Maritime Spatial Planning is a national competence, countries need to ensure the **coherence of their plans across sea basins**. This is not only set out by the EU MSP Directive (2014), but is important to ensure connectivity between transboundary uses, especially linear infrastructure, and thus lead us to an efficient and sustainable use of Baltic Sea space.

Building on recommendations developed under previous initiatives such as BaltSeaPlan and PartiSEApate, the EU Interreg BSR project Baltic LINes (2016-2019) sought to increase transnational coherence of shipping routes and energy corridors in Maritime Spatial Plans. Within Baltic LINes, representatives from nine countries around the Baltic Sea looked into the current status of these sectors as well as possible future scenarios. They identified planning issues as a result of different national planning criteria and approaches and developed practical guides in the form of a step-wise approach as planning solutions. Taking such an **overarching transnational Baltic perspective** has already shown to be of great benefit for the national authorities in developing MSP solutions.

As an important third pillar of the project, BalticLINes partners have developed the first ever overarching Baltic Sea wide MSP data infrastructure. The underlying motivation is the following: if countries were to apply a similar approach to gather, use and publish data in a coherent GIS data standard, it would **improve the sea-basin-wide knowledge base for MSP decisions**. The BASEMAPS system now allows access to MSP data based on a Marine Spatial Data Infrastructure (MSDI) from which users can view and download data and metadata in Open Geospatial Consortium (OGC) standards.

In implementing Baltic LINes, an integrated approach has been applied with MSP authorities working with research institutes to foster the science-policy interface. An **innovative approach to stakeholder involvement**, using the MSP Challenge software in three transnational workshops, led to new ways of gathering input to relevant MSP topics and increasing support and consensus on resulting MSP decisions.

The Baltic LINes project was not the first, and will also not be the last project on MSP in the Baltic Sea Region. New transnational challenges are lying ahead, such as climate change or increasing maritime space needed for renewable energy production. Furthermore, in the coming years, the MSP authorities will need to increasingly share experience not only in the development but also the **implementation of their MSPs**. In this process, they can build on the knowledge gained during Baltic LINes as well as on the project recommendations developed. This brochure can be a starting base for them. It provides planners, sector stakeholders and future projects an overview of the main relevant project findings with more details than would be found in the referenced main reports.

On behalf of the BSH, I would like to thank all partners for the good cooperation and partnership over the last years. Let us continue in that spirit in the next years.

I hope you will enjoy reading this brochure,

Dr. Kai Trümpler

Head of the MSP section at the German Federal Maritime and Hydrographic Agency (BSH); lead partner of Baltic LINes

Baltic LINes team

THE BALTIC MSP PROJECT SEA

Over the past 15 years a number of EU-funded, transnational MSP projects have been implemented in the Baltic Sea Region. By supporting the knowledge exchange and dedicated work of specialists dealing with spatial planning at sea, these projects continuously lead to the development of new tools (e.g. map services, MSP tools, data portals) and solutions. The Baltic LINes project has been **building on the knowledge, experience and recommendations** from these previous projects. In turn, the Baltic LINes project results shall guide future Baltic MSP processes and projects.

BaltSeaPlan (2009–2012)

- Improved the joint information base/stocktaking
- Included Spatial Planning in National Maritime Strategies
- Developed a Common Spatial Vision for the Baltic Sea outlining how sectors could be guided by Baltic Sea-wide spatial planning (**BaltSeaPlan Vision 2030**)
- Demonstrated MSP in eight pilot areas
- Developed MSP capacities across all Baltic Sea countries showcasing how to do MSP (31 reports summarised in BaltSeaPlan findings)
- Developed the key principles for MSP in the Baltic Sea, including the concept of spatial efficiency and spatial subsidiarity

PartiSEApate (2012–2014)

- Fostered transnational dialogue with stakeholders from aquaculture, fishery, offshore wind, shipping, underwater cultural heritage and environment on MSP
- Tested and developed instruments and models for cross-border consultation and cooperation on MSP in three pilot cases: Pomeranian Bright (SE, DE, PL), Lithuanian Sea (LT, LV, SE, RU) and Middle Bank (SE, PL)
- Developed the first series of country fiches on MSP systems in each Baltic Sea country, which have been updated ever since (VASAB country fiches)
- Developed the structure for the Baltic Sea-wide MSP governance system leading to the **HELCOM-VASAB recommendations on transboundary cooperation and consultation** as well as the MSP Data group

Baltic LINes (2016–2019)

- Focused on cross-border issues in relation to the **shipping and energy sectors**
- Informed on current and future developments and resulting connections between borders and structures
- Proposed planning solutions for fixed linear infrastructure (cables and pipelines), wind farms and designations of shipping lanes
- Enabled access to pan-Baltic MSP decentralised data based on a Marine Spatial Data Infrastructure
- Led to the development of a Baltic Sea edition of the 'MSP Challenge' simulation platform to foster input and understanding of sector and planning experts on transnational challenges and possible solutions

Project's Duration: March 2016 – April 2019

Total project budget: € 3 409 458

European Regional Development Fund: € 2 674 451,50

The overall objective of the Project: to increase transnational coherence of shipping routes and energy corridors in Maritime Spatial Plans (MSP) in the Baltic Sea Region (BSR)

BaltCoast (2001–2004)

- Developed the concept of Sea-Use-Planning within the Baltic Sea Region
- Led to the BSR wide recommendations for MSP

PlanCoast (2006–2008)

- 1st Handbook on Maritime Spatial Planning guiding EU wide MSP development
- Fostered the 1st generation of pilot and statutory plans in the Baltic Sea Region

East-West Window 2007–2008

- Introducing MSP to Russia

BalticSCOPE (2015–2017)

- Developed common solutions to cross-border maritime planning in the Southwest and Central Baltic Sea
- Generated a framework for monitoring and evaluation of cross-border MSP processes

BALTSPACE (2015–2017)

- Analysed how to overcome integration challenges in MSP
- Developed the spatial benefit analysis tool

BalticIntegrid (2016–2019)

- Network and fora for exchange on offshore wind energy

Plan4Blue (2016–2019)

- Focus on Gulf of Finland and Archipelago Sea areas covering sea areas of Estonia and Finland
- Development of cross-border capacity in maritime spatial planning.

Pan-BalticSCOPE (2018–2019)

- Cross-border collaboration to support MSP (e.g. planners forum)
- Integration of land-sea interaction into MSP
- Implementation of the Ecosystem Based Approach and data sharing

SEAPLANSPACE (2018–2020)

- Targets the development of a skilled labour force in the blue and green economy

BalticRIM (2017–2020)

- Promotes the inclusion of Underwater Cultural Heritage in MSP

Capacity4MSP (2019–2021)

- Create a practically oriented and interactive collaboration platform for knowledge exchange and intensified dialogue between MSP, decision-and policy makers and other stakeholders (blue-economy representatives, relevant EU-SBSR coordinators, environmentalists, etc.)
- Increase the visibility and impact of single projects and build up potential synergies

Offshore Energy

To assess the requirements of the energy sector in relation to MSP and to obtain a better understanding of the possible spatial implications of these requirements, the project carried out a thorough desktop analysis of existing information. The focus was on **factors influencing the current (and potentially future) demand on Baltic space by the energy sector**. This includes current energy production, governmental targets and industry oriented developments.

Offshore energy production and requirements

Wind energy (on- and offshore) already meets 11.6% (336 TWh) of the EU's power demand and is the most competitive source of renewable power generation. In 2017, renewable energy accounted for 23.9 GW of 28.3 GW from new EU power installations. Further, 55% of all new installations are wind installations. Denmark has the highest share of wind energy in its electricity demand (44% of the country's total), followed by Germany (20% of the country's total).

Offshore wind development in the Baltic has been slower than in the North Sea. Despite an earlier start, the increase in installed capacity has been slower than in many other regions. **The development has been driven by Denmark and Germany**, the two countries with the highest capacities both under operation and under construction (see table 1). The size of turbines and wind parks have increased significantly over the years, and consequently also the average distance to shore and the water depth at park sites.

With offshore wind power on the rise, efforts are being made to create **one integrated European energy market**. Based on the analysis presented in the main report, it can be concluded that most of the countries in the BSR will meet the near-time targets (2020) set for renewable energy in the energy mix, greenhouse gas emissions and interconnectivity.

Floating wind turbines have not yet been installed and no such projects are being planned, despite testing of scaled prototypes having been carried out in certain areas of the Baltic. One such area was established in 2015 off the west coast of Sweden for testing a Seatwirl vertical rotor floating turbine. Other potential testing sites are currently under consideration.

Country	Existing Offshore Wind Farms (OWF)	Planned Offshore Wind Farms (OWF)
Denmark	13 (516 turbines)	3 projects under preperation
Estonia	0	8 projects in the pipeline or expressed interest
Finland	1 (11 turbines)	10 projects in different phases
Germany	3 in EEZ (210 turbines), 1 in Mecklenburg-Vorpommern (21 turbines)	1 project approved
Latvia	0	Several expressions of interest
Lithuania	0	3 Finished Environmental Impact Assessments (EIA) for projects
Poland	0	1 project received permit, 1 project finalised Environmental Impact Assessments (EIA)
Sweden	5 (77 turbines)	7 projects approved + several in pipeline.

Table 1: Existing and planned offshore wind farms in the Baltic Sea per country, 2017.

Offshore cable connections

Electricity interconnectors provide the physical links, which allow the transfer of electricity across borders and to islands or platforms. Currently there are about a dozen interconnectors in the Baltic Sea, some of which have already been decommissioned. Existing and planned (until 2030) offshore interconnectors are shown on the map in figure 1.

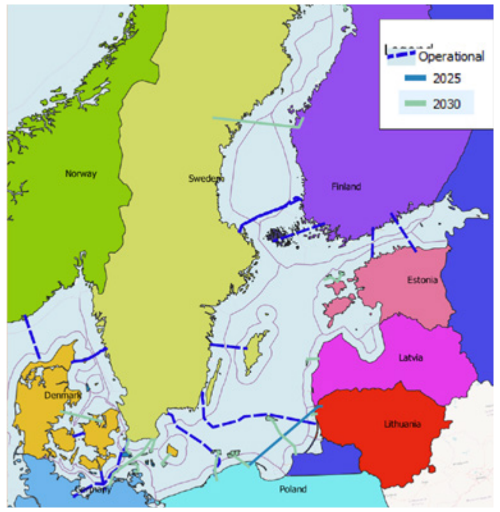


Figure 1: Existing and planned offshore cable connections in the Baltic Sea Region.

Read more: Baltic LINes energy scenarios for the Baltic Sea 2030 and 2050

Shipping

There is limited space for shipping due to the physiographical shape of the sea bed of the Baltic Sea. Competing uses by other sectors narrow down the available space, especially the most recent growth of the offshore wind energy sector. **The designation of coherent shipping corridors** would be best done via the definition of common gates at country borders. In contrast to the offshore energy sector there is a **comprehensive system of international regulations at sea**. The International Maritime Organisation (IMO) is the standard-setting authority when it comes to the regulation of international shipping. In designating (inter) national shipping measures, both economic and environmental developments as well as the prevention of shipping accidents need to be taken into account.

Main economic developments

- The shipping market is highly dependent on global and regional economic development. Globally, overseas transport has substantially increased over the last decades. In the Baltic Sea, economic growth of commercial shipping can mainly be attributed to increasing trade volumes with Russia. **The shipping market is expected to grow**. The European Commission's ambition to shift transport from road to sea supports this development.
- The number of ships navigating through the Baltic Sea has decreased despite increasing trade volumes, highlighting a trend towards **larger vessel sizes**.
- Ports in the Baltic Sea need to prepare for larger ships and provide **access as well as appropriate infrastructure** for loading/unloading.
- Passenger transport related to ferry services has declined while the European cruise ship industry shows a strong upwards trend. The Baltic fishing fleet declined over the past decade.
- The expected increase in leisure traffic will demand more space, which can be met through an expansion of safety distances to keep the commercial shipping traffic undisturbed.
- The offshore wind energy sector will have high spatial demands in the future especially when ample **safety distances** are assigned to all components and additional space is reserved for the related service traffic.
- Specific solutions such as the 'No Special Fee' system in ports and the avoidance of the ballast water exchange of international voyages are mainly based on agreements between transnational maritime organizations and the Baltic Sea countries (especially the port authorities).
- Climate warming can have a strong impact on shipping traffic as well as port development in the Baltic Sea.

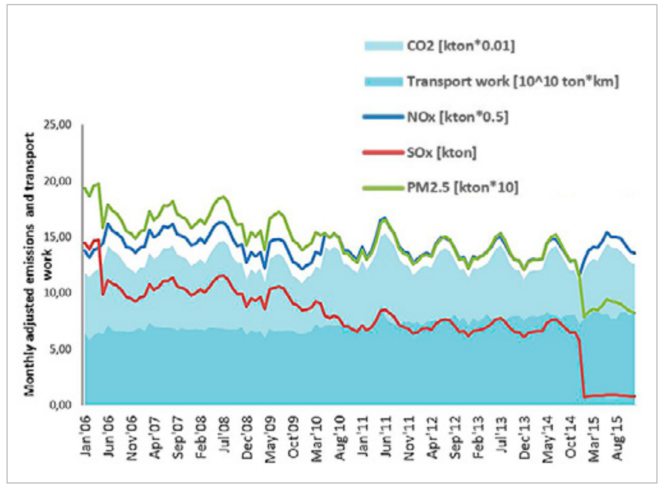


Figure 2: Emissions from shipping in the Baltic Sea, 2006-2014 (data: Johansson and Jalkanen 2015, Boteler et al. 2015).

Environmental developments

- Despite the increase in transport, **emissions of most pollutants could be reduced** to a lower level than a decade ago (see figure 2). The International Convention for the Prevention of Pollution from Ships (MARPOL) and the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWMC) provide guidelines and set standards regarding emission control, discharge of waste at sea and ballast water exchange in the Baltic Sea.

Shipping Accidents

- The number of **shipping accidents increased** over the past years. Cargo ships are most frequently involved followed by passenger ships and tankers.
- The main cause for accidents is human error. Even though mainly related to unintentional action, 17% of the accidents occurred after intentional decisions against common rules and plans.
- Groundings account for 29% of all accidents and mainly involve small vessels with minor draught sizes that lack on-board pilotage systems.
- The number of collisions with other vessels and impacts with fixed or floating objects has increased over the past years and account for 38% of all accidents in 2013. The southwestern Baltic Sea is the main hotspot for these types of accidents.

Read more: Report on shipping in the Baltic Sea

Maritime Spatial Planning is not only about balancing concurrent interests in the sea, but also about anticipating future spatial needs. To get a better understanding of the **needs of the offshore energy sector**, the Baltic Lines project developed future energy scenarios for 2030 and 2050, covering offshore wind power and grid infrastructure in the Baltic Sea (including Skagerrak and Kattegat). These scenarios are divided into low, central and high, which provides an opportunity to consider and discuss a range of possible developments and effects.

The 2030 Scenario

In 2030, offshore wind is a maturing industry in the South-West corner of the BSR. Locations for wind farms in countries such as Poland and Estonia have become available for offshore wind farm developers. The Baltic States, Poland and Russia have invested in their first parks.

The capacities of the low, central and high 2030 scenarios are 7.4 GW, 9.1 GW and 14 GW respectively. Regardless of the case, offshore wind farms still **require less than 1% of the Baltic Sea** (see table 2). In the low scenario, interconnectivity is promoted between Sweden-Finland and Poland-Lithuania. An additional combined interconnector and offshore wind transmission between Germany and Sweden is added in case of the central scenario.

In the 2030 scenarios the amount of offshore wind power in the Baltic is moderate, and the **challenges for MSP are limited**. They deal more with local conflicts of interest than global transboundary planning of the use of the Baltic Sea. However, the concentration of projects in the southern Baltic between Denmark, Germany and Sweden will make planning more complex and challenging in this area.

The 2050 Scenario

Reaching the 2050 high scenario requires an annual growth rate of newly installed capacities per year of around 16%. In 2050, the sea area covered by wind parks is significantly higher. They will still concentrate in the southern Baltic Sea. The German and Polish capacity quotas will require the use of 37% and 20% of the German and Polish Baltic Sea area for offshore wind. The capacities of the low, central and high 2050 scenarios are 31 GW, 58 GW and 150 GW. This requires a **more substantial amount of space**, amounting to approximately 1.5%, 2.9% and 7.4% of the surface of the Baltic Sea, respectively. After 2030, some wind farms will start to reach their end of life. It is assumed that they are repowered to the same capacity, probably with fewer larger turbines. Also floating turbines open up the range of water depth available for deployment between 2030 and 2050.

Due to the stronger demand in countries like Germany and Poland that have relatively limited space for offshore wind development zones, **a higher degree of collaboration between countries** is required to reach the 2050 goals. An increased exchange of energy – referred to as green-streaming – is needed. This is achieved by interconnecting power links in-between Sweden, Denmark and the Baltic States towards Poland and Germany. The growth in interconnectors and their combination with wind farm export cabling further strengthens the case for even greater coordination in MSP in the Baltic Sea Region in the medium to long term, especially in the southern part of the basin. Co-operation between authorities from multiple countries will need to be the norm rather than the exception.

% Space	2017	2030 Low	2030 Central	2030 High	2050 Low	2050 Central	2050 High	Total av. area [km²]
Denmark	0.55%	0.93%	0.31%	0.38%	1.36%	1.81%	3.15%	32 247
Germany	0.93%	4.05%	1.15%	1.44%	9.95%	16.37%	37.04%	14 839
Sweden	0.03%	0.06%	0.11%	0.16%	0.74%	1.48%	3.85%	125 262
Finland	0.02%	0.05%	0.10%	0.12%	0.67%	1.62%	5.49%	80 178
Poland	-	0.84%	0.96%	1.89%	4.68%	8.59%	20.31%	32 167
Estonia	-	0.12%	0.21%	0.45%	0.48%	0.80%	1.52%	35 170
Lithuania	-	0.00%	0.14%	0.29%	2.90%	5.87%	14.86%	6 172
Latvia	-	0.00%	0.00%	0.09%	0.42%	0.87%	2.34%	27 461
Baltic EU	0.11%	0.38%	0.45%	0.67%	1.51%	2.78%	6.89%	353 496
Russia	0.00%	0.16%	0.33%	0.79%	1.48%	3.80%	13.31%	23 504
Total	0.10%	0.36%	0.45%	0.68%	1.52%	2.87%	7.35%	377 000

Table 2: Estimated space requirements for the 2030 and 2050 offshore wind scenarios in the Baltic Sea.

Mapping the energy scenarios

The maps on energy scenarios form a key component of the scenario study (see figure 3). Based on different assumptions, offshore wind farm areas were identified by excluding current and future areas for shipping, environmental protection, aquaculture and other uses. The analysis also took into consideration the average sea depth and distance to land. Using this approach, the study identified specific areas that have **the biggest 'technical' potential** for new offshore wind development in 2030 and 2050. The map also includes interconnectors that have already been discussed at an administrative or political level. It shows the wider field of energy transport and makes it possible to discuss 'mashed grid' options, combining offshore wind and grid development in one process.

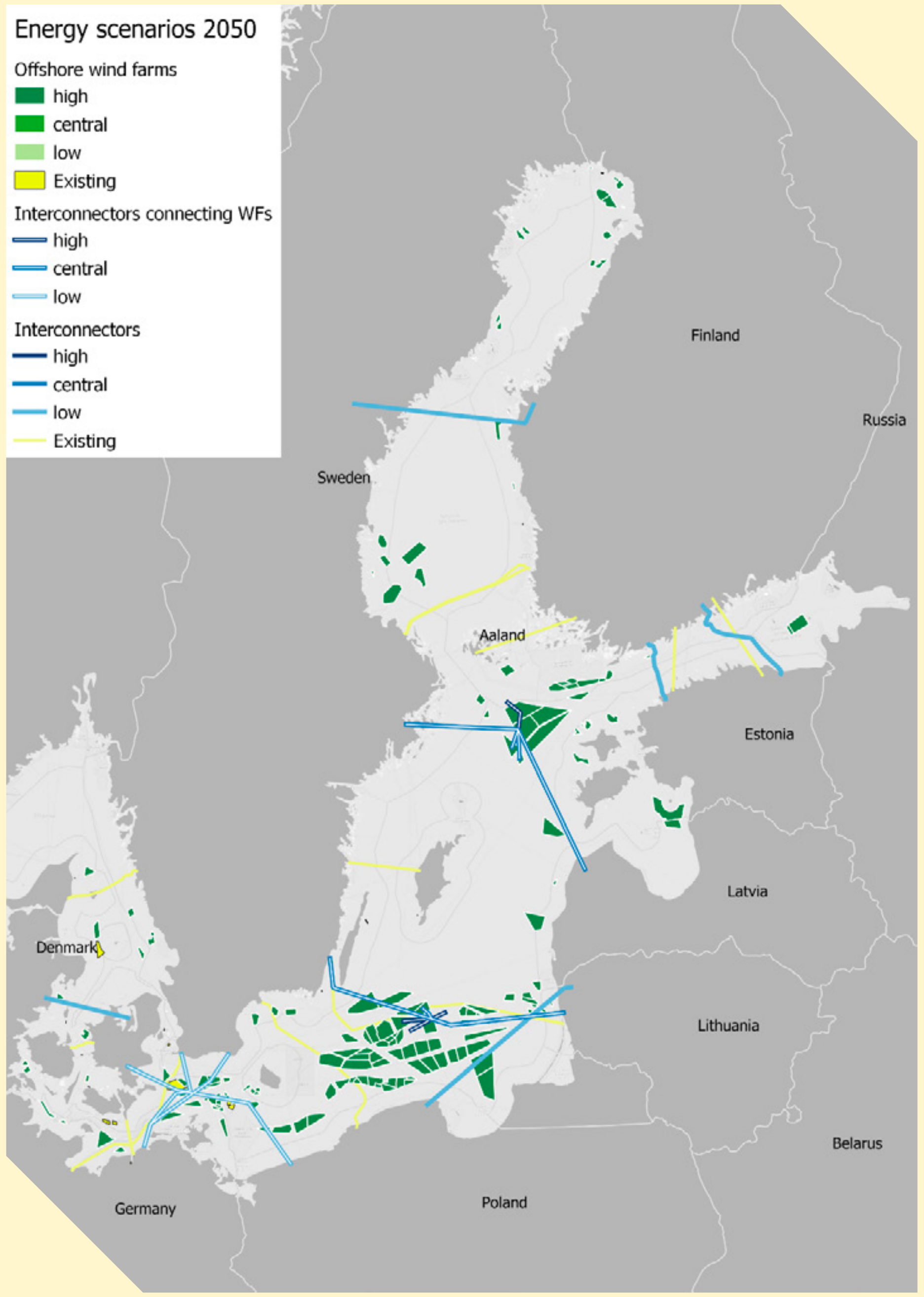


Figure 3: 2050 energy scenarios for the Baltic Sea. High, central and low scenarios for 2050 as well as currently operational installations of offshore wind power and interconnectors.

Energy scenarios for the Baltic Sea 2030 and 2050 Read more

Shipping is a traditional maritime sector and the freedom of navigation allows ships to sail almost everywhere in the Baltic Sea. The Sustainable and Fast Growth scenarios prepared by the project indicate the growth in the international commercial exchange, with Russia establishing stronger international connections. To **increase safety and efficiency**, maritime spatial planners integrate the current and future spatial demands of the shipping sector into their plans by **designating specific areas for shipping purposes**, such as shipping, non-shipping and anchoring zones. To get a better understanding of these demands, the Baltic LINes project identified six key trends in shipping and discussed their relevance for MSP on the short and long term (2030/2050).

1. An increase in annual shipping turnover

The expected increase in annual shipping turnover will not have a significant influence on the general Baltic shipping pattern. It is foreseen that particularly heavy traffic will concentrate on handling the hub ports and key international ports, especially on the eastern coast. The main MSP role is to **minimise the different types of risks** related to this intensity and traffic concentration:

- Collision risks will increase calling for better spatial organisation of ship traffic including local shipping and leisure traffic.
- Environmental risks (avoiding a stronger impact of shipping on ecologically valuable areas through underwater noise, disturbance of birds, etc.) will require new types of knowledge and know-how from MSP.

2. Strong growth of larger and specialised ports

Major port developments are expected in Russia, Estonia, Finland, Poland, Lithuania and Latvia. In the face of limited spatial resources in the hinterland, some ports may have to expand offshore, influencing the marine space use, intensifying the spatial and recourse conflicts as well as increasing pressure on the natural environment.The trend of ports specialisation and enlargement will have an impact on MSP, which needs to reserve **adequate space for port development** in line with the ecosystem-based approach.

Few aspects still remain unclear though:

- The future development of new port technologies (e.g. 'unmanned ports' located outside urban areas or connection of ports with land infrastructure).
- The consequences of port development for the coast (especially the development of LNG infrastructures).

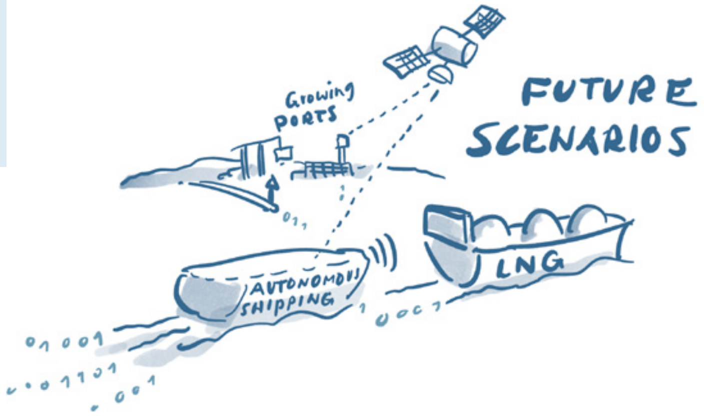
3. Short Sea shipping intensification

- Smaller neighbouring ports will become supporting ports for the bigger ones, creating **bipolar relations** with main ports, intensifying short sea shipping traffic.
- A number of new ports will emerge/get stronger to fill the gap in the Baltic transport system, while the existing ones become highly modernised to improve their efficiency and throughput.
- The biggest intensification is foreseen in the Finnish Bay, due to the development of Russian ports and the ro-ro connections between Estonia and Finland, and between the Gdańsk and Pomeranian Bay.

4. More space for maneuvering needed

Both scenarios indicated that the shipping future means larger numbers of bigger ships with higher deadweight tons (DWT). In consequence:

- Bigger ships require more space for maneuvering, not only in the ports area (anchorage, etc.) but on the routes as well.
- With the development of wind farms and a growing recreational traffic, additional space alongside of the IMO schemes will be needed.
- **Commonly agreed MSP standards** will be needed when defining shipping corridors.



Read more: Report on future of shipping in the Baltic Sea

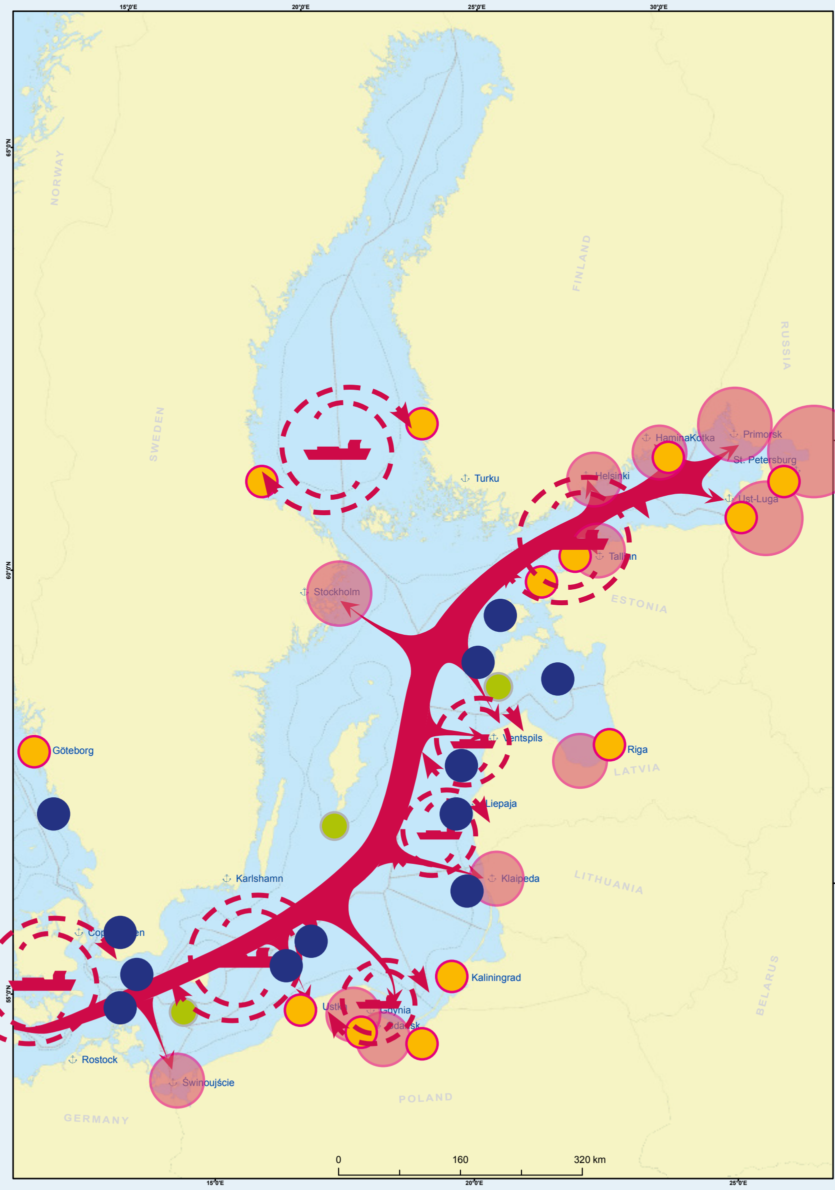
5. Autonomous shipping

The concept of unmanned shipping is gaining more and more attention. If it becomes reality, the fixed corridors to be used mandatorily by such ships could become a prerequisite for the concept of autonomous shipping together with reasonable safety distances to other sea uses:

- Ensure that **planned areas for transport are wide enough** to save the space for this specific future development.
- Ensure space for emergency actions (e.g. – hijacking, storms) and estimate space demand for such needs. This requires new types of knowledge and tools for the simulation of emergency situations.

6. Growing offshore services

- The planned developments in the offshore industry (energy production, mineral extraction, aquaculture, etc.) will increase and introduce new traffic on the **routes that connect constructions with the service centres**. The consequence for shipping patterns however – even though mainly local – will be strong.
- MSP will have to properly address the socio-economic impacts of the development of these various offshore industries on terrestrial communities and the cumulative environmental impacts of blue growth.



Mapping the trends

The six key trends as described in the scenario report have been incorporated in different ways into a map. The maps are of an exploratory nature and aim to facilitate the discussion on where in the Baltic Sea the trends might have the biggest effects. While this brochure contains all symbols in one map (figure 4), the report itself also contains different maps for every specific trend.

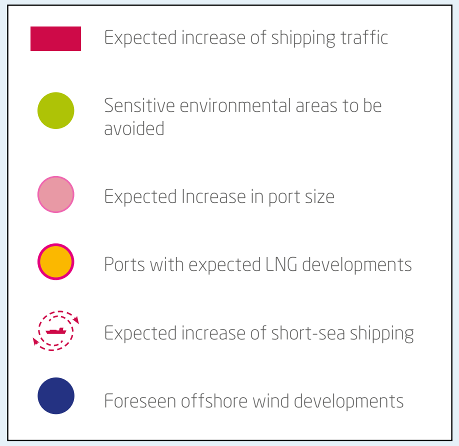


Figure 4: Six major shipping trends and their potential occurrence in the Baltic Sea.

BASEMAPS – A DECENTRALISED DATA PORTAL

Maritime spatial planners need spatial data to gain the information required to develop sound planning options. Also national decision-makers require a good knowledge of relevant transnational developments across borders. Building on the BaltSea-Plan recommendations, Baltic LINes focused on the elaboration of **a tool to access open standard data based on a Marine Spatial Data Infrastructure (MSDI)**. The result is a browser-based application called BASEMAPS (BAltic SEa MAP Service) that allows MSP practitioners to access the relevant and most recent MSP datasets hosted by the respective Baltic Sea Region countries. The development of BASEMAPS was carried out in the following four phases.

1. Evaluation of data availability

The first step towards designing BASEMAPS was to evaluate the data availability in each country and the need for transnational MSP. A number of datasets were identified and considered most relevant by Baltic LINes project partners. They were asked to provide datasets available in open geospatial standards: WMS (Web Map Service) and WFS (Web Feature Services). WMS is a standard which delivers map images. WFS, on the other hand, gives access to vector format geographical information.

The collection of these services was one of the most challenging tasks of the project since **not all countries were ready to provide data in open standards**. Fortunately, the INSPIRE directive is encouraging most countries around the Baltic Sea to share data using international geo standards.

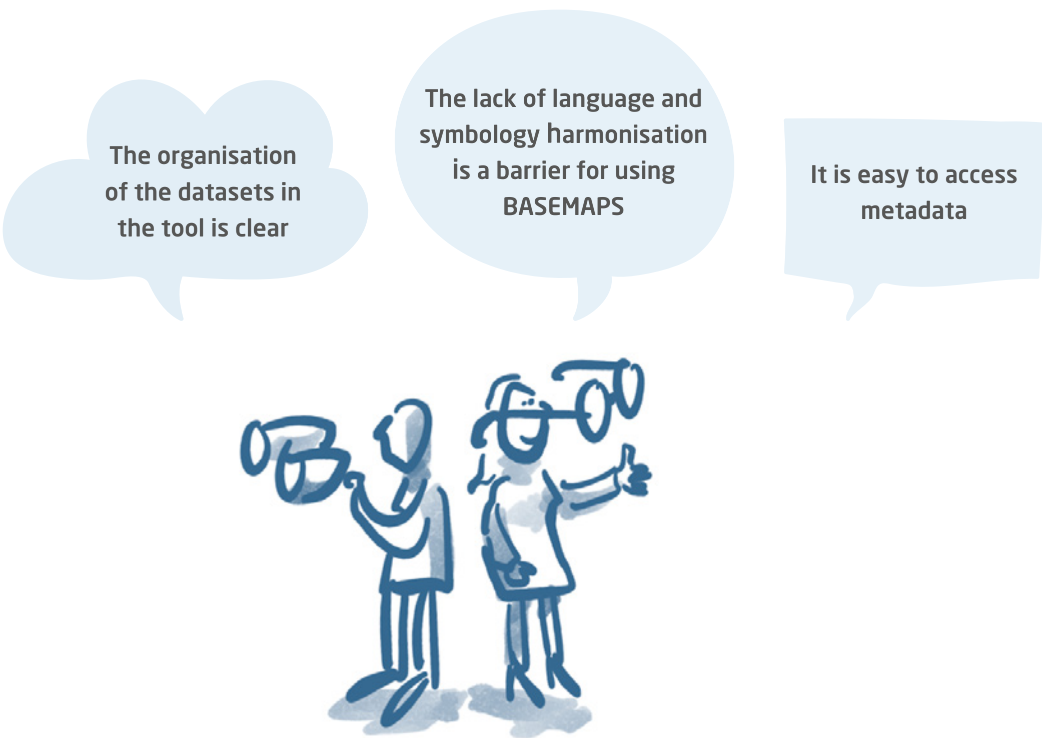
2. Evaluation of planners needs

The project made a study of available systems providing interoperable data and existing technology standards. This study also analysed user demands in order to specify the requirements for the new system. Based on experience from other projects and interviews carried out among planners in the partner countries, the requirement specification was identified.

With BASEMAPS, MSP authorities and practitioners can:

- View and download datasets published by official national data providers
- View their metadata
- Click on geographical features to get information
- Zoom in and out to get more details of the area

Additionally, data providers can also add and edit data.



Infographic: The Future of Maritime Spatial Planning Data
Report on data availability
Report on data exchange and dissemination

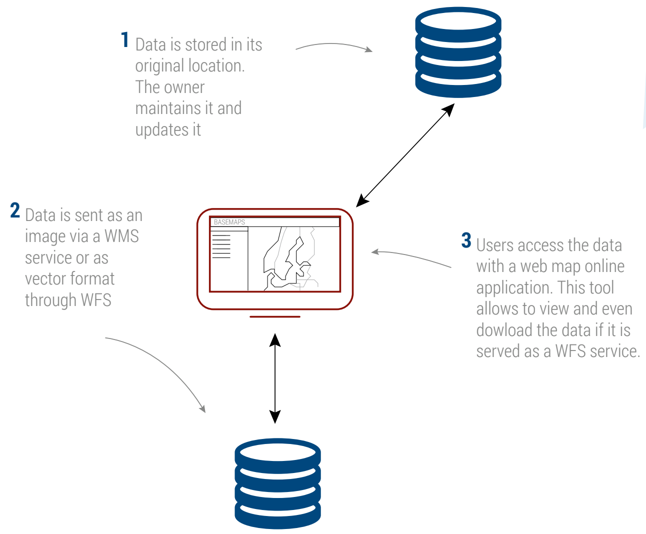


Figure 5: Designing a MSDI prototype for MSP data in the Baltic Sea.

3. The prototype: BASEMAPS

In a decentralised system, data is stored and maintained in its original location. This data is then published using standard protocols like Web Map Services (WMS) or Web Feature Services (WFS). A web based tool accesses the data from its original databases, thereby getting the most up-to-date datasets (see figure 5). For example, If two neighbouring countries publish data on cables the user could see both datasets from the original source, being sure that it is the latest official information available. One of the main challenges is to **get data via WMS** and, even more challenging, via WFS. It will take time until all data providers will publish data through standard services. Therefore, we are designing a system to access both centralised (from HELCOM, for example) and decentralised data.

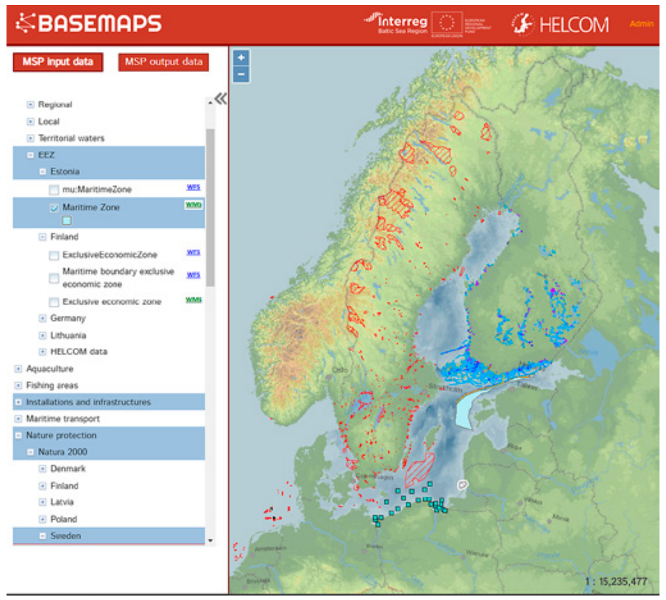


Figure 6: Screenshot of BASEMAPS from https://basemaps.helcom.fi/.

4. Testing and launching BASEMAPS

The first public version of BASEMAPS (see figure 6) was launched during the data workshop of the Connecting Seas Conference in Hamburg (13-14th of February 2019). The workshop gathered data experts from all over the Baltic Sea, who provided valuable input on the short- and long-term development of the tool.

https://basemaps.helcom.fi/

The MSP Challenge uses game technology and role-play to support communication and learning for Maritime Spatial Planning. Since 2011, a role-playing game, a board game and an interactive simulation platform have been developed. BalticLINes enabled the development and application of a **Baltic Sea edition of the interactive simulation platform**. This edition was applied in three workshops held in the BSR, involving almost 100 energy, shipping and environmental stakeholders from the region.

The MSP Challenge in a nutshell

MSP Challenge board game

Key characteristics

- Played on a 2.8 × 1.6 m board, printed with a map of the fictional 'RICA Sea'.
- 12–30 players assigned to stakeholder or planner roles for the countries Island, Bayland or Peninsuland.
- Key game objective: 'Jointly develop the RICA Sea so that at the end of the game, you and others feel comfortable with the state of the RICA Sea and how you developed it'.
- Players collaboratively discuss and decide on where to place many coloured tiles and threads representing diverse aspects of the marine environment and human activities.
- Typically played over a period of 1.5–2 hours, which includes debriefing.

Benefits

- Literally puts players of all languages around the table to experience MSP.
- Triggers players to quickly share information, evidence and stories from their own experiences, and discuss planning options.
- Lets players jointly develop an ecosystem based marine/maritime spatial plan, while dealing with the language and communication challenges that MSP poses.

Applications

- Used in Scotland to encourage stakeholder involvement in the implementation of the Scottish National Marine Plan (2015).
- Used to kickstart the MSP revision process in Belgium in a meeting with 125 stakeholders in Bruges (February 2017).
- Used in BalticLINes during the EUSBSR forum in Berlin (June 2017) and at the Connecting Seas Conference in Hamburg (February 2019).
- Copies produced for BalticLINes partner BSH and other partners, adapted to their national language for future stakeholder processes.

MSP Challenge simulation platform

Key characteristics

- Played in teams on computers, all connected to the same digital representation of a real sea basin.
- **Integrates real geographical data** (both marine and human activities) sourced from a great many proprietary institutions and data portals such as HELCOM and EMODnet.
- Interacts with **science-based simulation models** for shipping, energy and ecosystem (Ecopath with Ecosim).
- Enables players to collaboratively draw up, implement and evaluate spatial plans for human activities and marine protection.
- Typically played over a period of 1–1.5 days, which includes debriefing.

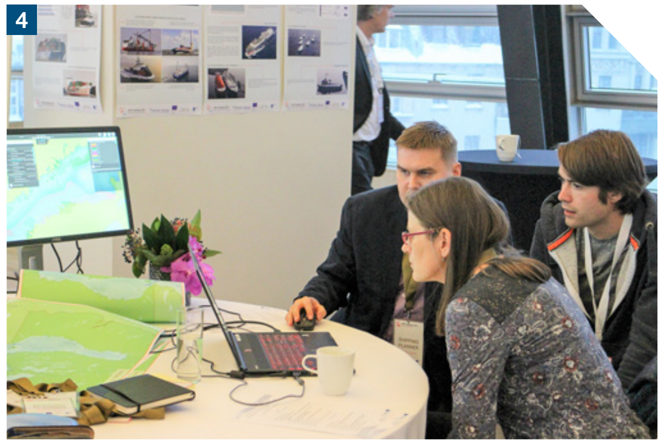
Benefits

- Enables multiplayer game sessions for experts and non-experts.
- Enables sea basin scenario exploration, co-design, validation or policy-oriented learning.
- Represents a significant step towards becoming a next generation marine planning support system.

Applications

- Clyde marine region edition with bespoke shipping and Ecopath-with-Ecosim ecosystem simulations developed for the Scottish Government (SIMCelt project).
- North Sea edition with bespoke shipping, energy and Ecopath-with-Ecosim ecosystem simulations developed in the NorthSEE project.
- Baltic Sea edition with bespoke shipping, energy and Ecopath-with-Ecosim ecosystem simulations developed in the BalticLINes project.
- Applied in BalticLINes in three workshops with almost 100 participants, particularly for energy and shipping stakeholder engagement and scenario exploration.

Impression of application in Baltic LINes



Several impressions of the use of the MSP Challenge board game (picture 1 and 2) and software (picture 3 and 4) during the Baltic LINes project. Picture 1 of the MSP Challenge Board Game session during the Connecting Seas Conference in Hamburg was nominated as the best in the category 'Cooperation' of the Interreg Baltic Sea Region programme photo competition.

Scientific publications

- Abspoel, L., Mayer, IS., Keijser, X., Warmelink, HJG., Fairgrieve, R., Ripken, M., ... Kidd, S. (2019). Communicating Maritime Spatial Planning: The MSP Challenge approach. *Marine Policy*. http://doi.org/10.1016/j.marpol.2019.02.057
- Keijser, X., Ripken, M., Mayer, IS., Warmelink, HJG., Abspoel, L., Fairgrieve, R., & Paris, C. (2018). Stakeholder engagement in maritime spatial planning: the efficacy of a serious game approach. *Water, 10*(6), 724-740. http://doi.org/10.3390/w10060724
- Steenbeek, J., Romagnoni, G., Bentley, J., Heymans, JJ., Serpetti, N., Gonçalves, M., ... Abspoel, L. (2019, under review). Combining ecosystem modelling and serious gaming to aid transnational management of marine space. Available on request: warmelink.h@buas.nl
- Hutchinson, K., Warmelink, HJG., Boode, W., Pereira Santos, CA., & Mayer, IS. (2018). An offshore energy simulation through flow networks: CEL within the MSP Challenge 2050 simulation game platform. In D. Claeys, & V. Limere (Eds.), *ESM 2018 proceedings* (pp. 157-163). Eurosis. https://pure.buas.nl/en/publications/an-offshore-energy-simulation-through-flow-networks-cel-within-th
- De Groot, P., Boode, W., Santos, C., Warmelink, HJG., Mayer, IS. (2019, under review). A shipping simulation through pathfinding: SEL within the MSP Challenge Simulation Platform. Available on request: warmelink.h@buas.nl
- Gonçalves, M., Steenbeek, J., Tomczak, M., Romagnoni, G., Puntilla, R., Karviainen, V., ... Mayer, IS. (2019, under review). Food-web modeling in the Maritime Spatial Planning Challenge Simulation Platform: Results from the Baltic Sea Region. Available on request: warmelink.h@buas.nl

www.mspchallenge.info

Stakeholder involvement within BalticLINes mainly aimed to gather specialist opinions on the trends in the shipping and energy sector. Therefore, two sector focused workshops have been organised within the project: A workshop on Shipping in February 2018 in Riga and a workshop on Energy in October 2018 in Copenhagen. During these workshops the MSP Challenge simulation platform for the Baltic Sea (see page 12) has been used as a key tool.

Offshore wind

The offshore energy stakeholder workshop: Well-planned multiple tool session

In October 2018 about 40 energy sector representatives gathered in Copenhagen to discuss the spatial implication of offshore energy in the Baltic Sea. The meeting was organised in cooperation with the Baltic Integrid project, since both projects are aimed towards the same type of stakeholders. The session used small round-table discussions to collect opinions. Participants drew on maps and discussed plans first before actually using the MSP Challenge software to **draw digitally and see the consequences of their actions**. The session was divided into three distinctive consecutive parts: energy targets, energy trends and connections/grid. The workshop provided some valuable insights on offshore energy related issues – as highlighted below – and also showcased how the MSP Challenge can be used to stimulate discussions.

Session 1: Factors driving offshore wind development

- Willingness to invest
- Communication/promotion
- Setting targets
- Political priorities
- Technological developments
- Competition with onshore wind
- Grid design (incl. meshed grid)
- Balancing power-consumption
- Transmission capacity

Session 2: Technology trends

- Change in turbine technology
- Increasing size of wind farms, more (cost) efficient
- Sub-structure (technology/costs)
- Limited effects of floating wind
- Transmission technology
- Technical development and R&D
- Multi-use of wind energy sites
- Planning processes (incl. SEA and EIA)

Session 3: Interconnectors & grid

- Become an energy export market
- High level of cooperation needed
- Harmonise TSO legislation
- Increase stability of the grid
- Synchronise permitting and decision-making processes
- Russian utility frequency (power) is used in Baltic states
- Interest of domestic producers
- MSP as main driver and promotor for energy and a pan-Baltic grid

Read more
Energy MSP Challenge in Copenhagen 2018

Shipping

The Shipping workshop: Experimenting with a traditional sector

About 30 sector stakeholders from around the Baltic Sea region were invited to increase their awareness of MSP and to discuss the potential spatial implications of future shipping trends. The session was divided into multiple parts, using a draft scenario report developed under the project. Shipping is a very traditional use of the sea with 'freedom of navigation' playing a strong role in the mindset of sector representatives. During the workshop, the different stakeholders recognised that **other sea uses, like offshore wind farms, may have an impact** on shipping routes in the future. Ad hoc game-play measures, such as badly planned wind farms, were used to increase understanding. The session thereby provided some input on future trends. It also re-enforced the idea of using the MSP Challenge simulation platform for the Baltic Sea in the future to raise the awareness of stakeholders.

Stakeholders' views on shipping trends

The following shipping trends have been indicated by stakeholders within the workshop, as well as from a previous survey, as being important for the Baltic in the coming years:

- Dimensions of most ships are likely to stay the same with only some increasing by 2030.
- Electricity is anticipated to be used as propulsion mainly for short-distance service traffic, hybrid propulsion systems for cruise ships and LNG, electricity and hybrid systems for the ferry/ro-ro sector.
- All competitive ports will have **LNG facilities** in time. This will increase the traffic coming from bunkering facilities. Offshore bunkering at sea is not expected.
- There is potential for developing a major hub in e.g. Gothenburg with the cargo being transferred there from large ships onto multiple smaller 'feeder' ships.
- **Unmanned vessels** seem to be most likely for cargo/container and ferry/ro-ro ships. Full autonomy will most probably only happen to ferries, container ships and in domestic shipping and only on certain routes.
- There may be an increase in cargo for container ships due to an increase of cargo capacity per ship, and there is expected to be an increase in the number of passenger ships as well as in the number of passengers.
- It is anticipated that ferry connections will gain importance or at least stay the same. A decrease is expected only for the ferry connection between Puttgarden and Rødby if the 'Fehmarnbelt' tunnel becomes operational.
- For all Russian ports a clear growth is expected. They might become more competitive with climate change (increased availability of oil & gas reserves, operational also during winter) and alternative transport paths via the North-East passage may become important.

Exploring the future of shipping in the Baltic Sea
Read more

The Latvian Ministry of Environmental Protection and Regional Development (VARAM), as the responsible Latvian MSP authority, combined the Baltic LINes stakeholder project activities with their ongoing statutory national Latvian MSP process, which ran simultaneously in 2017–2018. Latvian stakeholders representing the shipping and energy sectors discussed which issues are of importance at a national and pan-Baltic scale respectively. This was done by developing various scenarios and **finding an agreement on the optimal scenario** for Latvia.

The scenario development process

Process used for engaging stakeholders

Step 1: May–October 2017
Stakeholder Identification

Step 2: June–September 2017
Adaption and Use of Sector Representatives' Communication and Involvement Methods

Step 3: June–September 2017
Management and Involvement Process of Sector representatives

Result: October 2017
The objectives and tasks set out in the aspects of sectoral involvement were achieved.

Process used for sectoral scenario development

Step 1: Study the current situation and sectoral development tendencies. This led to a first list of key factors for each sector.

Step 2: Defining the factors influencing future manifestations and evaluation of their importance. A survey among stakeholders using the list of key factors provided the main input.

Step 3: Placing key factors on the two scenario axes. The decision of the key factors (for offshore wind: wind turbine technology/political support; for shipping: demand for cargos/technology development) is based on the survey results and pre-design of upcoming workshops.

The scenarios

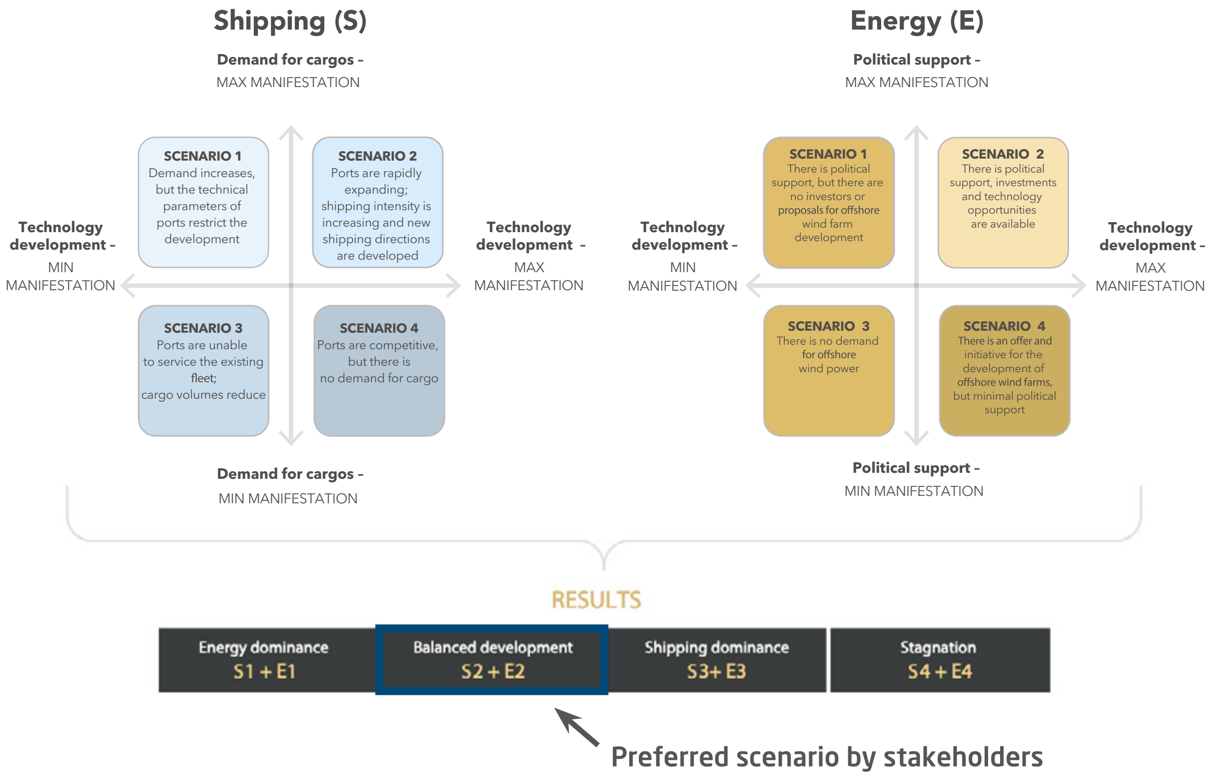


Figure 7: Future scenarios for shipping and energy.

Read more: Stakeholder Involvement in Long-term Maritime Spatial Planning: Latvian Case

Outcomes – Offshore wind

Baltic Sea-wide issues regarding energy identified by the stakeholders

- **Offshore wind park developments in the neighbouring countries.** What are the plans of neighbouring countries for offshore wind farms, and is mutual coordination possible or necessary? What are the examples of best practice?
- **The role of the offshore wind parks in the decarbonisation of the transport sector.** What is the experience of the BSR countries in the long-term development of a sustainable and efficient transport system, creating all decarbonisation options for all transport modes, moving to new and innovative low-carbon transport technologies?
- **Offshore wind park support policy.** The role of the public sector in exploring the construction of offshore wind farms and making the data public. What are the options and conditions for balancing offshore wind farms (power generation capacity at lull time)?
- **Studying sea currents.** Research and simulations of sea currents for the possible formation of deposits that can be caused by the foundations of new structures (wind turbines) at the bottom of the sea and how it redirects shipping routes.

Conclusions for the Latvian MSP process

The desired development of the energy sector in maritime space needs to be seen in the context of the expected small increase in electricity consumption and a significant increase in the share of electricity produced from Renewable Energy Sources (RES). **The use of offshore wind potential should not limit the development of shipping.** Thus wider areas should be explored in order to find optimal offshore wind farm locations that are economically most advantageous while being at the same time least impactful on other industries and the environment in Latvia.

Outcomes – Shipping

Baltic Sea-wide issues regarding shipping identified by the stakeholders

- **Future shipping intensity in the Baltic Sea.** Future forecasts and scenarios should describe the future intensity of shipping, the development and use of ships and shipping technology, changes in cargo types and transport destinations.
- **Coordination of LNG development plans in the BSR.** LNG development plans and bunkering opportunities should be developed in a coordinated and complementary manner, especially if the development is implemented through public funding.
- **Adaptation of the Danish Straits to larger ships and deeper draughts.** The shipping sector needs clear long-term signals as to whether or not the deepening and adaptation of the Danish Straits or other alternatives concerning the Baltic Sea may be an issue for the agenda. And if so, is this a question before or after 2050?
- **Adaptation to climate change.** Experiences and good practice in planning and implementing the adaptation of the shipping sector to climate changes (incl. possible changes in sea-ice cover periods).

Conclusions for the Latvian MSP process

The desired future development of the shipping sector will be characterised by the **development of large ports and optimal shipping conditions**, including in the case of a significant increase in cargo turnover, the number of serviced vessels, ferry and cruise ships, and yachting. The shipping sector will need to pay more attention to maritime safety aspects. The sector will seek to reduce ship-generated emissions, and therefore Latvian ports will also have to adapt to technological developments. Latvian ports have no experience in servicing offshore wind parks; therefore, they are cautious and call on the energy sector to provide them with economically sound estimates of the contribution of this sector to the development of ports.

Work package 4 of the project concentrates on coherent planning of linear infrastructures, the key issue of the project. The first step is the identification of possible planning **mismatches in border areas which require adaptation** and creation of planning solutions for pan-Baltic shipping and energy corridors. Three deliverables present results from project meetings, expert interviews and stakeholder consultation with the following objectives:

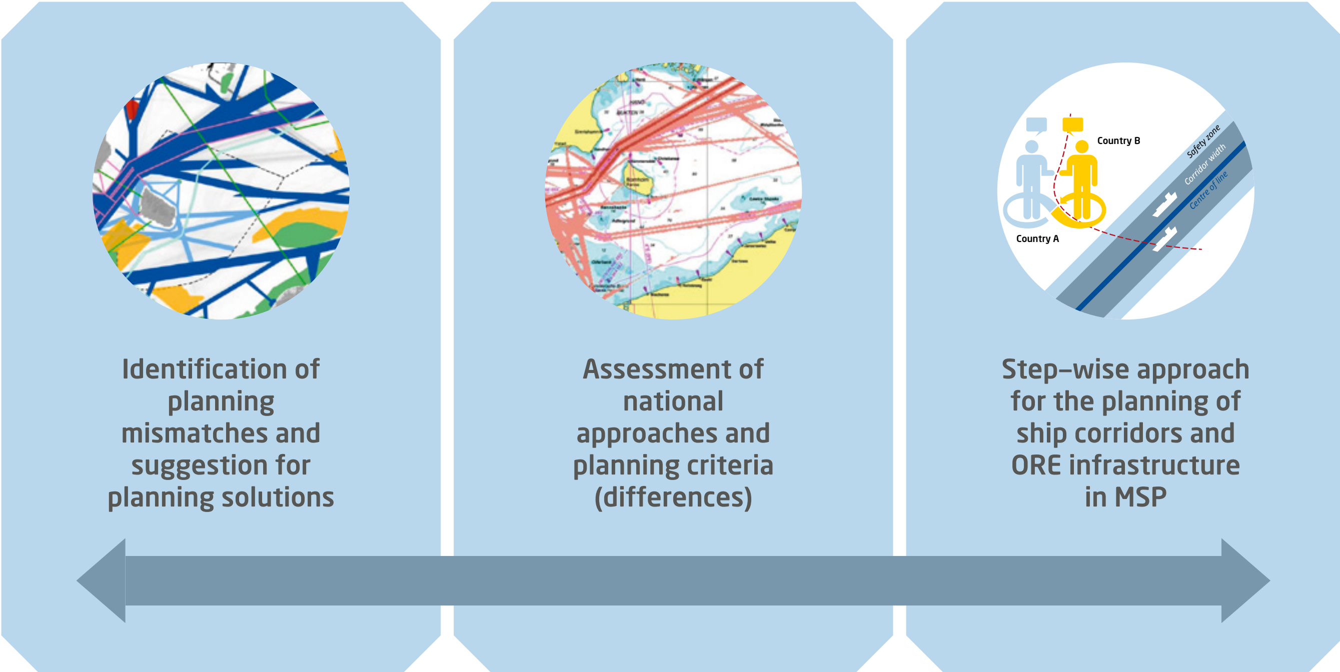


Figure 8: BalticLINes approach on planning issues, criteria and mismatches.

Abstract examples of planning issues for shipping/energy

1 Planning Mismatch: Routeing of cable corridors does not match at EEZ border

2 Differing methodologies: different dimensions of priority areas for shipping

3 Nature conservation issues: Planned offshore wind farms bordering sensitive marine protected areas in other country

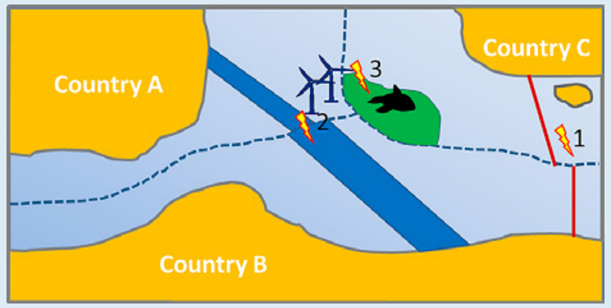


Figure 9: Abstract example of planning issues.

Planning mismatches can arise when different national MSP designations are not in line with each other at the border (see figure 9).

These mismatches may result from differences in methodologies used, planning criteria and cultures, MSP approaches and sector priorities, as well as missing or outdated data from neighbouring countries or less focus on transboundary issues.

Within BalticLINes, various cases showing different kinds of planning mismatches have been identified in relation to shipping and energy developments. For each case, specific planning solutions have been suggested. These have then led to more general suggestions on how to ensure coherence in planning across borders.

It is important to notice that **the planning mismatches at borders do not often pose any current operational problems** since there is still enough sea space. However, **issues may become more critical if sea space gets more limited and scarce** due to increasing offshore installations and increasing maritime transport activities.

Read more: Infopaper From Planning Issues Towards Planning Solutions

Example case study: Area around and east of Bornholm (Poland, Sweden, Denmark, Germany)

Planning mismatches identified:

- Mismatches between ship corridors (gaps between and different widths of corridors).
- Issues between shipping and energy (shift of traffic due to OREI).

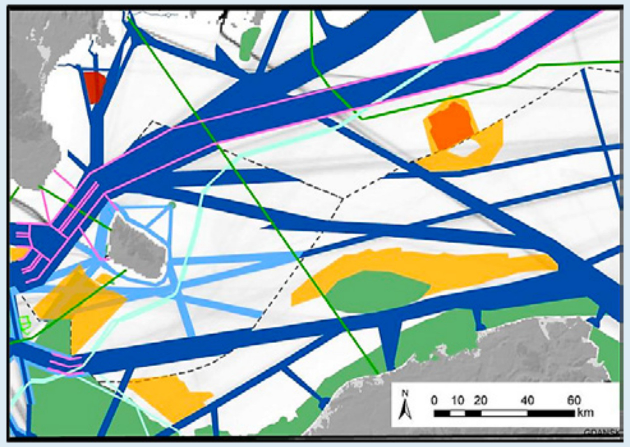


Figure 10: Example of MSP planning issues.

Possible reasons identified for planning mismatches:

- Different approaches for designating shipping areas (differing width).
- Permission for offshore wind farms has been given without taking into account AIS data; licenses for offshore wind farms are in place/have to be respected.
- Outdated or missing data and information, especially the status of several cables is unclear.

Case specific solutions:

- Partners decided to check scenarios on port development, in particular to contact Klaipeda port for information on the potential growth of Klaipeda port, in order to find out if there is a reason to designate areas in the Swedish sea for ships going to Klaipeda.
- A political agreement has been found between Poland and Denmark to find common designations for a so-called 'grey zone'. Problematic in this context might have been the different stages in the MSP process of both countries.
- The interest area for OWF in Denmark should also consider traffic towards Klaipeda.

General planning solutions ensuring coherence among national MSPs

- More **coherence between national MSP processes and timeframes** would help to prevent planning mismatches to happen in the first place.
- As the timing of the national MSP (drafts) is differing and not aligned, there is a special need for early consultation of national plan designations. It is recommended to provide maps for international consultation showing both designations of the country that is drafting the plan and data (draft) plans of the involved neighbouring countries.
- One important reason for planning mismatches are the different philosophies behind the various national MSPs, for example differences between legally-binding plans and plans with a management character. Whereas alignment may not be possible, it is already helpful to have a good understanding of how MSP is implemented and what kind of planning criteria are applied in the different countries (see page 20 & 21).
- An explanation of calculation methods for width of shipping areas would also help to better understand and consider differing national approaches.

To summarise, still many cross-border mismatches can be found between designated ship corridors or between areas designated for shipping and energy. These mismatches often relate to different national approaches for MSP or different applications of planning criteria. Therefore, Baltic LINes also includes a comparison of national MSP approaches and planning criteria for a better (transnational) understanding (see page 20 & 21).

Planning criteria are the factors that are taken into account for the identification, assessment and ultimate spatial designation and regulation of areas for specific spatial uses and activities, such as selection of suitable areas for offshore wind farms, cable corridors and important corridors for shipping ('site/corridor selection criteria'). Planning criteria and their (different) applications in different countries are of high relevance when trying to find **the source for mismatches and the suggestion of possible planning solutions**.

Offshore wind

Legal aspects and international regulations influencing energy planning criteria

In contrast to the shipping sector and despite common EU targets, the Baltic Sea Region **lacks an established intergovernmental collaboration or body to coordinate activities in the offshore energy field**. There is, for instance, no international convergent and binding legal framework to regulate, for instance, the allocation of offshore wind energy installations. Typically, these are based on regulation of other sectors such as shipping, defense and nature protection, which place restrictions on the allocation of locations for OREIs.

The following international guidelines are relevant for energy sector considerations:

- UN Convention on the Law of the Sea (UNCLOS): states general principles (i.e. rights to decide and use sea areas) and mentions the possibility for coastal states to establish in EEZs 'reasonable' (max. 500m) safety zones around artificial islands, installations or structures (incl. OREIs).
- International Maritime Organization (IMO): designated sea-lanes and TSSs (Traffic Separation Scheme) are excluded zones for OREIs, but rerouteing for the benefit of other sea uses is possible.
- Nature conservation regulation (Convention on Biological Diversity, International Union for Conservation of Nature and HELCOM): protected areas often prevent building of OREIs.

Most commonly used energy planning criteria*

Technical infrastructure and connections:

- Availability to connections and distances to onshore grid (8)
- Distance to shore and to construction, operation, maintenance port (4)
- Area and project size (space demand per turbine) (3)
- Future planned development potential of grid (connections and extensions) (2)
- Grid capacity (2)

Environmental habitats and species

- Marine and coastal protected areas (Natura 2000 areas) (5)
- (concentrated) bird migration routes (2)
- Biotopes (1)
- Mammal (seasonal) distribution (1)
- Important bird areas (1)

Policies

- Climate policy trends and targets (2)

Other sea uses

- Shipping lanes (5)
- Safety of navigation (4)
- Pipelines and cables (4)
- Other permanent infrastructure (3)
- Fishing zones (3)
- Dumped munitions (3)
- Proximity of existing wind farms (2)
- Cultural heritage (2)
- Radars (2)
- Military zones (2)
- Mineral resources extraction (1)

Economic factors

- Regional demand for electricity (2)
- Local employment and growth stimulation (2)
- Trends in the energy sector (1)
- Economic profitability (1)

Social aspects

- Visual impact on the landscape and views from the coast (4)
- Stakeholder involvement (1)

* The number after each of the criteria reflects the number of sources that mention the criteria.

Shipping

Legal aspects and international regulations influencing shipping planning criteria (figure 11)

The most relevant regulations designating shipping corridors in MSP are:

- the International Convention for the Safety at Sea (SOLAS)
- the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs)
- the General Provisions on Ship's Routeing Systems of the IMO (GPSR).

In the Exclusive Economic Zone (EEZ), national governments are able to propose routeing measures to the IMO (jointly if the EEZ of two or more countries is involved).

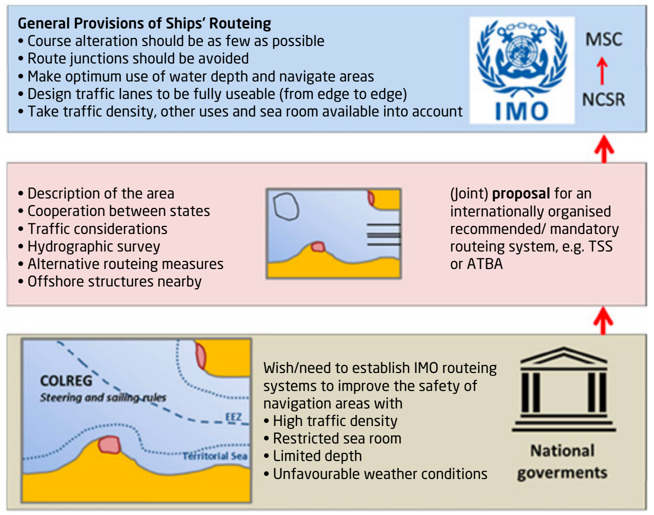


Figure 11: Schematic overview of the proposal process for ships' routeing systems.

Most commonly used shipping planning criteria in shipping area designation

DENMARK		Width of priority areas + safety zones according to traffic density (AIS data from 2016) and ship sizes on main traffic routes, guidance taken from Nautical Institute paper. Corridor widths between 6 and up to 10 nm.
ESTONIA		AIS based shipping density is used for discussing/deciding on multiuse of marine space or establishing spatial constraints (e.g. Ships' route design).
FINLAND		Shipping density maps based on HELCOM AIS data will be used to determine corridor width.
GERMANY		Larger corridors equal widths of TSS; 1 nm width for 1000–4900 vessels per year; 10 nm for >10 000 ships. Designation in MSP from 2009 based on AIS data from 2005–2009 (national stations).
LATVIA		Use of AIS data and consulting all Latvian ports. The width of the shipping corridor and safety zones of these areas reserved for shipping is 6 nm to/from major ports or transit routes and 3 nm to/from small ports of Latvia. The width was agreed upon by consulting Maritime Administration of Latvia and taking into account the guidance document of Nautical institute.
LITHUANIA		Shipping routes and roadsteads are well defined and strictly respected in the MSP documents and charts. Yearly summary of ship density was taken as a basic information for justification of the corridors.
POLAND		Widths of priority areas not defined in detail yet.
SWEDEN		AIS data was used to designate national interest areas, which were the basis for later designations of areas in MSP. MSP only covers the nationally important corridors. Smaller routes rely on the 'freedom of navigation'.

Table 3: Shipping planning criteria used in the countries around the Baltic Sea.

Lesson learned: Standardisation of approach instead of standardisation of criteria

Agreeing on a set of joint planning criteria for the whole Baltic Sea Region would be ideal in order to plan coherently, but an agreement would require standardisation of national approaches, which seems to be fairly **difficult due to differences in national planning systems**. Project partners decided to collect those planning criteria that are most frequently used by countries, describe the national approaches and suggest a way to approach the planning of shipping and energy for MSP on a practical level. Explaining the rationales behind the planning of shipping and offshore renewable energy infrastructure in different countries may also help to reduce the need for harmonisation of MSPs in some cases.

Identification of Transnational Planning Criteria
Read more

As shown before, different national priorities and planning cultures make it impossible for all Baltic Sea region countries to apply the same methodology for designating their respective maritime uses. As the best possible option, however, two **practical guides have been developed to provide advice to planners** on how to take a step-by-step approach for the designation of areas for shipping and energy installations in MSP. These steps may not only be relevant for Baltic Sea region countries, but can also be applied elsewhere. Moreover, a specific methodology has been developed to assess how much space is required by an offshore wind farm to achieve a certain energy capacity.

Offshore wind

General process of designating an offshore wind farm

Planning of energy installations is an iterative process starting from more general considerations of suitability of areas and corridors to more detailed construction planning, which is followed by permitting procedures before the actual construction (see figure 12). The BalticLINes project developed a step-wise approach summarising the considerations taken when assessing, deciding on and designating the suitable areas for offshore wind energy and grid development. This approach **should not be seen as the one-and-only way**, but as a possible process of the designation of offshore wind.

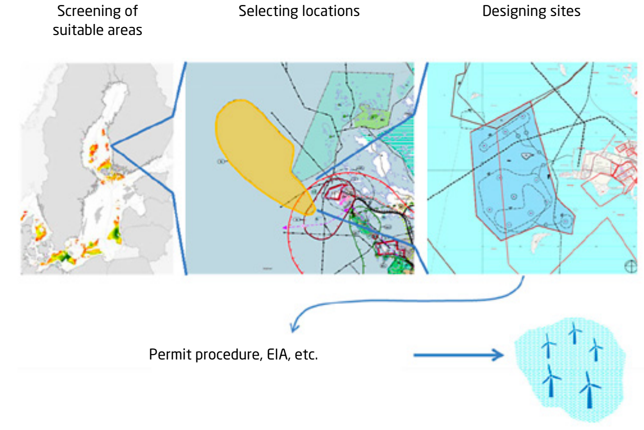


Figure 12: Planning of energy installations as an iterative process.

Planning guidance for offshore renewable energy installations

STEP 1: Define the need for development and political goals for offshore renewable energy installations

- Clarify what the political goals for the development of offshore wind energy are, what the priority of the development is and be aware of the future trends and technological developments

STEP 2: Mapping the existing designations and installations

- Find out areas already designated for offshore wind energy and areas designated for other uses and activities
- Check your neighbouring countries' area designations for wind energy and other uses
- Take into account in the plan the previously mentioned and incorporate them into the planning process

STEP 3: Mapping suitable areas (general planning criteria - see also below for capacity density)

- Assess the natural and technical conditions, the demand for energy in the coastal area and the possibility for grid connection

STEP 4: Mapping the conflicts and synergies with other uses and activities

- Detect areas/locations with conflicts, find solutions for these conflicts and discuss with other sectors and stakeholders

STEP 5: Defining of the priority areas for offshore wind energy

- Consider again national targets for renewable energy production, identify the priority areas, discuss with other sectors and stakeholders, define specifications for the priority areas

Planning guidance for offshore energy cables

STEP 1: Define political framework/targets

- Clarify what the political energy or climate protection targets are
- Consult neighbours as early as possible to identify further need for cables
- Define future need for offshore energy cables and interconnectors based on political and market-driven framework/criteria

STEP 2: Check suitability of areas

- Geology and seabed conditions

STEP 3: Stocktake: Analysing/Mapping conflicts and synergies with other uses

- Consider existing and planned energy and data cables/cable corridors and include all other relevant planned and existing uses/rights of use and protected areas

STEP 4: Consider land-sea interaction

- Consider connection to onshore power grid

Step 5: Define cable corridors based on the analysis and application of planning criteria/planning principles

- Space needed for the cable itself and its laying, as well as a safety zone around it to ensure sufficient space for potential repairs, space at cable crossing areas and/or specific distances in case of parallel routeing with other uses

Read more: A Practical Guide to the Designation of Energy Infrastructure in Maritime Spatial Planning

Shipping

General process of designating Ship Corridors

Designations of ship corridors in MSP vary greatly due to differences in national planning systems. Especially when it comes to the project level, e.g. for shipping in the vicinity of offshore wind farms, **thorough risk assessments** have to be conducted on a case-by-case basis. Using the similarities and differences of designations of ship corridors in the different national systems, the following 5-step approach claims to be a good example of how to prepare the first draft of ship corridor designations in MSP for national and international consultation.

STEP 1: Data acquisition of IMO measures in the national sea area

- Transfer of existent IMO routeing and fixed uses as a basis for initial plan drafting
- Assessment of future plans for potential spatial regulation of ship traffic

STEP 2: Data acquisition and preparation of Automatic Identification System (AIS) data (see figure 13)

- Assessment of current ship traffic patterns for a first draft of ship corridor designations
- Consideration of safety issues

STEP 3: Assessment of political goals and policies that impact the shipping sector (see figure 14)

- Assessment of economic development and industrial developments in the shipping sector
- Assessment of changing natural conditions impacting the shipping sector
- Indication of an area with changing spatial needs for shipping in the future

STEP 4: Assessment of spatial demands across sectors

- Indication of potential conflicts between different uses
- Development of planning solutions

STEP 5: Assessment of transnational ship traffic (see figure 15)

- Analysis of designated ship corridors along borders
- Alignment of ship corridors across borders

STEP 6: Categorisation of areas for shipping

- Designation of shipping corridors

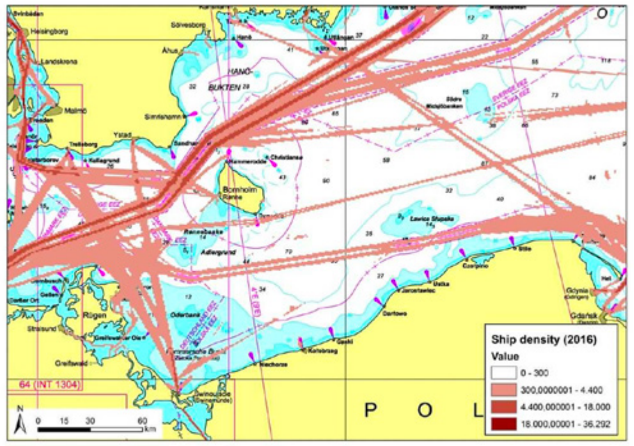


Figure 13: Step 2: AIS data needs to be analysed to designate ship corridors.

Figure 14: Step 3: Future developments need to be studied to estimate future spatial demands.

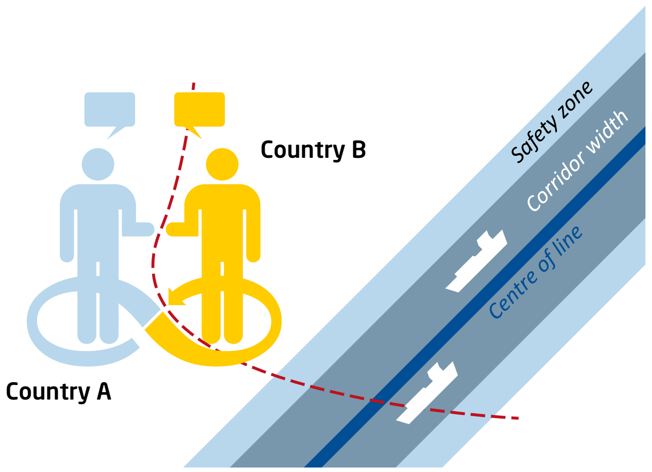


Figure 15: Step 5: Transnational exchange between planners to increase coherency of designations.

Read more: A Practical Guide to the Designation of Ship Corridors in Maritime Spatial Planning

COOPERATION WITH NORTHSEE, THE NORTH SEA REGION

Baltic and North Sea maritime spatial planners have much in common. They partly face similar challenges and opportunities concerning offshore wind and shipping developments in MSP. To facilitate the process of exchange of information and experiences, the NorthSEE project was set up as a sister project of Baltic LINes under the Interreg North Sea Region programme. During the duration of both projects, the continuous exchange of project activities and findings was undertaken. Some key events highlight the successful cooperation between the two projects.

Description of the NorthSEE project

The countries around the North Sea are forerunners when it comes to MSP. Most of them already have national Maritime Spatial Plans in place. Relevant authorities have used their own planning methods and processes to develop these plans. The NorthSEE project focusses on an exchange of approaches that will eventually lead lead to greater coherence in Maritime Spatial Planning (processes) and Maritime Spatial Plans.

The Baltic LINes and NorthSEE project share many similarities, with the goal being to strengthen both projects. The projects have the same lead partner (BSH). Also BUAS, AAU and SwAM are partners in both projects. **The general project approach of NorthSEE is similar** to the Baltic LINes project, working from 'status quo' to 'planning solutions'. The project also focuses on the shipping and energy sector and considers environmental issues. Furthermore, the MSP Challenge is used as a tool for stakeholder engagement.

Sharing expertise and experiences

The similarities between both projects have provided many opportunities for exchange of expertise and information. As a standard, draft reports on a specific sector developed by Baltic LINes have been shared with NorthSEE partners for comments and vice versa. **This improved the validation of the outcomes for both projects**. Several other concrete activities strengthened the relation. This includes a common partner meeting (June 2016) and NorthSEE-Baltic LINes work-group meetings on Energy and Shipping (March 2017).

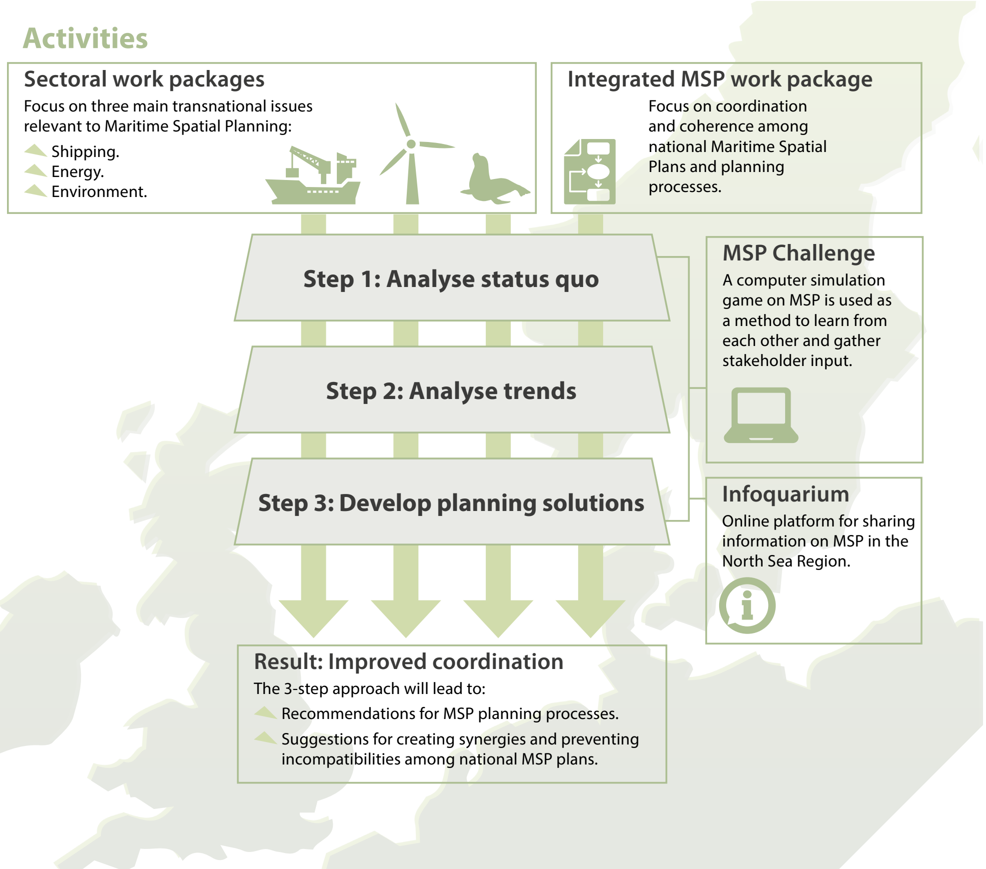


Figure 16: NorthSEE project at a glance.

www.northsee.eu

The Connecting Seas MSP conference

The projects decided to bundle their resources and organise the Connecting Seas MSP conference together on the 13–14th of February 2019 in Hamburg. This joint conference provided the opportunity for maritime spatial planners of both sea basins to learn more from each other and discuss possibilities for future cooperation. Furthermore, sector experts have been eager to participate because of the amount of information and the number of maritime spatial planners available at one combined event.

▶ A transnational 'sailing tour' was organised in which participants got 15-minute-long updates on the current national MSP processes in the Baltic and North Sea.

▶ The nine workshops at the conference were developed and hosted jointly by Baltic LINes and NorthSEE project partners.

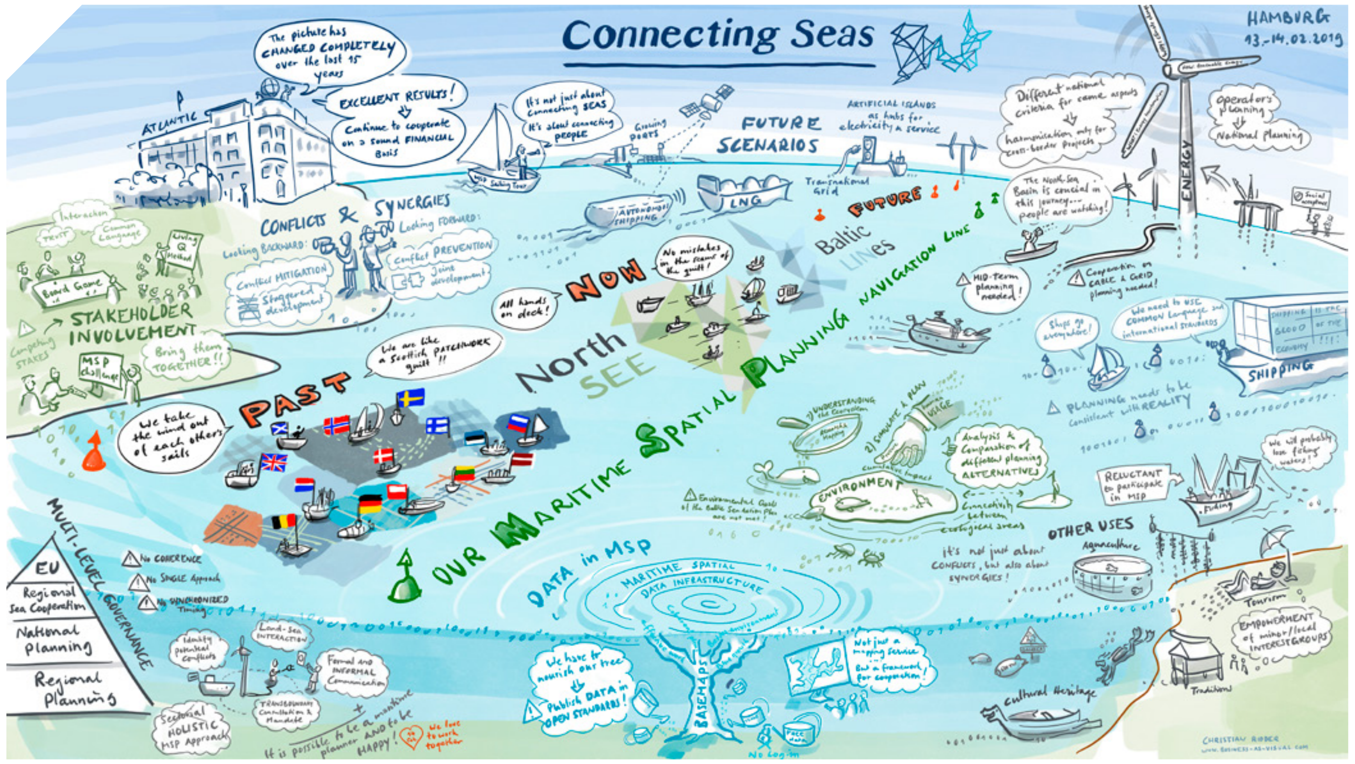


Figure 17: Most important findings from the Connecting Seas MSP conference. Visual summary developed by Christian Ridder business-as-visual.com.

Baltic LINes was implemented during a period when all EU Member States around the Baltic Sea were preparing their first or second generation of Maritime Spatial Plans in compliance with the EU MSP Directive (2014/89/EU). These differ in the following aspects: the overriding objectives of the MSP; how binding the MSP plans are in legal terms; the temporal planning horizon; the scale of planning and how sectoral or nature protection planning can be influenced by MSP. Last but not least planning authorities have been allocated to very different ministries in each of the countries, which leads to differences in resources and information directly accessible to them. Baltic LINes has contributed substantially to achieve coherence across the Baltic Sea Region MSPs despite these differences.

General conclusions

Country	MSP (National plan)	Binding/ nonbinding MSP
DENMARK	12/2020	Binding
ESTONIA	8/2020	Binding, incl. OWE installations
FINLAND	3/2021	Very strategic, non-binding
GERMANY	6/2021 *	Binding
LATVIA	12/2018 *	Non-binding
LITHUANIA	6/2020*	Binding
POLAND	7/2019	Binding
SWEDEN	12/2019	Non-binding

* National plans have been adopted

Table 4: National plans of the EU Member States around the Baltic Sea, August 2018.

The different planning procedures and decision-making structures throughout the Baltic Sea Region countries do not allow the introduction of one common standard in relation to all aspects encompassed in MSP. In line with the spatial subsidiarity principle, this is also not necessary. A diversity of methods and processes also has advantages, such as higher flexibility and stronger links to existing domestic legislation. It is more important to extract and find agreement on those issues, which require transboundary solutions.

A pre-condition to finding those solutions is an ongoing comparative analysis of the different MSP approaches, processes and methods applied. In order to match plans at borders, planners need to understand the neighbours' planning content and categories.

Main lessons learned

1. An important achievement within the Baltic LINes project has been to establish a **clear comparative overview on the various planning and technical design criteria as well as underlying methods** used by the different countries in designating zones for shipping and energy infrastructures.

   This allowed the extraction of a **common set of steps to be used by all MSP authorities** when designating energy and shipping areas. It has also **highlighted aspects, which can be harmonised** despite the differences among countries: e.g. the introduction of 'no-go-shipping' areas. The establishment of a common planning approach increases the comparability and mutual understanding of national decisions towards greater coherence.

2. Another way of avoiding mismatches of MSPs across borders is by **showing national MSPs always within the context of their surrounding areas** including the adjoining MSPs. This may be obvious, but is not always practiced. It is often possible to find **solutions for mismatches** between countries despite differences in the MSPs. A pre-condition is, however, to know about them.

   Especially before the final adoption of a given MSP, countries may be able to find solutions, which can still be integrated into their current MSP, for example by finding a new type of zone for a 'shipping line'. At the same time, **good ways of cooperation will need to be found in the implementation phase of MSPs** when countries will know the respective designated zones of their neighbours.

3. With BASEMAPS as well as the Baltic Sea edition of the MSP Challenge, Baltic LINes has developed **two important new tools**, which make it easier for MSP Planners as well as their relevant stakeholders to **not only 'think', but also 'see' across the borders**. Both tools are ready to be used and applied. It will, however, substantially depend on the care and good will of the respective institutions in all Baltic Sea Region countries as **to how well these tools will be maintained and used in the coming future:**

   - **BASEMAPS can only be as good as the data provided by the countries.** Creating the link to BASEMAPS is the obvious key condition, which needs to be supported by the respective MSP authorities. Moreover, countries should provide metadata descriptions not only in their own languages, but also in English to make them understandable across borders. Differences in standards may remain, but with BASEMAPS it is now much easier to identify them and decide on whether any further future alignment may be necessary and what may be possible to change in national data sourcing processes.
   - Also the usefulness of the Baltic Sea MSP challenge edition will depend on how much time and efforts are devoted by any respective future user to make it work towards their needs. Baltic LINes has created the basis with a ready to use simulation platform being in place as well as equipping many MSP stakeholder engagement institutions with a set of their Board Game. **Baltic LINes has also increased the capacity and knowledge of experts around the Baltic Sea in how these simulation tools can be best applied** not only for educational purposes, but also for discussing and working on concrete planning issues among planners as well as with stakeholders.

4. Despite the development of these tools, **there is still a lack of proven methods and knowledge on how to evaluate and assess certain trends and developments and how Maritime Spatial Plans can best cater to them**. This also applies to ways of how Baltic Sea-wide maritime scenarios can be better interlinked with land-sea interaction effects, thus creating the basis for an overarching territorial cohesion.

   As pointed out by previous projects, such as PartiSEApate, it takes **a long-term, on-going effort to create a joint understanding with sector stakeholders in view of pan-Baltic developments and spatial planning options.** For the well organised shipping sector, efforts should be concentrated on creating a good process for how the various networks may best communicate and work with each other. In the case of the energy sector, however, a more pro-active effort may be required. Not only Baltic LINes but also the parallel ongoing INTEGRID project faced the problem of the absence of 'one single' representative pan-Baltic energy dialogue partner. It is out of scope of the HELCOM-VASAB MSP working group to instigate the creation of such a group, but a realistic way forward is to **continuously create opportunities for a dialogue** and invite relevant energy stakeholders.

   The **clear set of questions and issues extracted by Baltic LINes** in relation to energy and shipping developments and their consequences for MSP provides an **excellent basis for further work** to be carried out in discussion groups as well as dedicated projects and studies.

5. Baltic LINes has again shown the importance of creating good opportunities for direct meetings and knowledge exchange. As evidenced, such **dialogue should not only be limited to planners** within the Baltic Sea Region. The success of the Connecting Seas Conference held in Hamburg in February 2019 showed that there is much to be gained from fostering an active exchange with planners outside the Baltic Sea Region. Moreover, there is a strong need to organise a **pan-Baltic maritime conference involving all major stakeholders** concerned. Such a conference could be used to discuss major trends from a sectoral as well as a cross-sectoral perspective, as well as the role of MSP processes and the resulting plans can play in paving the way towards the sustainable development of the Baltic Sea.

Based on the various Baltic LINes deliverables and the generated findings, the Baltic LINes partnership has elaborated the following recommendations **to be taken on board by Baltic Sea Region MSP Authorities** organised within the HELCOM-VASAB Maritime Spatial Planning Working Group.

Horizontal recommendations

- **Update and expand the planning criteria table:** The planning criteria table developed under Baltic LINes for the energy and shipping sector should be reviewed and updated, where necessary, by the national MSP authorities. The planning criteria for other sectors and uses should be included. Any changes should be reported back and presented to other relevant platforms.
- **Moving towards cooperation on MSP implementation:** As shown by BalticLINes, it may not always be possible to align the MSPs across borders at their design stage. With more and more countries having MSPs in place, concrete steps should be defined by the HELCOM VASAB MSP working group on how Baltic Sea Region countries may best cooperate in order to achieve coherence during the implementation of the respective MSPs, including voluntary agreements.
- **Provide maps for international consultation showing designations of neighbouring countries**. Countries should use maps showing not only the planned designations of the given MSP being subject to the consultation, but also relevant information including either the given or draft national MSPs of the involved neighbouring countries.
- **When appropriate use the MSP Challenge Baltic Sea simulation platform for future processes:** To this end the given MSP authorities (or other users) need to closely align with the designers to ensure that the respective session is organised according to its given specific purpose.
- **Continue and expand efforts to involve a wider range of stakeholders:** The currently established Baltic Planning Forums and Conferences should be extended to include other experts and stakeholders rather than only MSP planners.
- **Increase and continue the efforts to take into account land-sea interaction effects:** The HELCOM-VASAB MSP working group may support the further development of analytical tools based on those already existing from previous projects especially with focus on the transnational dimension of such land-sea interactions.

Offshore energy recommendations

Invite and involve the energy sector in the HELCOM-VASAB MSP working group. Dedicated energy sessions and/or workshops should be organised together with the HELCOM-VASAB MSP working group. To this end, energy stakeholders such as TSOs, offshore wind farm developers or authorities responsible for renewable energy policy and (sectoral) planning should be invited.

Discussion topics should encompass:

- **The review and update of national and pan-Baltic energy scenarios** (using Baltic LINes templates).
- **Coordination for linear infrastructure in MSP** (power lines, data cables, pipelines), the definition of strategic corridors and possible establishment of gates.
- **The interplay between terrestrial and offshore grids.**
- **Results and recommendations of other dedicated energy projects** (e.g. Baltic InteGrid).
- **Establish a (technical) pan-Baltic offshore energy and grid stakeholder group**, inspired by the North Sea Energy Initiative, made up of experts and that could actively feed into future projects. A starting point could be the Baltic Offshore Grid Forum (BOGF) established under the Baltic InteGrid project.

Shipping recommendations

Explore how **HELCOM Safe Nav, HELCOM Maritime and the HELCOM-VASAB MSP working group can improve cooperation** on MSP issues in relation to shipping, safety and seaport issues.

Discussion topics should encompass:

- Common positions towards the IMO in view of possible **shifting of shipping lanes**.
- How to better integrate and align **IMO terminology within national MSPs**.
- **How and whether or not MSPs can take into account future developments** of the shipping sectors.
- **An agreement establishing that the centre-line should be used as a common starting point** for coherent shipping lines defined within national MSPs (already recommended in Baltic SCOPE).
- How potential transnational 'mismatches' between shipping lines of different national MSPs (resulting from different planning systems & cultures) can be dealt with during the **future implementation of MSP**.
- Results of the few existing tools to assess **land-sea interaction effects between shipping, ports development and further on-land transportation of goods**. Further exploration of how such tools should be most effectively developed further.

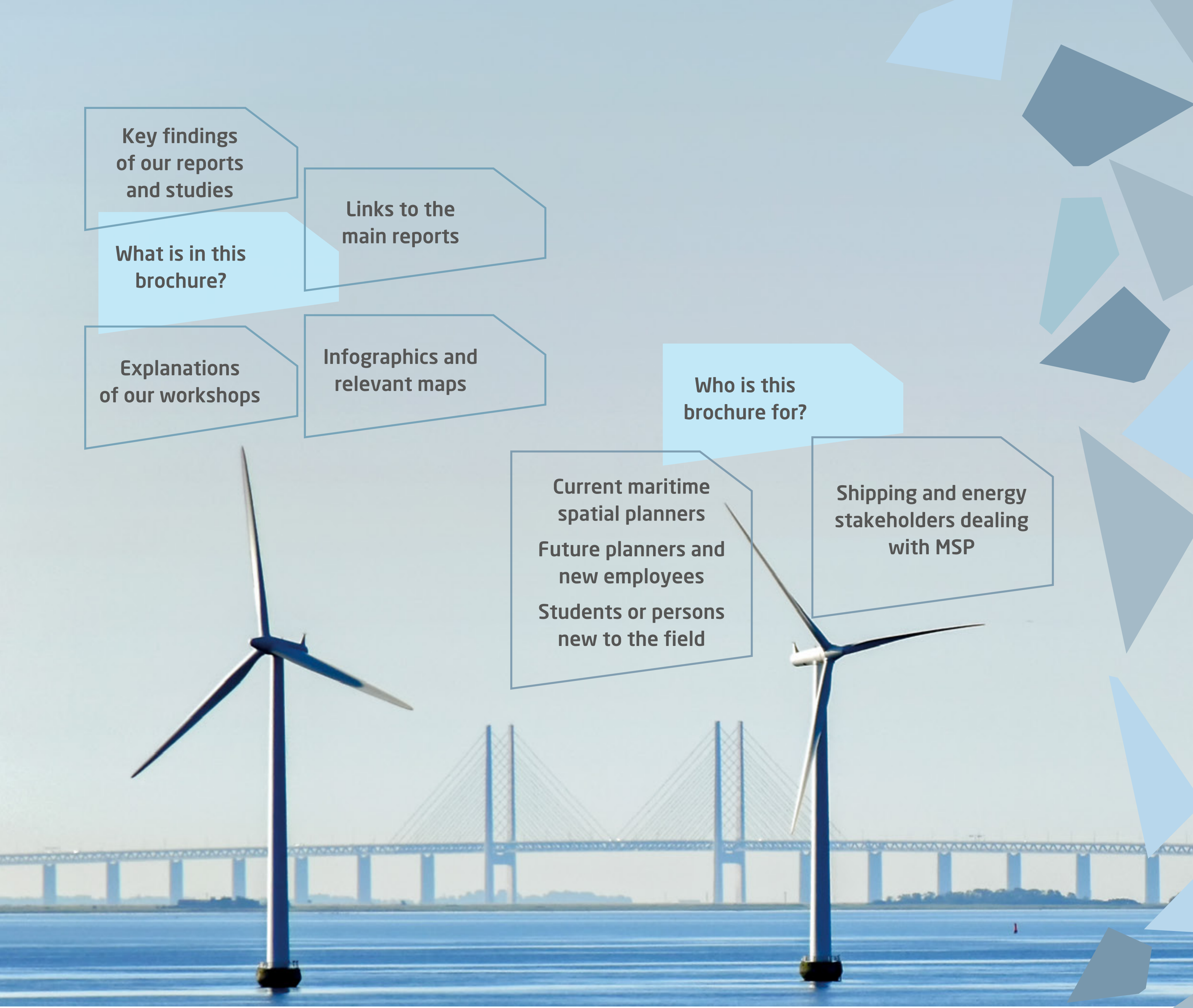
MSP Data recommendations (incl. BASEMAPS)

Update the terms of reference of the Baltic Sea Region MSP Data Expert Sub-group (BSR MSP Data ESG) under the HELCOM VASAB MSP Working Group:

- The BSR MSP Data ESG should work to **support the data availability in the newly created tool** to access BASEMAPS (see page 10) and make sure that their national data is included.
- **Follow-up on the status of the data availability** at each group meeting of the BSR MSP Data ESG. The Data ESG should inform the HELCOM-VASAB MSP WG on the status of BASEMAPS' completion.
- **BASEMAPS should be the focal point for getting an overview on MSP related spatial data** stemming from national Marine Spatial Data Infrastructures (MSDIs). Therefore, BASEMAPS could be the starting point for cataloguing relevant data to be used by MSP related spatial decision support tools.
- BASEMAPS should be continuously fed and its **data layers extended to other sectors** such as aquaculture, underwater cultural heritage, etc.
- The BSR MSP Data ESG should encourage MSP data providers to **establish English as an additional language to provide MSP transboundary data**.
- BSR MSP Data ESG should work to **support a common symbology for MSP data** and to establish of **common term vocabulary** to achieve semantic interoperability.

Baltic LINes project recommendations

Read more



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Interreg Baltic Sea Region

EUROPEAN UNION

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