Baltic LINes

Coherent Linear Infrastructures in Baltic Maritime Spatial Plans

Recommendations to the HELCOM-VASAB working group on transboundary consultations on linear infrastructure within the MSP process

Version 2.1

Report prepared by: Prof. Maciej Matczak

modalconcept

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Interreg Baltic Sea Region

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Introduction

As the EU MSP Directive (2014) requires all member states to adopt Maritime Spatial Plans (MSP) for their sea spaces by 2021, many countries are currently in the drafting phase, designating areas for use by one or more sectors in the coming decades. Planning a national sea area is a complex task in which different sectorial interests need to be carefully weighed against each other, conflicts have to be resolved and planning solutions need to be found. Another challenge in the MSP process is the need for cohesion across borders. The transboundary consultations are a key aspect in the proper implementation of MSPs, especially in relation to linear infrastructure.

The Baltic LINes project is focused on cross-border issues on shipping and energy lines, leading to a specific need for information on connections between respective borders and structures. The project aims to propose planning solutions for linear infrastructure (cables and pipelines), fixed installations such as wind farms and shipping lanes. The project seeks to increase the transnational coherence of shipping routes and energy corridors in Maritime Spatial Plans in the Baltic Sea Region (BSR). In this way, BalticLINes is contributing to the development of appropriate framework conditions for Blue Growth activities in the coming 10-15 years, thereby increasing security of investors.

BalticLINes will develop recommendations for a BSR agreement on transboundary consultations on linear infrastructures within the MSP process, including recommendations on how to deal with consequences of already existing MSPs (MSP implementation). They will be presented to the HELCOM/VASAB MSP Working Group to decide on, and follow up, their implementation. The report encompasses lessons learnt from the consultation strategy and the processes of the project. Therefore, the results of this report may lead to endorsement by the HELCOM/VASAB MSP WG, and subsequently could be introduced into the formal national MSP processes.

By communicating and presenting these recommendations to a wider expert public in Europe, and also beyond, it might provide valuable input for authorities and stakeholders, by focusing on aspects of cooperation not directly linked to certain specificities of the Baltic Sea Region.

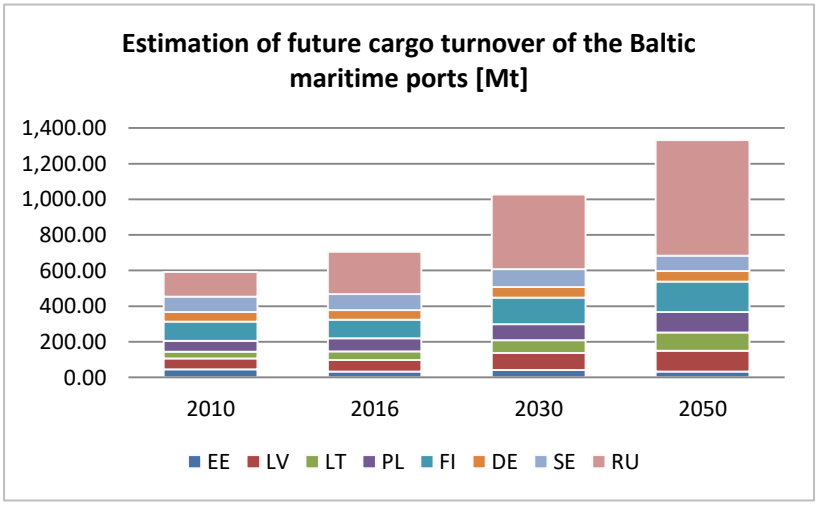
Maritime navigation trends related to spatial aspects

Current status and development trends of the Baltic shipping

Up to 15% of the world's cargo traffic is handled in the Baltic Sea Region, creating one of the busiest maritime spaces worldwide. There are more than 2000 ships in the Baltic marine area at any given moment. About 400 seaports operate on the coast, and around 90 occupy significant positions in the transport market. Baltic Sea ports handled a total of 888.4 M tons of cargo in 2017, most of which were handled in Russia (247.5 Mt), Sweden (176.0 Mt), Finland (96.9 Mt), Poland (87.3 Mt) and Denmark (83.5 Mt). More than 234.9 million passengers have been transported via the Baltic. In recent years (AAGR 2007-2017), the main engines of traffic development have been Russia (+5.7%) and Poland (+4.5%).

Growth in Baltic shipping activity will be driven by various factors and trends, both internally and externally in nature. Taking into account key elements in particular areas, the following issues can be listed[1]:

a) growth of trade flows on both a regional and a global scale,
b) re-routing of international trade, dominated by increased trade volumes from Russian and Polish maritime ports, and development of new inland corridors (e.g. Rail Baltica, New Silk Road, Baltic-Adriatic Corridor),
c) improvement of environmental standards in shipping and seaport operations (e.g. SECA, safety regulations on ferries, BWMC, The EU Emissions Trading System, CO2 reduction, Sewage delivery).
d) evolution of fleet structure, ship size and capacity (bigger vessels),
e) pro-environmental technological changes, such as: new/alternative fuels (LNG, electric) or engines & propulsion systems (wind), exhaust gas reduction systems & devices (e.g. scrubbers),
f) new technologies and ship operating patterns (digitalisation, autonomous unmanned vessels),
g) seaport extensions and fuller engagement leading to more complex logistics services.



According to research completed within the BalticLINes project, improvements in turnover of maritime port cargo should reach levels from 58.8% (limited growth scenario) up to 77.7%

[1] *QUO VADIS Exploring the future of shipping in the Baltic Sea. BalticLINes (WP 2)*

(fast growth scenario) during the period 2016 – 2030. Growth of over 148% is expected up to the year 2050 (see Figure).

This impressive increase in cargo turnover in maritime ports will have an effect on shipping activities in the Baltic area. Significant growth in sizes of vessels, especially container and bulk carriers, will coincide with a decrease in traffic intensity. If we consider the period between 2015 and 2050, the highest growth is expected in the group of dry bulk carriers (+152,1%), container ships (+94,7%) and liquid bulk carriers (+96,1%). As a result, total vessel traffic on the Baltic should decrease (-10.2%) until 2050. However significant changes in the structure of ship types, as well as in sizes, should occur.

Based on the outlined changes at the global level, as well as taking into account the influence of external and internal factors, the general trends for the shipping sector can be summarized thus[2]:

- Shipping is likely to increase on an intra- as well as on an extra-European scale due to global population growth & migrations, economic growth and the effects of increasing global and regional trade.
- It is expected that a modal shift of transport from road to sea will take place in Europe. The Baltic Sea favours waterborne transport over shorter distances because of the high density of harbours. Here, Short Sea Shipping often reduces the total distances compared to road freight transport. Developments towards the raising of road-, bridge-, and tunnel taxes in several EU countries favours this shift from road to sea.
- Further implementation of environmental regulations will increase the costs of transport services, thus a modal back-shift (from sea to road & rail) could also occur.
- A greater number of larger vessels is expected to enable more efficient and cost-saving maritime freight transport. Larger ships with deep draughts will represent a major challenge, especially for routes entering the Baltic Sea or crossing its shallow areas as well as for the port development as channels and trans-shipment quays will need to be deeper and wider.

These rising trends may force a concentrations of cargo in bigger ports which have a better chance of financing port infrastructure. Small and medium sized ports will not be able to handle larger ships, so further concentrations of cargo in bigger ports will be observed.

Consequences of the shipping sector trends on MSP development process

All above listed trends do have an significant influence on the process of defining of MSPs. As the plans should be prepared with the long-term perspective, the future needs referred to the shipping corridors capacity, spatial structure and international or inter-sectorial coherence are the key challenges. Because of the process should secure the sea areas free of navigation obstacles, MSP authorities should pay attention also to economic factors, navigation safety and environmental pressure. Other lesson learned by the BalticLINes partnership is a need of multi-criterion approach applied to seaward development of ports being the modal nodes

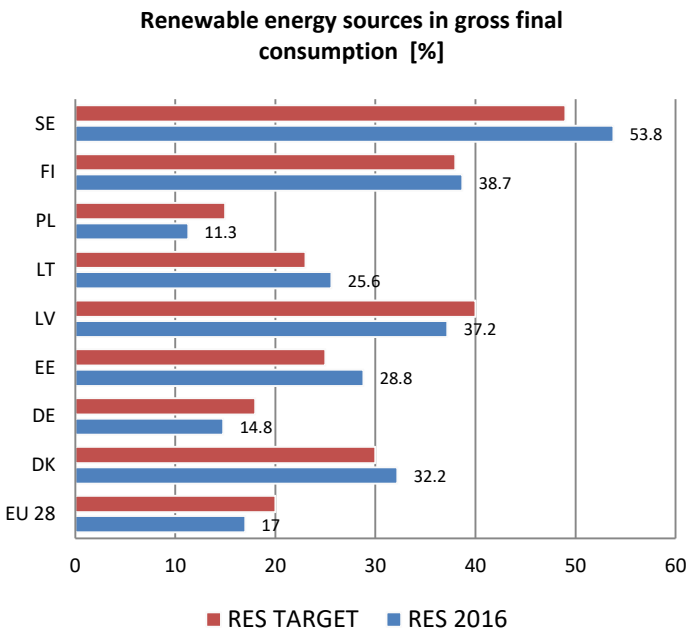
[2] *QUO VADIS Exploring the future of shipping in the Baltic Sea. BalticLINes (WP 2)*

connecting the shipping industry with the markets. For instance, impact on coastal erosion or impact on hinterland by road or rail traffic created by the shipping activity have to be included into considerations. Connectivity over the national borders is another issue which needs to be ensure in order to secure safety of navigation, both on main shipping corridors and short-sea or leisure traffic. MSP authorities should take into consideration the new demand, promote smart positioning of OWF and aquaculture areas or calculation of the financial burden for the shipping sector related to the location of permanent navigation obstacles. Also international (or Baltic) standards should be agreed among MSP authorities with regard to sea areas in terms of minimum safety requirements for ships with normal and dangerous cargo separately. The research outcomes confirm also the role of stakeholder consultation in the process of MSP development. Active engagement of representation of shipping operators by regular contacts or effective dialogue with MSP authorities or other sea users should streamline the process. Dynamic changes in the shipping sector also confirm the need for constant monitoring and corrections of prepared plans (relevant level of flexibility), so creation of effective communication channels becomes an important development challenge.

Energy sector trends – offshore wind energy & regional energy links

European and Baltic energy trends

Today, the EU is highly dependent on imported non-renewable energy sources, especially from Russia and Norway, which are responsible respectively for 40% and 37% of total gas imports in 2015. Relevant actions should be implemented to balance the structure of deliveries, both in relation to spatial pattern of fuel sources and the means of energy production. Developments in the field of renewable energy sources (RES) are therefore foreseen. Production of RES has strong political support, therefore significant growth is expected in the total megawatts produced, including from offshore wind farms (OWF). Similarly, national renewable energy targets will likely lead to a favourable climate for investment and



growth up until 2020, and beyond, based on EU wide targets for renewable energy (see Figure).

In February 2015, the European Commission adopted "A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy". This strategy builds on the 2030 policy framework for climate change and energy which laid down three key targets for the EU by 2030[3]:

1) at least 40% cuts in greenhouse gas emissions compared to 1990,
2) at least a 27% market share for renewable energy, and
3) at least a 27% improvement in energy efficiency.

This strategy has five inter-related strains which also act as development directions for the Baltic Sea region:

- Energy security, solidarity and trust,
- A fully integrated European energy market,
- Energy efficiency contributing to moderation of demand,
- Decarbonizing the economy,
- Research, innovation and competitiveness[4].

Two main aspects of this policy and their further contribution to the MSP process has been investigated by the BalticLINes partnership:

1) development of offshore wind farms on the Baltic Sea,
2) improvement of energy interconnection between Baltic countries (underwater grid).

The Baltic offshore wind farm development

Denmark (12 wind parks with 506 turbines), Germany (3 wind parks with 171 turbines) and Sweden (5 wind parks with 77 turbines) have been forerunners in the development of offshore wind energy. In other Baltic countries, the process of OWF development remains at differing stages, from expressions of interest provided by investors (e.g. Latvia, Estonia), via the implementation of EIA procedures (Lithuania), up to obtaining permits for first constructions (Poland).

Referring to OffshoreDC (2015), the scenarios for the development of offshore wind parks in Baltic countries assume 27,493 MW of power will be available between the years 2020–2030.

Sweden, Finland, Poland and Denmark should become key producers of offshore wind energy. Taking into account technological trends in offshore wind energy, a clear preference towards increased turbine sizes has been identified. For the year 2030, implementation of wind turbines with a rotor diameter of up to 228 m, and power of 15 MW, is foreseen.

Summing up the key trends in OWF developments, the following issues should be considered:

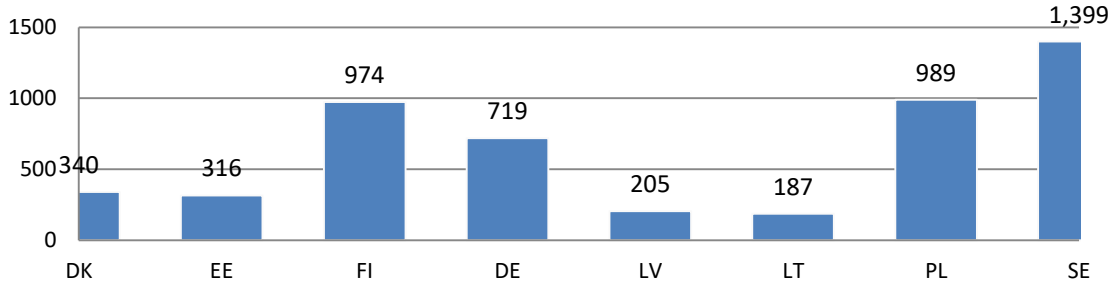
[3] *European Parliament, 2016*
[4] *Baltic Sea Region Energy Sector Synthesis Report. BalticLINes (WP 2.1.)*

a) increases in wind farms, becoming bigger, more powerful and moving further offshore in deeper waters,
b) a trend for increases in development areas (no. of turbines) is not clear because, due to spatial restrictions, more powerful turbines may be favoured,
c) floating wind turbines will become more popular in deeper waters and further offshore, which will unlock suitable deeper water sites, and which might in the long run become competitive even in shallower waters, due to ease of installation and scale effects around the Baltic Sea,
d) however the ice conditions in the northern Baltic Sea may be a challenge and limit the applicability of floating turbine technology in the region,
e) floating wind turbines are – depending on the substructure and mooring - also expected to be able to support larger wind turbines, for example 12-15 MW, which is consistent with a trend in increased capacities of wind turbines,
f) trends for bigger parks and bigger turbines together with advancements in the ability to build further offshore, as well as in even deeper waters, need to be considered as critical in the MSP process.

Spatial challenges of OWF implementation

Offshore wind farms require suitable maritime space estimated theoretically at 5.36 MW/km² (Europe's gross offshore wind potential and capacity density)[5]. Thus, the future area required for offshore wind energy development on the Baltic Sea can be calculated at 5,129 km^2 in 2030 (see figure). However, wind farm capacity densities show high variances, and significant differences exist between national averages. The slightly lower average wind speeds in the Baltic Sea region might cause wind turbines to have a lower specific power rating than wind farms in the North Sea region, thus a further extension of the estimated area is possible.

Estimated area of maritime space designed for OWF in 2030 [km2]

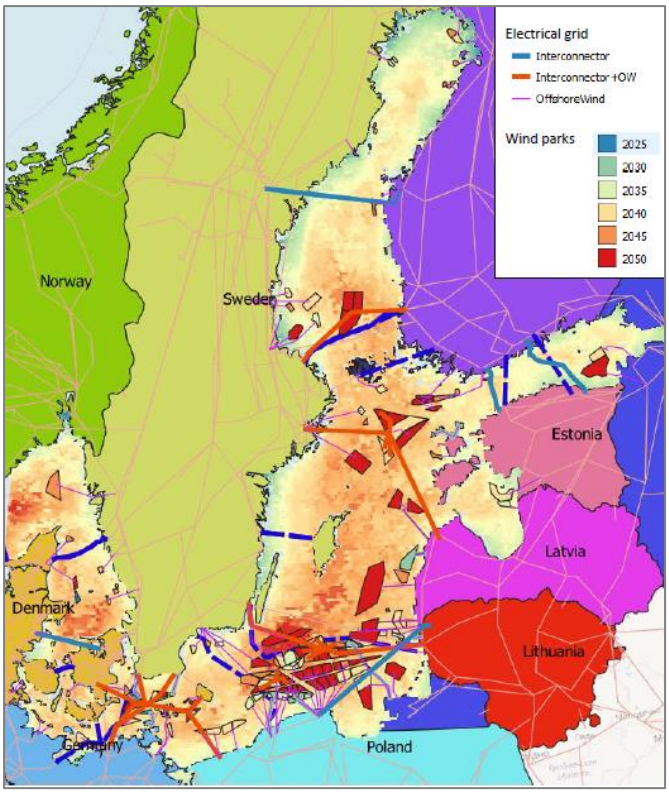


Further development of OWF installations on the Baltic Sea will be dependent on different incentives, such as energy demand or trajectories needed for each country to reach their energy targets, scenarios which will be derived from various authorities, industries and stakeholders. Considering the long-term perspective (2050), the expected maritime area designated for OWFs could range from 28,390 km^2 (low scenario) up to 226,831 km^2 (high scenario). It should

[5] *Capacity densities of European Offshore wind farms, BalticLINes (WP 2/ WP 4.2.)*

be realised, that the high scenario implementation would mean that 12% of the area of The Baltic Sea would be covered by off-shore wind installations (see Map)[6].

Significant trade-offs between the energy and transport sectors, especially in the central Baltic area, could occur.



Considering the current level of MSP development, only Germany has a set of national (EEZ) and regional (territorial sea) maritime spatial plans (MSP)s and a consecutive Spatial Offshore Grid Plan (for the EEZ) in force. Poland has not had any turbines installed yet, but more than 70 applications have been submitted (without any MSP in place).

Identification of the relevant spatial challenges in the process of OWF implementation would include the following elements:

- maritime spatial planning can help the development of OWF in deeper waters by defining spatial zones (stability and clarity for investors and project costs reduction),
- appropriate spatial planning will reduce spatial conflict within congested inshore waters and avoid higher densities of marine users (see Figure – high scenario),
- for MSP this means that offshore wind farms will require and occupy more sea space and will mean increased competition with other sea users,
- time frames of offshore wind energy projects are considerable and should be taken into consideration in marine spatial planning.

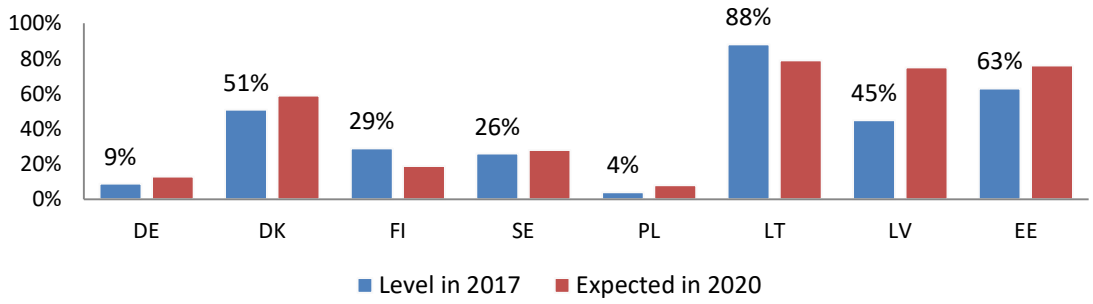
Considering the spatial demand of wind energy installations, the global commitment to have 10% of the sea areas designated as protected areas (UN CBD implementation) should be mentioned. A recent HELCOM report on MPAs concludes that even though we have reached the 10% in the whole Baltic Sea the following sub-basins are still lacking behind: the Eastern and Western Gotland Basins, Northern Baltic Proper, Åland Sea, Bothnian Sea and Bothnian Bay. Tradeoffs between the OWF development and MPAs designation needs to be consider in the process of MSP development.

[6] *Baltic LINes Energy Scenarios for the Baltic Sea 2030 and 2050, BalticLINes, 10.2018*

Cross-Baltic energy interconnections – requirements and trends

Deployment of renewable energy technologies that make use of wind resources in the BSR (incl. OWF), requires a suitable capacity of energy interconnections. This will decrease total costs significantly and accelerate developments in the process of wind power plant clusters. In October 2014, the European Council called for a "speedy implementation of all the measures to meet the target of achieving interconnectivity of at least 10 % of their installed electricity production capacity for all Member States" by 2020. Then, the Commission suggested in the European Energy Security Strategy (EC, 2014), that it should extend its 10% electricity interconnection target by 2020 to 15% by 2030. EU countries need to be able to rely on their neighbours to import the electricity they need. Without infrastructure, it would be impossible to buy and sell electricity across borders. Connecting isolated electricity systems is therefore essential for the security of supply. Reliable connections with neighbouring countries will lower the risk of electricity blackouts, reduce the need to build new power plants, and make it easier to manage variable renewable power sources such as solar and wind.

Energy interconnections in the Baltic Sea Region, current status & future challenges



As a result, new electricity infrastructure projects will be required mostly in Poland (4%) and Germany (9%). These infrastructural upgrades and interconnections for electricity are being supported by the EU under the Baltic Energy Market Interconnection Plan (BEMIP).

Power grids in the MSP development process

The development of wind parks and energy connections must be included in the maritime spatial plans, so knowledge about development plans and its requirements is important. The BalticLINes partnership investigated in details the future projects of the offshore wind farms and transmission, so relevant information becomes more available for authorities and stakeholders[7]. Similarly, a practical guide to the designation of energy infrastructure in maritime planning, referred to both OWF and cables was prepared[8]. As a summary of the analysis, the following principles can be considered particularly important in the spatial planning process at sea, which at the same time can be considered as a good practice:

[7] *BalticLINes Energy Scenarios, Appendix 3: Offshore wind parks and transmission projects in planning, SwAM, RISE 2019*

[8] *A practical guide to the designation of energy infrastructure in Maritime spatial planning, BalticLINes WP 4.4.*

- maximum bundling possible by parallel routing: cables and other offshore infrastructure should be integrated whenever possible to maximize concentration of sea uses and reduce use of space,
- consideration of all existing and approved uses and adequate safety distances to constructions and shipping routes,
- crossing of priority and reservation areas for shipping by the shortest route possible/as right-angled as possible (for safety reasons, covered by the provisions of UNCLOS),
- routing as far outside of Natura2000 areas/protected biotopes,
- consideration of cultural heritage sites, esp. wrecks and other underwater obstacles special consideration of sites where munitions have been discovered,
- shortest route possible (relevant from economic perspective), under consideration of conflict minimisation with other uses and nature protection issues,
- coverage, which ensures a permanent safety of subsea cables,
- avoiding cable crossings (increase the risk of malfunctions, higher maintenance requirements, increased traffic of maintenance/repair vessels, which should be avoided),
- routing of interconnectors through transfer gates at EEZ borders.

Voluntary implementation of the principles by MSP authorities and relevant stakeholders should streamline the planning process at national and international level. On the other hand, technical and economic criteria may support a different shape of the cables location, thus an appropriate assessment of investment efficiency, based on the concept of sustainable development, should be made and included in the MSPs.

Effective solution for the OWF and grid development at seas, currently investigated by the Baltic InteGrid[9] project is implementation of a meshed offshore grid in the Baltic Sea region. Optimization of the power grid at the bottom of the Baltic should lead to savings, both at the level of investment and the functioning of the regional energy system in the international dimension.

Experience gained from previous processes of Maritime Spatial Planning in the Baltic Sea Region

The adoption of the EU Directive on Maritime Spatial Planning (2014/89/EU) has promoted the process of MSP, as this requires all coastal EU member states to prepare cross-sector maritime spatial plans by 2021 (see table).

[9] *http://www.baltic-integrid.eu/*

Country	MSP (national plan)
DK	12/2020
EE	8/2020
FI	3/2021
DE	06/2021
LV	12/2018
LT	6/2020
PL	7/2019
SE	12/2019

Therefore, countries in the Baltic Sea Region (BSR) are currently planning the use of their respective sea areas. Unfortunately, countries do not practice MSP in identical ways and significant differences can be identified[10]. These include the following issues: how binding the MSP plans are in legal terms and the temporal planning horizon or the scale of planning or type and number of sectors addressed in MSP. Planning authorities are also allocated to very different ministries in different countries, as well as considerable variations in the overriding objectives for MSPs. As a result, the experiences gained from previously developed MSPs vary significantly between countries.

Analysis of results and products of other European projects within MSP

A number of EU-funded, cross-border research & development projects have been launched to further facilitate cooperation between EU countries in the management of maritime space to support the implementation of the MSP legislation (Table below).

Key results of the projects were to enable the meeting and cooperation of specialists dealing with spatial planning at sea, identification of barriers and best solutions, as well as the development of dedicated spatial planning tools (e.g. map services, MSP tools, data portals). Parts of the projects also resulted in recommendations. Regarding the results and products of the projects strictly related to the BalticLINes initiative, three examples can be presented more closely: *BaltSeaPlan, PartiSEApate, Baltic SCOPE* and *NorthSEE*.

[10] See: *Identification of transnational planning criteria, BalticLINes (WP 4.2.).*

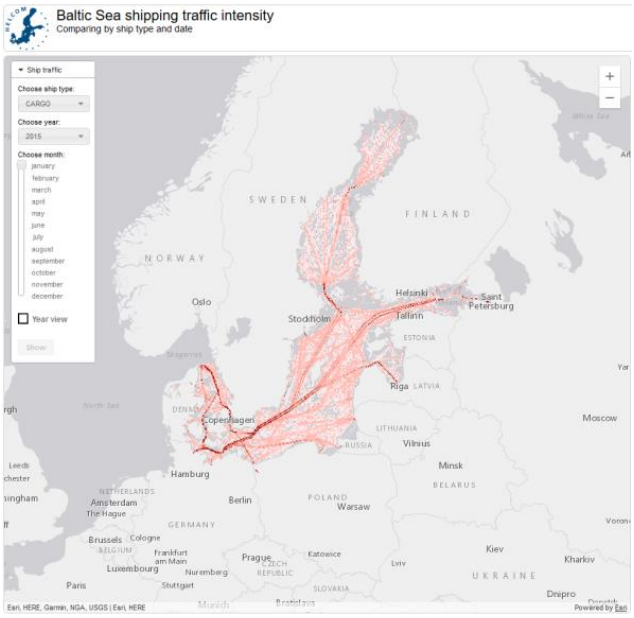
Project		Case studies	Pilot plan	Map service	MSP tool	Data portal	Recommendations & guidelines	MSP consultation	Scenarios development	Good practice
Plan Bothnia	2010-12		+	+						
BaltSeaPlan	2009-12	+	+		+		+			
TPEA	2012-14		+							+
PartiSEApate	2012-14		+				+	+		
ADRIPLAN	2013-15				+	+				
SIMCELT	2015-17	+				+				
BalticSCOPE	2015-17			+	+		+			
MARSPLAN	2015-17	+	+		+					
SIMNORAT	2017-18	+			+			+	+	
SIMWESTMED	2017-18	+			+			+	+	
SUPREME	2017-18	+			+		+	+	+	
Pan Baltic Scope	2019-19				+	+				
MarSP	2018-20				+					
NorthSEE	2016-19				+		+		+	
OCEAN METISS	2017-19				+					
BalticLINes	2017-19				+	+	+	+	+	

The main results of the **BaltSeaPlan** (*Planning the Future of the Baltic Sea*) project implementation, are related to advanced tools dedicated to the MSP (e.g. modelling for MSP, data exchange structure, stakeholder involvement), 8 pilot MSPs and a *web-advanced MSP tool*. A Web application based on the Boundary-GIS Geoportal is a supporting tool which should facilitate involvement of stakeholders by allowing them to view the current planning status of the area and to comment upon them. The users can do so without any specific computer knowledge and/or computer program. The BaltSeaPlan also created a *Vision 2030 Towards the sustainable planning of Baltic Sea space*, covering a set of guiding principles, which should apply to all decisions regarding the Baltic Sea space, including: Sustainability, Pan-Baltic thinking, Spatial efficiency, Connective thinking and Key transnational topics. Similarly, just as key elements of implementing MSPs were designed, key implementation tools were also designed, including: data management and monitoring, spatial subsidiarity, a transnational approach to transnational issues and national and sub-national maritime spatial plans.

PartiSEApate tested and developed instruments and models for MSP multi-level governance mechanisms for the Baltic Sea Region via three concrete pilot cases – Pomeranian Bright (SE, DE, PL), Lithuanian Sea (LT, LV, SE, RU) and Middle Bank (SE, PL). The key final outcomes of the project were also *MSP Governance Framework Report* and *Handbook on multi-level consultations in MSP*. In addition to this, the project considered MSP data network issues. Finally, project activities made identification of several key recommendations for improving the efficiency of the MSP process possible. At the policy level, (HELCOM/VASAB MSP WG) it is suggested that the authorities responsible for MSP should take the lead in the Working Group, concentrating strongly on policy and decision-making issues. National decision-making processes should be organised by each country independently. Parallel development of a pan-Baltic practitioners' network is suggested. Regular meetings of the practitioners would streamline information exchange and create trust between the planners. An expert group representing a broad range

of relevant opinions on the MSP process is another key body recommended by the PartiSEApate project. Important partners required in the MSP development are also sector organisations.

Regarding cross-border consultations & cooperation, early engagement of the partners to the planning process is suggested. The consultation process should also be based on: clear intentions, information exchange, pro-active attitudes, formal and informal relationships as well as multi-level involvement.



The main goal of the **Baltic SCOPE** was to come up with common solutions to cross-border maritime planning, leading to greater alignment of national plans. To achieve this goal, two MSP cases were studied, encompassing the Baltic Sea's southwest area, which affects Sweden, Denmark, Germany, and Poland, and the marine area between Estonia, Latvia, and Sweden. Both case studies focused on shipping traffic, energy production, fishing, and environmental functions in these areas and how they can compromise with each other. A key product of the project is the *online tool enabling the mapping of maritime activities on the Baltic Sea*. The maps available via HELCOM AIS explorer can be detailed and defined by time period (monthly, range 2006-2016) as well as by type of vessel (cargo, container, passenger, tanker, rorocargo, service, fishing, other).

In addition to this, the *Recommendation on Maritime Spatial Planning Across Borders* was prepared and issued. These recommendations are useful to planners, policy-makers and others dealing with Maritime Spatial Planning in the Baltic Sea, and possibly beyond. The document covers four aspects (transboundary co-operation, processes, planning evidence and stakeholders and platforms) and four sectors (shipping, fisheries, energy and environment).

Similarities between the BalticLINes and **NorthSEE** (*A North Sea Perspective on Shipping, Energy and Environmental Aspects in Maritime Spatial Planning*) projects result from the involvement of some of the same partners (DE, SE) as well as the time frame of the implementation of the project. The project activities are mostly focused on identification of trends (environment, shipping and energy sectors) as well as development of MSP tolls (MSP Challenge simulation game, Infoquarium) facilitating better coordination of MSP development according to sustainability requirements. Project's achievements include also the recommendation part referring to: energy, MSP, future energy trends and data. The general recommendations are also defined.

Taking into account the recommendations indicated in the presented projects, an overview of their scope and implementation status as well as additional information or activities are pre-

sented in the table below. Due to the area of interest of the BalticLINes project, the focus was on issues related to: shipping, energy and MSP data exchange. The chronological order of presentation was adopted because it helps to identify specific activities undertaken in the area of MSP. It also refers to the current effects and actions taken in the BSR area.

PROJECT (end date)/SECTOR Recommendations	Stage (BSR)	Actions & information (BSR)
BaltSeaPlan (2012) – MSP Data		
Infrastructure: Interoperable MSP relevant data and meta data must be created	In progress	BASEMAPS develop by BalticLINes
Specifications: The MSP data infrastructure should be based on agreed lay-out and specifications with regard to data issues, data scope, formats and technical requirements etc. This must be in line with the INSPIRE Directive.	In progress	BASEMAPS develop by BalticLINes
Exchange network: MSP data exchange should consist of: Pan-Baltic MSP Data Coordinating group; National MSP Data Contact Points; Regional MSP Data Points (for larger countries); MSP Data Providers.	Partly completed	Pan-Baltic: BSR MSP Data ESG
Data exchange: should be facilitated via a Baltic Sea MSP data portal, offering OGC compliant map and data services. These could be linked and/or integrated into individual applications.	In progress	BASEMAPS develop by BalticLINes
Data exchange: National/Regional MSP Contact Points should provide for updated data sets in the data infrastructure in regular 6-month intervals	In progress	Lack of relevant formal requirements
Expert/Advisory Group: A permanent MSP Data Expert Group in advisory capacity to the Pan-Baltic MSP Data Coordinating Group	In progress	BSR MSP Data ESG
Legal policy: The pan-Baltic data infrastructure should draw on unrestricted and free of charge data produced	In progress	BASEMAPS concept as relevant source of information
Resources: Baltic Sea states should grant adequate financial and organisational resources for securing the implementation and maintenance of a sustainable MSP data network and infrastructure	In progress	Under discussion
PartiSEApate (2014) – Data needs and network		
National MSP data contact points need to be set up in the BSR	In progress	--
A pan-Baltic Spatial Data Infrastructure (SDI) for MSP should be set up, allowing decentralised data holding	In progress	Development of the BASEMAPS under the BalticLINes
Common priorities need to be set for data compilation, bearing in mind the concrete evidence to be generated for MSP	In progress	Development of the BASEMAPS under the BalticLINes
Common data standards need to be developed for data exchange, focusing on issues of transboundary relevance	In progress	Development of the BASEMAPS under the BalticLINes
Socio-economic data gaps need to be filled	In progress	BASMATI (2017-2020) as example
Strong metadata needs to be included to create transparency on data reliability and significance	In progress	--
BalticSCOPE (2017) - Shipping		
Take each other's shipping routes into consideration in MSP and strive for cross-border coherence by aligning shipping routes at the border, using the centre-line	In progress (voluntary)	Soft recommendation implemented voluntary by MSP authorities
Integrate of common safety guidelines and regulations	In progress	Implementation of a common standards for the BSR regarded

PROJECT (end date)/SECTOR Recommendations	Stage (BSR)	Actions & information (BSR)
into national plans (criteria for safety distances)		as unfeasible
Ensure collision-friendly installation design (turbines)	In progress	Responsibility of stakeholders (energy investors), best practices needed
Limit rerouting of the shipping lines (based on IMO measures). When rerouting, planners should find the best possible alternative route and take impact on other sectors into account.	In progress	Lack of relevant tools and measures for final estimation of impact – needs for further research (added value identification)
Shipping interest in MSP should be classified according to their importance.	In progress	Lack of relevant tools and measures for final estimation of impact – needs for further research (added value identification)
Small vessels traffic should be also included during the MSP development (AIS, VMS).	In progress	Responsibility of MSP planners and authorities
BalticSCOPE (2017) - Energy		
Develop a pan Baltic long-term picture on renewable offshore energy – needs, capacity, other sectors' needs, impacts, etc.	Completed	Energy Scenarios developed (Appendix 5) by the BalticLINes, periodic update needed
Consider existing or approved infrastructure and plans of neighbouring countries as well as potential cumulative effects on the environment and other sectors of the combined development	Completed	Energy Scenarios (Appendix 3) developed by the BalticLINes, periodic update needed
Develop joint cross border gates for linear infrastructure in MSP (power lines, data cables, pipelines)	In progress	--
Notify concerned countries early on about spatial plans and projects with transnational impact.	In progress	Best practices identified, cooperation projects (e.g. BaltiLINes) facilitate the process of coordination
NorthSEE (2019) - Energy		
Create a concrete national energy policy roadmap to achieving 2050 energy targets	Completed or in progress	National authority competence
Energy policy targets should be translated into the same units for all NSR countries. This will allow a comparison between countries.	--	National authority competence
Support the integration of the European internal energy market.	--	National authority competence
NorthSEE (2019) - Data		
Use and maintain existing data infrastructure and encourage industry to submit their data to both national data portals and other portals such as EMODNED	In progress (soft)	BASEMAPS for Baltic Sea Region
Contribute data to the MSP Challenge Game in order to help generates simulations of the future energy industry trends to determine available marine space.	Completed	MSP Challenge Game Baltic Sea Edition implemented in the BalticLINes
Share data relevant to oil spill contingency with all NSR countries to aid a fast and efficient response to oil spill emergencies	Not relevant	Maritime authorities issue
NorthSEE (2019) – Future energy industry trends		
Encourage and support multi-use developments in order to use space more efficiently and sustainably	In progress (soft)	Multi-use development recognized in the BalticLINes
Suitable locations should be identified for floating wind across countries in the North Sea.	In progress	Floating wind turbines technology recognized and analysed in the BalticLINes
A transnational oil spill contingency plan should be set	Not relevant	Maritime authorities issue

PROJECT (end date)/SECTOR Recommendations	Stage (BSR)	Actions & information (BSR)
up across all NSR countries to aid trans-boundary incidents and fully engage with the emergency response command structures for other member states		
Identify demand for grid connections, interconnector routes and gates, grid and connection points on land	Completed	Energy Scenarios (Appendix 3) developed by the BalticLINes, periodic update needed
NorthSEE (2019) - General		
Carry out a comparative analysis of the different MSP approaches and processes between NSR countries to foster the understanding of other national MSP processes to enhance cross-border cooperation	Completed	Review of the approaches of the BSR countries completed by the BalticLINes
Establish an over-arching North Sea MSP body or mechanism that can coordinate efforts and facilitate cooperation between NSR countries after the lifetime of the NorthSEE project	Completed	HELCOM/VASAB MSP WG
Create a MSP dictionary which defines general terms to make terminology comparable to facilitate a better understanding of each other's MSP processes	In progress	Linguistics and terminology issues identified in the BalticLINes
Define general steps in an MSP process, where countries can put their specific MSP activities in a timeline.	Completed	Relevant structure for the BSR completed by the BalticLINes
Cooperate in projects such as the NorthSEE project as an opportunity to improve coordination of a number of aspects related to MSP	In progress (soft)	Needs of future cooperation clearly identified

Summing up, it can be concluded that the majority of recommendations have a soft character, therefore is a limited possibility to verify their implementation. Most often, they depend on voluntary practices of individual, national MSP authorities. There is also a visible lack of acceptance for common standards. What's more, the BalticLINes research reveals that some countries don't have even national standards. So, the review and presentation of individual solutions should be regarded as the only way of knowledge dissemination and exchange. Awareness of differences, in particular standards or approaches, can positively influence the effectiveness of the planning process in the transboundary scope. A special place among recommendations is the need to build an appropriate system providing data and information on maritime space. The BASEMAPS concept fits perfectly into such a need, although from the perspective of the project implementation (till 02.2019), it will not be possible to achieve the desired effects. Thus, the continuation of work by HELCOM is essential.

Planning criteria in the pan-Baltic MSP development

MSP is by definition an approach that aims to balance out different interests by following an ecosystem-based approach. Thus, all relevant users and its requirements should be included in the process of MSP definition (Figure), so in practical terms MSP means the end of the era of shipping freedom. In fact, the designation of ship corridors is often one of the first steps when drafting a MSP[11].

[11] *A practical guide to the designation of ship corridors in maritime spatial planning, BalticLINes (WP 4.4.)*

A reliable determination of the spatial structure of the maritime space requires relevant and consistent planning criteria in the scope of the Baltic Sea region. These criteria can be seen as factors necessary for the assessment, regulation and spatial designation of specific spatial uses and activities. Thus, planning criteria include different factors that need to be considered when identifying and deciding which areas are suitable for specific use. Three types of criteria for spatial designation can be listed:

1. exclusionary criteria "no go areas",
2. restrictive criteria "soft constraints",
3. textural criteria.

According to the research completed by the BalticLINes project, big differences between different countries concerning planning processes and criteria were revealed.

Planning criteria of shipping corridors

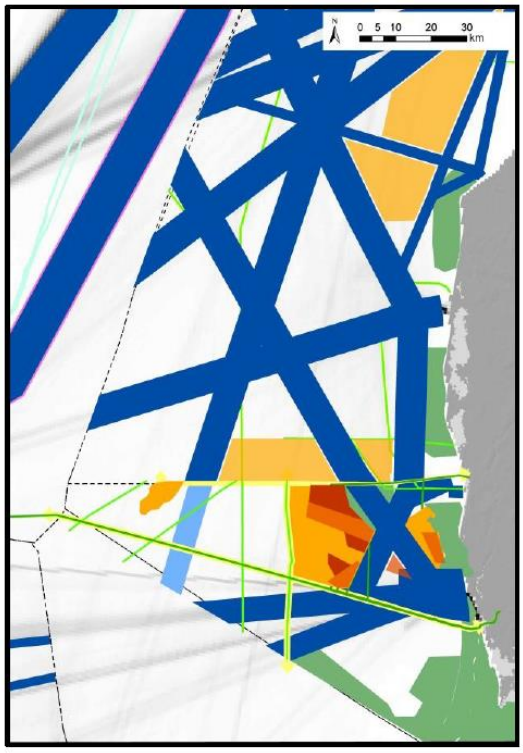
Spatial restrictions for navigation are the result of a slowly evolving process over centuries, conducted by the IMO since 1958. The key regulations for maritime spatial planning are the SOLAS and CORLEG conventions and GPSR system. Implementation of routing measures by the IMO covers only part of the global maritime space (main routes), therefore further relevant spatial planning, especially in coastal areas is required. For that purpose, relevant and transboundary coherent planning criteria are needed.

As regards the criteria implemented during the MSP exercise in relation to shipping corridors, a number of aspects were identified in Baltic countries. They are[12]:

- width of priority areas and safety zones designed according to traffic density – AIS data (DK, EE, FI, DE, LV, SE);
- ship size and frequency of traffic (DK, DE, LT);
- maritime port traffic (LV);
- not identified or "freedom of navigation" corridors (PL, SE – smaller routes).

[12] *Identification of transnational planning criteria, Work package 4.2, BalticLINes*

As a result, significant mismatches between MSP development in the area of implementation of shipping corridors are noticeable. Regarding the most important types of mismatches identified by BalticLINes, the following issues can be listed (Figure):



a) some countries add additional safety zones along routeing measures while others just transfer the spatial dimension of the IMO routeing scheme as such (DK vs. SE);
b) ship corridors are designated in one country but not continued in the next bordering country (LV vs. SE);
c) ship corridors have different widths in one country when compared to its continuation in the next bordering country (PL vs. LT).

The experiences gained on the BalticLINes project, however, shows that those mismatches sometimes have a more symbolic character, but do not necessarily lead to planning issues in reality.

Implementation of transboundary dialogues between countries would require a common approach to the planning criteria in the shipping sector. However standardization of national approaches seems to be fairly difficult due to differences in planning systems. More useful could be to suggest a way forward on how to approach the planning of shipping for MSP on a practical level. A permanent platform/forum for MSP planners could create effective measures for exchanges of knowledge and experience.

This statement is confirmed by the fact that the BalticLINes project has managed to identify a number of solutions that can effectively reduce discrepancies in the national MSPs. Referring to the results of the analysis the following solutions can be pointed:

- more coherence between national MSP processes and its timeframes as well as common knowledge of the progress would help to prevent planning issues,
- authorities should provide to partners as early as possible the precise date in the draft plans,
- the earlier the consultations will be started, the fewer mismatches will be created,
- using a broader view on the maritime spatial planning during the international consultation by providing maps include, designations of the country that is drafting the plan and data as well as (draft) plans of the involved neighbouring countries would streamline the process,
- common approach to calculation methods for width of shipping areas for all BSR countries could be a possible (but voluntary) solution,
- a better balancing of sectors would be required, however relevant measures of impact assessment are needed,

- stronger international competence or regulation for offshore energy installations would be desirable, as there is no international, IMO-like organization for energy,
- by offering a map showing planning mismatches in the plans including the surrounding areas authorities can create a better overall view,
- dissemination of knowledge on national MSP approaches and planning criteria will increase transnational understanding.

The currently executed process of designation of MSPs in the Baltic countries shows that consultations between countries allow for reaching an agreement that results in increased coherence of the plans. As an example, the Polish-Lithuanian case can be presented. Poland has voluntary taken into account the existing plan for the Lithuanian maritime space increasing significantly the coherence of shipping lines which have a marginal importance for Polish transport.

It should be remembered, however, that any changes in maritime space cause specific consequences, both current and future, so it is necessary to determine the effects of such changes both for the country and its neighbor. Again, there is the question of availability of appropriate assessment tools usefully for planers.

Offshore wind farm development on the MSP level

Investigations carried out by BalticLINes reveal that different criteria are implemented in the decision processes regarding the location of offshore energy installations at sea. In particular, the relationship between sectorial decision-making and MSP differs. In some countries, MSP simply takes into account the decisions made in sectorial planning, while in other countries MSP steers sectorial decision-making. It could also be stated that there is no common understanding of the factors that need to be considered when planning and designating new locations for OWFs.

As a result of discussions between BalticLINes partners, a set of 24 criteria for OWF planning for MSP processes was elaborated. Such criteria were divided into seven categories:

1) technical infrastructure and connections,
2) environmental habitats and species,
3) physical and natural conditions,
4) other sea uses,
5) economic factors,
6) policies, and
7) social aspects.

It is clear from the detailed investigations of national criteria that significant differences exist (e.g. suitable depth indication).

The OWE planning is a rather new topic in many countries, thus the methods, criteria and approaches have not been relevantly developed and stabilised. There are also no existing international bodies which could take the role of developing common sets of criteria.

Considering the nature of the MSPs, the spatial overlap between the potential offshore wind farm area and the corridors where the intensive maritime traffic is creating, should be regarded as a critical transnational and cross-sectorial planning issue. For this reason an relevant hazard analysis is needed. Taking into account the traffic safety as a key challenge in the spatial planning process on the seas, it is particularly important to regard development plans of OWF as well as shipping activity and assure appropriate safety zones between the areas. An example of good practice and possible solution to the presented issue are requirements of the UK OREIs related safety of navigation guidance [UK, 2016].

Energy grids and cables planning challenges and solutions defined by the BalticLINes

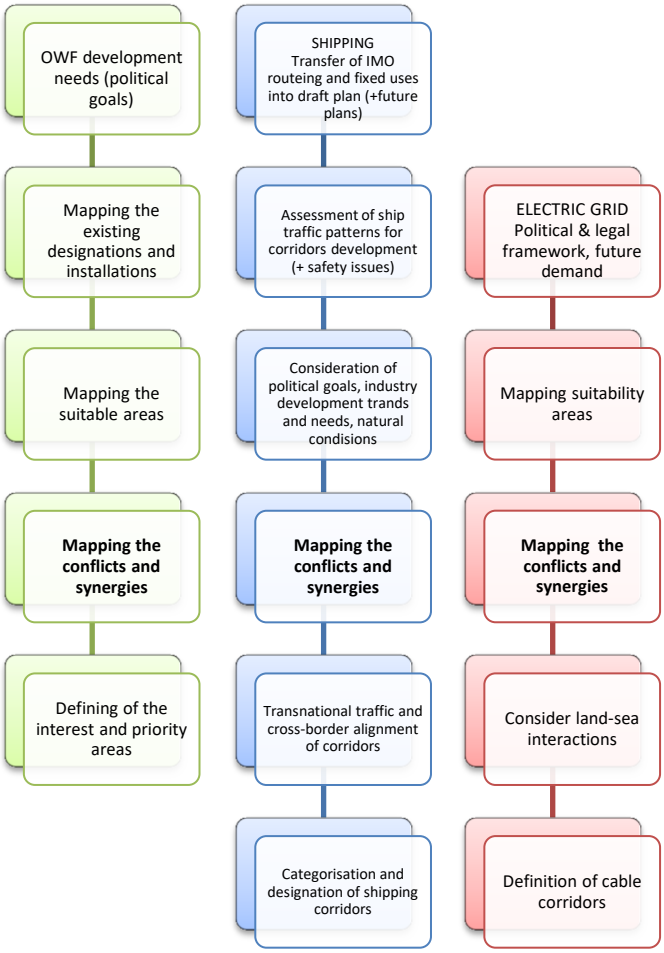
Electricity cables as well as data cables or oil/gas pipelines seem less confrontational with other interests than shipping or OWF, so identification of planning criteria for subsurface linear infrastructure seems simpler. The main differences between the approach of Baltic countries are connected with formal implementation of the transfer gates for interconnectors at EEZ borders (e.g. Germany, Lithuania) or lack of such regulations (no plans for linear infrastructure corridors) – such as in Sweden.

Taking into account tendencies for 'over-planning', the following criteria for electricity cables can be listed: space needed, safety zones around it, existing cables and pipelines, other sea uses (e.g. heritage sites, construction works, dumped munitions), location technically suitable for connection. A big challenge for further development of planning criteria is the fact, that energy sector is currently not well-organized when it comes to offshore energy developments as well as energy grids. For instance, within in the European ENTSO-E network Baltic Sea is not focused in itself.

Guidelines and solutions in the MSP model procedures and consultation requirements

The BalticLINes project identified the relevant steps in the process of MSP development with regard to OWF installations, shipping corridors and electric grid and cable connections (Figure)[13]. Comparisons between the particular processes revealed common stages as well as the differences between them. In the case of energy elements (OWF, grid) the political framework is the main aspect which will enable future development. However, other different aspects were noticed in the process of shipping corridors implementation. Global routeing of IMO corridors create a starting point for procedures. The planning of shipping corridors also seems to be a process which is most dependent on future market, technological or environmental changes, thus a detailed analysis of the development of this sector is necessary (scenario development).

[13] *A practical guide to the designation of ship corridors in maritime spatial planning. BalticLINes (WP 4.4.), A practical guide to the designation of energy infrastructure in maritime spatial planning. Baltic LINes (WP 4.4.).*



As regards the MSPs, all of the users of the maritime spaces will have to be involved, with comprehensive identification of conflicts and synergies being an integral part of each procedure. Linear infrastructure development, like international shipping corridors and transfers of energy between electrical grids, also requires transboundary coordination.

Therefore, vertical as well as horizontal coordination & consultation will be key drivers for a coherent development of maritime spatial plans. These processes have to include multi and cross-level cooperation, with special attention paid to the relationships between planning authorities and sector stakeholders as well as proper transboundary coordination and consultation between planning authorities.

Because consultations between MSP developers and representatives of maritime sectors are vertical in nature (e.g. shipping, seaports, OWF investors and operators, grid operators, fishing industry), a wide range of communication (formal meetings and informal relationships) within a cooperation framework should be established. Bearing in mind that it is important that the business sector should understand the MSP requirements and procedures, as well as the time restrictions involved for sector representative engagement, this cooperation should be carried out according to relevant time plans, using clear and understandable language and using flexible communication approaches.

A crucial element of the consultation process is stakeholder identification based on relevant analysis and mapping, engagement of leaders, multilevel cooperation and flexibility to unpredictable changes. Effective communication between MSP authorities and stakeholders should be carried out by specialists, with clearly defined goals, tasks and time schedules for the cooperation. Shortcomings in communication or methods of involvement can have a negative effect on the willingness of sector representatives to participate and to continue cooperating in the engagement process.

Accordance with MSP requires long-term perspectives, and the active involvement of sector representatives in any scenario development is necessary. The best results can be obtained when:

- previously prepared materials are distributed between stakeholders,
- everyone involved understands the purpose of the process and their role in it,
- the process must be creative and adaptive so that participants want to be involved in each subsequent stage and step of the process.
- the process should be sequential, following on from each prior event and achievement.
- the involvement process should be adequately documented[14].

The engagement of stakeholders helps to resolve conflicts, increases knowledge and acceptance as well as creating ownership of the joint product (MSP).

Regarding transboundary horizontal cooperation, a selection of complete recommendations was presented in the Baltic SCOPE project. In the case of general outcomes, the following issues should be noted:

- planning authorities should draw attention to pan-Baltic and bilateral issues at the national political level to deal with conflicting national interests which cannot be resolved through informal dialogue between planners,
- planning authorities should strengthen cooperation with sector agencies, which act as contact points to international decision-making organs, including HELCOM, VASAB, IMO and IALA,
- planning authorities should develop a more symbiotic relationship with sector authorities also in sector negotiations across borders,
- there should be implementation of a common policy framework towards the initiation and development of common policy level agreements on environmental-related aspects[15].

All of the above elements are fully coherent with the observations and experiences gained during the implementation of the BalticLINes project.

Data availability for effective maritime spatial planning – BASEMAPS development

Maritime spatial planning and deeper cooperation requires a comprehensive set of information and data. The main challenge of transboundary data and information exchange is access to relevant infrastructure being able to provide complex open datasets that are flexible to use. The table below presents the key requirements for shipping and energy planning purposes selected by the planners in the interviews completed in the BalticLINes project [16].

[14] *Stakeholder Involvement in Long-term Maritime Spatial Planning: Latvian Case. BalticLINes*
[15] *Recommendations on Maritime Spatial Planning Across Borders. BalticSCOPE, March 2017*
[16] *Data Exchange and Dissemination. BalticLINes (WP 3.3./D 3.3.)*

	Most of the planners answered	Other answers
Important elements for shipping	Up-to-date data Metadata viewer Open/remove layer Download data	Upload your own layers to the system Include AIS data Select/filter the types of ports
Important elements for energy	Metadata search and views Download data Present and future plans in bordering countries	Link inshore/offshore grid Meteorological station/data Safety zone of structures gateways

According to the INSPIRE implementation schedule, installations and infrastructures (3.3) datasets should be ready and made available to every EU country by the end of 2020, since they are part of the INSPIRE Annex III. As for today, this access is limited and the following issues can be regarded as the most crucial problems to be solved:

- lack of data distributed in standard protocols,
- most of the important datasets for MSP are in the Annex III of INSPIRE (countries are supposed to have it ready in 2021—long after the end of the project)
- the specifications for INSPIRE are not yet so fully developed ,
- data distributed in standard systems but with no standard languages in many cases,
- data lacks harmonization in visualization styles in many cases.

Regarding best practices, some examples of marine geoportals implemented by other countries can be mentioned: Canada (GeoGratis, DFO GeoPortal), Australia (AMSIS, IMOS), Ireland (MIDA), UE (INSPIRE Geoportal), and the HELCOM Data & Map Service. This shows the development of marine geoportals, based on open source technology, have been introduced all over the world. However, they appear to lack:

- a single entry point,
- an overview over the origin, the quality, and the resolution of the data,
- an overview of download and access options,
- proper marine data overview catalogues,
- collaboration with private data owners,
- specific procedures for updating the data, which are clear to users of the portal.

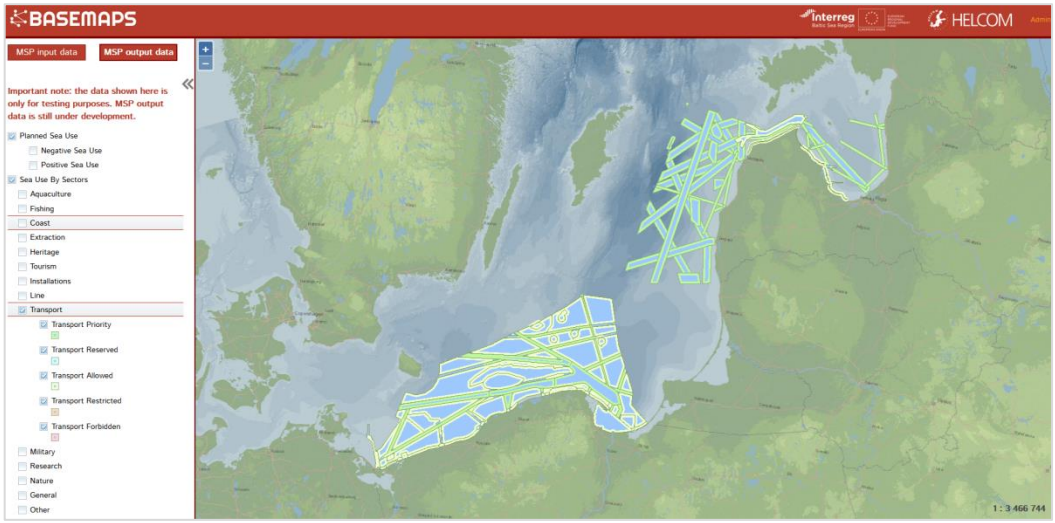
As regards the effective exchange and dissemination of data required by MSP procedures and cooperation, some recommendations have been defined[17].

According to the research of the BalticLINes, only one single overall national geoportal entry point providing a clear overview of all data (regularly updated, good quality and resolution) and download options should be available. A clear strategy should also be developed for how the data is published and updated. Geoportals should include web services to allow the data to be viewed in the users' own applications, improving inter-operability. International, open technical standards should be used, ensuring inter-operability between platforms of different countries. If any overlap between data in different portals exists, it needs to be clearly communicated to the users of the portals. Easy-to-read guides should be provided for how to use

[17] *Data Exchange and Dissemination (WP 3.3./D 3.3.) BalticLINes*

the portals. Strategies should be implemented to improve the data sharing of private data shareholders to expand the sources of open marine data.

An important step in the process of development of relevant MSP data systems is the solution implemented by the BalticLINes – the first Marine Spatial Data Infrastructure (MSDI). A new Baltic Sea Map Service (BASEMAPS) will provide a transnational data infrastructure in comprehensive and coherent manner (Figure).



As per assumption the BASEMAPS is a hybrid systems architecture based on a mixture between a pure centralised solution (HELCOM portal) and a decentralised solution, which will be updated gradually over time, when more data will be available through web services. In a decentralised system data is stored and maintained in its origin location and published using WMS or WFS protocols. In order to deal with the challenges concerning access to decentralised data, the tool was tested and adjusted during the project, and the further steps will focus on data harmonisations tools. HELCOM will develop the prototype after the project ended in early 2019. Most of the information to be included in BASEMAPS should in principle be available through the public authorities and required to follow the INSPIRE Directive.

The language issue, being an important limiter of the usefulness of the system, will be solved in BASEMAPS through a translation table for the layer names in the map services from the different countries around the Baltic Sea (English). According to the concept, this principle can later be extended so that the users in the individual countries can use their native languages when requesting data from the neighbouring countries.

Currently developed tool (BASEMAP) can only define and analyse the existing conditions and maintaining the present state of affairs. Because MSP is a future-oriented activity, planning should be able to reveal also possible alternative futures, so modelling functionality in the MSP data systems should be regarded as important measure. Consideration of trends and developments in planning procedure will help to recognize spatial pressures in the future. Other type of challenge concerning the MSP data systems are shortcomings in the availability of socio-economic and socio-cultural data suitable for the MSP process. Data related to these issues are in many respects missing or not easily usable, which is also a challenge in implementing the ecosystem based approach (EBA). Relevant MSP data system should have an ability to aggre-

gate and interpret the data to fulfil the needs of the planners. So called the second generation MSP requires more analytical information and strategic evidence, has been challenging for the EU member states. The BASMATI project[18], executing in the Bonus Blue Baltic programme (2017-2020) develops integrated and innovative solutions for MSP including methods and tools for the assessments of different plan-proposals, while including spatially explicit pressures and effects on marine ecosystem services in order to create a spatial decision support system (SDSS) for the Baltic Sea region to facilitate broad access to information.

Other example of simulation-kind of interactive tool tested by the BalticLINes partnership is a computer-supported simulation game based on accurate data "MSP Challenge 2050 Baltic Sea Edition". The game in a North Sea version has proven to be an effective tool for raising awareness of the various MSP stakeholders for the processes involved in MSP, so relevant edition designed for the Baltic has been prepared. The game allows for multidimensional visualizations and feedback that gives maritime spatial planners insight in the diverse challenges of sustainable planning of human activities in the marine and coastal ecosystem.

Best practices and lessons to be learnt within the methods and tools of innovative maritime planning

Lessons learned from the BalticLINes project

The BalticLINes project focused on cross-border issues for shipping and energy lines, leading to a specific need for information on respective connections between borders and connections of structures. The research and discussions completed within the project's working packages enables us to define a number of lessons which need to be learned in the field of MSP. Referring to the main outcomes, the following issues can be listed:

- a comparative analysis of the different MSP approaches and processes between BSR countries fosters understanding of the MSP processes in other countries,
- cross-border cooperation would be enhanced by a better understanding of planning standards and approaches,
- direct meetings of the planners makes it possible to find a common 'language' (terminology) for MSPs and facilitates personal contact between them,
- different decision-making structures and procedures are used in the BSR countries, so implementation of a common BSR standard seems unrealistic,
- however particular solutions or best practices revealed during the execution of a project will favour the unification of selected activities in the area of MSP,

[18] *https://bonusbasmati.eu/*

- transboundary consultation needs to be implemented at the political level (e.g. competent Ministries, HELCOM VASAB WG), operational (competent planning authorities, MSP planners) as well as between stakeholders (sector representatives, researchers),
- identification of general steps of designating areas for energy and shipping in MSP process helps to reduce planning mismatches by using similar or at least comparable methods,
- a review of planning and technical design criteria for shipping corridors, offshore wind farms and energy grids across all Baltic Sea countries could support the harmonisation of planning approaches, especially for future cross-border elements,
- collection and comparison of already completed national MSPs clearly indicates 'hot spots' and areas of inconsistency,
- implementation of relevant cross-border gates should improve transboundary cohesion of Baltic MSPs,
- proper planning of maritime space should also include on-land effects of shipping corridors (hinterland access to seaports and its development) or underwater electric grid (on-land electric grid location and capacity) development,
- a multi-criterion approach should be applied to MSP preparation and revision, thus the balance between economic factors, safety requirements and environmental pressures need to be included in final decisions,
- the measures and tools for the relevant valuation and comparison of particular issues (listed above) are not yet fully developed, so further research is required,
- technological innovations (shipping, energy) and further implementation of IT solutions (digitalisation, unmanned transport) into socio-economic systems can create new challenges as well as solutions for MSP,
- energy sector is currently not well-organized when it comes to offshore energy developments, so consultation process is partially restricted (lack of relevant partner for discussion),
- innovations in the field of maritime transport will change the sector, so relevant identification of how these changes will have an influence on MSP in trans-boundary scope is required,
- a comprehensive, consistent and convenient data base with up-to-date covering the Baltic Sea area is necessary for planners dealing with marine spatial plans,
- limited access to coherent data and information on the spatial development of the Baltic Sea areas, limits the cohesion of spatial planning in the trans-boundary areas on the Baltic Sea as well as made the decision and investment processes more difficult,
- shortage of a relevant pressure to encourage Member States to enhance their cooperation in the field of delivery of comprehensive data for the MSP as well as lack common standards and open access to relevant MSP information in the Baltic Sea Region is visible,

- heavy processing power and network bandwidth needed to process and transfer the MSP data, so relevant development IT technical infrastructure determinates the development of the MSP data systems,
- further development of innovative IT tools to support planners is needed (pan-Baltic data infrastructure for MSP - BASEMAPS) especially possessing decision-making support functionality.

Identification of the best practices

A number of best practices related to MSP have been identified during the implementation of the project. Most of these are related to previous experiences of particular partner-countries in the process of maritime spatial planning or implementation of related regulation and policies as well as refer to achievements and standards developed by national or international organisations. Selection of the best practices revealed and proposed to use in MSP development process is presented below.

One example is the *Offshore Grid Plan* as a sectorial plan, which contains quite detailed regulations for the planning of energy cables in the German EEZ (incl. technical specifications and planning principles).

Considering the data availability, the extensive amount of information provided by the German and Danish authorities can also be regarded as a benchmark (however not all of the researched datasets are available yet)[19]. Implementation of the principle of Open Government Data by Denmark and Finland is another good example for further consideration.

An area where particularly good practices can be indicated is a definition of parameters of the sea safety zones. In this case, we can refer to such practices as:

- UK OREIs related safety of navigation guidance [UK, 2016] providing requirements towards spatial overlap between the potential offshore wind farm area and the intensive maritime traffic.
- An objective way to determine the safe distances between shipping lanes and offshore wind farms that are still consonant with nautical safety requirements is included in a White Paper on Offshore Wind Energy developed by the Netherlands (2013).
- Determination of the path widths for maritime spatial planning included in the AIS study completed by Maritime Institute of the Netherlands (MARIN).
- The PIANC assessment of width of shipping corridors (larger safety zones of 2nm to both sides of a path for the UK).
- Determination of areas not possible for offshore energy installations provided by regional planning authority form Satakunta region (Finland) in cooperation with a range of stakeholders sea uses.

[19] *Data needs and availability, BalticLINes, D 3.1.*

- Appropriate distances between the cables included in guidelines of the International Cable Protection Committee (ICPC) and the European Subsea Cables Association (ESCA) can give helpful advice.

A study investigating the issue of so-called capacity density of offshore wind farms (OWF) and the main influencing factors could be also regarded as the compilation of good practices. The research completed by Deutsche WindGuard GmbH for the BalticLINes project includes both technical-economic issues and regulatory frameworks influence the capacity density. Although no detailed recommendations have been developed, the report provides some key analytical insights which are relevant for planners working or starting to work on zoning for offshore wind in their MSPs.

Other type of good practices being observed during the period of the BalticLINes project execution were practical consultation between the Baltic countries. As indicated above, the discrepancies observed in national MSPs became the subject of consultations. The voluntary consideration of common needs has helped to increase the spatial coherence of plans and thus eliminate a number of mismatches. For instance, Poland designated shipping lanes to safeguard Klaipeda port.

Undoubtedly, good practices are also the practical guides prepared within the framework of the BalticLINes project regarding the process of designation of maritime infrastructure planning. Separating the basic stages of the process and indicating potential options and solutions on each of them will support planners in the preparation MSPs.

Recommendations for transboundary consultations on linear infrastructure within the MSP process

The final task in this part of the BalticLINes project is determination of the recommendations resulting from analyses and research carried out during in the whole project. Recommendations are a logical consequence of the phases that were implemented before, the lessons that were learned in the research as well as the good practices identified in the project implementation process.

Despite the initial assumption, it was decided to define recommendations directed at two target groups having different competences and a position in the process of development of spatial plans at sea. The first and basic one is a HELCOM/VASAB MSP Working Group, where the recommendations are of a strategic nature, taking into account the international level of perception of the planning process in the Baltic Sea region. The second, additional target group are planners, offshore infrastructure managers or operators and other important stakeholders engaged into maritime economy development. In this case, attempts were made to approach to the identification process and definition of recommendations more practically.

The recommendations have been divided, consistent with the layout of the project into three main areas, including:

1. Energy,
2. Shipping,
3. Data for MSPs.

In addition to recommendations referring directly to specific sectors, horizontal issues can also be identified. In this matter, it is difficult to clearly identify the specific issues, which is why they have been presented in a general way (not sectorial).

The starting point for the preparation of the recommendation was a review of such issues that appeared earlier in the MSP projects, as was presented in the report. Among the presented recommendations, part has been implemented, some are still valid, while in some cases they have a soft character, which prevents their final verification. Therefore, it was assumed that hard recommendations still being under implementation are a potential area of interest for the BalticLINes. At the same time, repetitions related to soft recommendations were avoided, which constitute a permanent challenge regarding the development of MSPs.

Appropriate presentation of the context and sources for particular recommendations requires the adoption of a specific presentation structure, which includes four key steps, such as: context, current situation, target status and the recommendations that emerge from it.

The recommendations presented below were created by the BalticLINes partnership during the plenary discussions of the project meetings in Tallinn (13-14.02.2018) and Gdańsk (-----) as well as by a dedicated panel sessions organised in Riga (13-14.11.2018) and Hamburg (14.02.2019). This exercise was also supported by research into relevant documents (incl. MSPs projects outcomes) as well as individual interviews and feedbacks form members of the BalticLINes partnership.

ENERGY Recommendations

ENERGY	HELCOM VASAB MSP WG	Planners, TSOs and key stakeholders
Relevant context	Baltic Sea Region Interreg has prioritised the area of energy Energy sector is currently not well-organized when it comes to offshore energy developments as well as energy interconnections. BASREC did not result in permanent cooperation BEMIP (both projects as processes) has initiated some cooperation on energy in the Baltic (grid orientation between TSOs).	The sector is increasingly growing with players from inside and outside the BSR countries. Also, in the BalticIntegrid project, work has been done on stakeholder integration and how the sector is organised. These findings and experiences are being used.
Current competences / way of working	Energy reports are presented during workgroup meetings. Recommendations will be followed up to ministerial sessions to foster the implementation of the defined recommendations. There is no energy workgroup in the Baltic (not under the MSP workgroup, as in the case of the data workgroup, and also not separate, like HELCOM Maritime). Currently no common guidelines on energy developments. The group does not deal with concrete areas for implementations	TSOs and key stakeholders are not organised on a pan-Baltic level for offshore wind developments. Limited level of collaboration exists through Wind Europe, ENTSO-e, BEMIP (DG energy).
Change of behaviour requested	Need to have a clearer understanding of how the energy sector is organised in the Baltic Sea region, mainly focussing on OWF. Further discussions about Offshore wind developments and energy grids required. Other initiatives which in the case of Baltic on Energy, should make use of them.	Pan-Baltic body should be organised in the case of Offshore wind energy (companies in the entire value chain). Other organisations / initiatives have to understand how the sectors are cooperating with each other. For example, ideas about future projects / ideas / technologies should be provided for planners Baltic wide, for example through the HELCOM VASAB MSP working group.
Possible recommendations	***Develop a sub-group under the HELCOM-VASAB MSP workgroup dealing with offshore energy developments and grid developments.*** ***Focus in this workgroup should specifically be on coherent pan-Baltic planning criteria of energy infrastructure.***	***Stimulate/Organise a Pan Baltic Offshore energy and grid stakeholder group/initiative, which could actively feed into future projects (e.g. platform projects) or workgroups (MSP workgroup).*** ***Disseminate of "A practical guide to the designation of energy infrastructure in MSP" as a good practice in the BSR***

SHIPPING Recommendations

SHIPPING	HELCOM VASAB MSP WG	Planners, TSOs and key stakeholders
Relevant context	Maritime Spatial Planners are not represented on the IMO forum, so do not have a relevant platform for discussion with the body providing key requirements in the maritime spatial planning process (shipping corridors structure) Innovations in the field of maritime transport will change the sector, so relevant identification of how these changes will have an influence on MSP in transboundary scope is required	Diversity and freedom in the planning criteria results in mismatches in the maritime spatial planning process, Implementation of formal (legal) common transboundary requirements regarded as impossible Platform for discussion between planners created in the framework of the R&D projects can support a voluntary adoption of basic requirements (common standards)
Current competences / way of working	IMO requirements are considered an important element in the MSP process but are treated differently by planners from different EU Member States There is no shipping workgroup in the Baltic able to discuss at the IMO level about spatial issues in maritime areas (peripheral areas) nor coordinate the investigation of development trends and innovations in shipping industry	MSP planners needs to implement national rules/attitudes toward the MSP Cross-border standardisation and unification of planning criteria are regarded as unfeasible, so a bottom-up approach seems the only solution in the process of improvement of coherence between the MSPs
Change of behaviour requested	There needs to be real impact on the shaping of the structures of shipping corridors at the IMO level in line with the needs of regional areas such as the Baltic Sea Creation of a body that will concentrate on maritime spatial planning issues in the shipping sector, in particular, that will analyse innovations and future challenges Future challenges towards shipping and maritime ports need to be identified and commonly included into the MSP process, especially in the transboundary sections	Planners need to update planning criteria (not just formally) for further improvements of spatial consistency of shipping corridors on the Baltic Sea
Possible recommendations	***Development of a sub-group under the HELCOM-VASAB MSP workgroup dealing with shipping and seaport issues*** ***Creation of relationships and dialogue in the IMO forum (as well SOLAS or CORLEG)*** ***Extend discussion about MSP issues with HELCOM Safe Nav Group of Experts about safety requirements in planning***	***Updating of the planning criteria table (bottom-up standardisation, unification) with the central line as a common starting point for the MSPs process in the shipping sector*** ***Disseminate of "A practical guide to the designation of ship corridors in MSP" as a good practice in the BSR***

DATA for MSPs Recommendations

DATA	HELCOM VASAB MSP WG	Planners, TSOs and key stakeholders
Relevant context	Limited access to coherent data and information on the spatial development of the Baltic Sea areas Lack of common standards and open access to relevant MSP information in the Baltic Sea Region Lack of a relevant pressure to encourage Member States to enhance their cooperation in the field of delivery of comprehensive data for the MSP	Limited access to coherent data and information on the spatial development of the Baltic Sea areas, limits the cohesion of spatial planning in the transboundary areas on the Baltic Sea A comprehensive, consistent and convenient data base with up-to-date covering the Baltic Sea area is necessary for planners dealing with marine spatial plans Stakeholders have limited access to information concerning the spatial development of maritime space, making the decision and investment processes more difficult
Current competences / way of working	Lack of access to relevant and cohesive data are major obstacles in the process of transboundary cooperation in the MSP development Different languages and formats as well as limited access to the spatial No deadline for obtaining open data from BASEMAPS	Data and information delivered to HELCOM by HELCOM Contracting Parties (HELCOM Map and Data Service). Access to data through spatial web service (BASEMAPS) The need to obtain relevant data from various sources and their further translation in the process of the maritime spatial planning increases the costs of the process and may lead to misunderstandings and misinterpretations
Change of behaviour requested	Amendment of BSR MSP Data ESR TOR to encourage data providers to deliver open data through web service using open standards for transnational consultations	Fully consistent and convenient open data and information sources provided by national coordinators to drive the BASEMAPS Open access for relevant data and information will support the process of maritime spatial planning on the Baltic Sea BSR MSP Data ESG responsible for updating and verification of available information (via BASEMAPS) Dialogue in BSR MSP Data ESR will improve the quality and consistency of data and information, thus the process of the MSP development and verification will become easier and more effective Strive to data harmonization to have a common language, symbology and definitions for MSP data.
Possible recommendations	***Amend the Terms of Reference of the Baltic Sea Region MSP Data Expert Sub-group (BSR MSP Data ESG) under the HELCOM-VASAB MSP Work Group.*** ***The BSR MSP Data ESG should work to support the data availability in the newly created Baltic Sea Region Spatial Data Infrastructure for MSP (an output of BalticLINes called BASEMAPS).*** ***The status of the data availability should be followed up in each group meeting.***	***The BSR MSP Data ESG should encourage MSP data providers to establish English as common language to provide MSP transboundary data.*** ***Likewise, the BSR MSP Data ESG should also work to support a common symbology for MSP data and establishment of common term vocabulary in order to achieve semantic interoperability.*** ***This could be achieved by further developing the "HELCOM-VASAB Guidelines on transboundary MSP output data structure in the Baltic Sea"***

HORIZONTAL Recommendations

A main recommendation of a horizontal nature is the persistence of mutual meetings between people and institutions responsible for spatial planning at sea, as well as stakeholders having indirect influence on the development of the transport and energy sector in the Baltic Sea Region. Good experience from previous years confirms the need to maintain the so-called **Baltic MSP platform**. The project outcomes approved that the knowledge and practice exchange as well as joint discuss about the challenges and directions of development of maritime spatial planning, including problems with coordination of activities and dynamic changes in the sector and its environment, significantly improve the MSP implementation in the Baltic dimension. In addition, the establishment of a MSP discussion platform should take into account a wider spatial context, which is why **support and further development of an European MSP forum** is an important challenge and recommendation for the future.

Considering the sectorial structure, development of a project or initiative **bringing together the offshore wind and cable industry with MSP planners** in the Baltic seems essential. Clearer understanding of each other's ideas and foster thereby smoother implementation of OWF and grid developments in the Baltic should be achieved.

HELCOM/VASAB MSP WG as a key body of international character **should be the initiator and integrator of this type of activity**. Encouraging representatives of BSR countries to further cooperation, especially in the context of technological development and strategic challenges (e.g. energy) will be an important challenge for the future. This activity should also take into account the need to obtain **adequate financial support in the next EU budget period** (2021-2027), which should provide interested parties with the opportunity to continue work on solutions improving the quality of maritime spatial planning. Applying for the appropriate **placement of MSPs issues between the European and Baltic priorities** is therefore another important recommendation.

Glossary

AIS	Automatic Ship identification Systems
BASREC	the Baltic Sea Region Energy Cooperation
BEMIP	Baltic Energy Market Interconnection Plan
BWMC	Ballast Water Management Convention
COLREG	International Regulations for Preventing Collisions at Sea
EEZ	Exclusive Economic Zone
EUSBSR	the EU Strategy for the Baltic Sea
FSA	Formal Safety Assessment
GPRS	General Provisions on Ship's Routeing Systems
HELCOM	Baltic Marine Environment Protection Commission - Helsinki Commission
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ICPC	International Cable Protection Committee
IMO	International Maritime Organisation
INSPIRE	Infrastructure for Spatial Information in the European Community (Directive)
MARPOL	International Convention for the Prevention of Pollution from Ships
MPAs	Marine Protected Areas
MSC	Maritime Safety Committee (IMO)
MSDI	Marine Spatial Data Infrastructure
MSFD	Marine Strategy Framework Directive
MSP	Maritime Spatial Plans
NCSR	Committee on Navigation, Communication and Search and Rescue (IMO)
OGP	Spatial Offshore Grid Plan
OREI	Offshore Renewable Energy Installation
OWF	Offshore Wind Farm
SOLAS	International Convention for the Safety of Life at Sea
SWB	Source Water Protection
TS	Territorial Sea
TSS	Traffic Separation Scheme
UNCLOS	United Nations Convention on the Law of the Sea