Baltic SCOPE

Towards coherence and cross-border solutions in Baltic Maritime Spatial Plans

Central Baltic Case

Topic Paper on Energy

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This Topic paper is the working paper based on the joint Baltic SCOPE exercise and cannot be treated as the official opinion of the European Commission and Member States involved.

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Content

Conclusions and recommendations

Energy supply is a precondition for economic competitiveness and welfare; it is needed for manufacturing, providing services, functioning of residential and industrial areas. The Baltic Sea offers a wealth of resources that can be sustainably utilised to harvest energy while ensuring that energy interests can coexist with other spheres of activity. Energy is therefore also one of the main drivers of marine spatial planning (MSP). In the Baltic Sea Region (BSR), as a new and emerging sea use, offshore wind energy is probably one of the main driving forces behind the interests of energy sector. National MSP developments are often driven by growing interests in offshore energy development, which might be supported by national renewable energy (RES) targets and regulative systems as well as energy and climate targets set out by the EU. At the same time MSP can also serve as a tool to prepare ground and accelerate offshore energy development as well as provide integration with terrestrial spatial planning through grid connections, planning of services, and availability of infrastructure among other things.

Closer coordination of development plans in the energy sector with those of other sectors – environment, fishing, maritime transportation and also defence, would benefit all involved stakeholders as it would provide a platform for timely exchange of information and analysis that would help avoiding conflicts between interests of these sectors in the future. A more coordinated approach to MSP would also allow avoiding or minimising costs pertaining to solving situations when sectors are facing conflicting interests when planning or implementing actual activities in the marine space.

Background

Energy sector is one of the fastest growing sectors in marine areas. A sustainable and reliable energy system ensures the functioning of the economy and daily life. Energy supply is a precondition for economic development, growth and competitiveness; it is needed for manufacturing, providing services, functioning of residential and industrial areas. Development of electricity production, transmission and distribution system creates preconditions for more efficient production, which not only contributes to faster development of existing industries and activities, but, depending on energy portfolio, also develops diversification of the structure of national economies.

Diversification of energy resources, especially in terms of a more widespread use of renewable energy sources, has been gaining importance over the recent years in economically more advanced countries. In addition to restructuring and opening of the energy market, diversification of energy resources and sources and routes of supply of energy, as well as more distributed power and heat generation with an emphasis on renewables, is considered one of the fundamental preconditions for secure and reliable supply of electricity and heat and the efficiency of the power sector. EU energy policy documents (most notably – European Energy Security Strategy) speak of the need to use local energy resources that do not have to be imported and improve energy security.

Current trends in the energy field show that there are two main characteristics in moving forward. First of all there are more stringent environmental constraints concerning air pollution and the utilisation of water and land. This means that energy production must have a sustainable and efficient location. Second, the liquidity of the energy market is a precondition for not only national power grids and pipelines, but interconnections with neighbouring energy markets as well.

Analysis of the topic

Requirements for the sector

The energy sector’s use of the sea involves electricity production, transmission and may also involve power distribution. It can also involve finding the most appropriate route for laying pipelines (natural gas, oil, oil products) on the seabed.

There are a number of basic requirements for the sector and factors influencing planning and decision-making in the context of use of marine space:

- Physical space – offshore energy is a relatively new addition to the activities in marine areas in the Baltic Sea. It means that energy sector competes with traditional use of marine areas (fisheries, marine transport, recreation, military security). The offshore wind farm development is prescribed by the space demand per turbine, and cable producers define the safety requirements for the setting up of the grid system. These requirements are internationally known as there are not too many producers of the necessary technology;
- Land-sea interactions through grid connections between facilities at sea and land power lines, including paying attention to better coordination between MSP and territorial planning on land;
- Grid capacity in general is good enough to allow wind exploration at sea. However, there are regions where the transmission grid capacity needs to be upgraded to be able to harness wind energy in the future. For example, there are two major energy infrastructure projects ongoing in Latvia (The Kurzeme Ring and the third power transmission interconnection between Estonia and Latvia) that could provide transmission capacity needed to start producing wind energy and transfer it to the shore and feeding into the grid;

- Meteorological and topographical conditions – strength of wind, depth of sea, type of sea bed, ice conditions;
- Exiting limitations – planning of new offshore wind facilities and cable lines can be impacted by existing cables or pipelines as well as cultural heritage sites (wrecks), environmental factors as well as military security requirements.

Current use

The Renewable Energy Directive establishes an overall policy for the production and promotion of energy from renewable sources in the EU. It requires the EU to fulfil at least 20% of its total energy needs with renewables by 2020. Of the three CBC countries Sweden and Latvia rank highest among all EU member states in terms of share of renewable energy in gross final energy consumption. Latvian National Action aims at increasing the share of renewable energy up to 40% by 2020, nevertheless actions are oriented towards changing support mechanisms for energy production. Possible mechanisms are still under discussion and have to be approved by 2017 after consultations with the European Commission. Similarly, Estonia having had experience with feed-in-premium system is also debating the potential return to the more stable feed-in-tariff scheme, which is also more foreseeable from the investment point of view. In 2014 the EC adopted *Guidelines on State Aid for Environmental Protection and Energy 2014-2020*, which allows flexibility for the Member States to decide on and apply technology-specific feed-in-tariff schemes to new small renewable energy installations although the overall approach is more in favour of market-based RES support mechanisms.

Currently, the energy sector’s interests in the Central Baltic Case study area are related mostly to offshore wind energy facilities, electricity cables, and gas or oil pipelines. This means that the space needed for the activities consist of the space needed for a pipeline or a cable and the safety zone around it. Offshore wind (OSW) parks require more space, and allocation of marine space might at times be complex – it requires space between turbines, space for safe passage of ships, corridors for connecting OSW facilities with the grid on land.

In the Eastern and South-Eastern part of the Baltic Sea, offshore wind energy is mainly in the development stage. In Estonia and Latvia, MSP would have to give the possibility for offshore wind energy and connecting wind farms with the on-shore grid. There are no operating offshore wind parks deployed in the territorial waters of Estonia and Latvia in July 2016. However, there are several areas indicated in Estonia and Latvia where permits for the assessment of conditions and exploration of wind energy have been granted. There are currently five wind farms at sea in Sweden (all are located within Sweden's territorial waters). Economic profitability (due to technology costs) of offshore energy as well as in some cases lack of legal regulation has hindered the development of offshore wind farms in Latvia and to some extent also in Estonia.

The environment in which offshore energy operates can be characterised as mainly having the form of an agreement between different sectors and stakeholders – deployment of offshore wind barely has a legal background. Offshore energy must take into account the restrictions that other sectors incur such as environmental restrictions, fisheries policy, IMO regulations for shipping lanes, and military security interests.

- To summarise, the main competing interests of the energy sector are the existing or potential conflicts with:
- local heritage;
- nature conservation;
- bird migration corridors;
- habitats for species;
- national defence interests;
- commercial fishing;
- recreation;
- shipping and marine transportation.

For example, wind power is competing with nature conservation in Sweden, because it is primarily offshore banks with high natural value that have been considered technically most appropriate for the construction of wind farms. This is also true in Estonia and Latvia as banks are good for erecting OSW facilities, but represent at the same time some of the best habitats for fish and other marine species as pointed out by representatives of environment and fishing sectors. Furthermore, wave power is currently also being researched in the case study area. Wave power in the Baltic Sea has been estimated as having good potential ability to be commercially utilised[1], albeit in a longer perspective.

Offshore energy often gets attention due to conflicts with local communities (preserving local heritage) and fisheries (offshore wind energy can have negative impacts on fisheries). Due to specifics of deployment (comparatively large territory plus safety zone around wind farms and cable connections with on-shore grid required, potential interference with the radar systems) offshore wind facilities are not always welcome in the context of national defence interests either.

When developing offshore energy further in the MSP process, discussions must be held between national institutions in charge of energy production, national stakeholders interested in offshore energy, grid operators, wind energy associations, environmental NGOs, and local communities. In addition, every other sector that is possibly influenced by the energy sector should be involved in the planning process.

Future needs and use

Due to the growing demand and awareness to avoid any unwanted impact on the climate and decrease the environmental impact of electricity and heat production a higher share for renewable energy in the energy supply is welcome and is one of the key elements of the EU energy policy. Deployment of renewable energy technologies that make use of the wind

[1] Dukulis, Aivars, Baltijas jūras resursu izmantošanas izvērtējums Latvijā, SUBMARINER Report 6/2013, p. 37.

resources in the Baltic Sea Region is also important to further develop a distributed energy production system, which will contribute to a greater energy security.

In addition to the actual energy producing units (wind farms, for example), electricity interconnections and the overall capacity of the grid must be taken into account as it is also important for energy security. Limited capacity of grids is one of the main factors hindering development currently (not taking into account different restrictions stemming from other sectors). There is a need to identify sustainable and efficient locations for distributed energy production through the use of marine space and resources.

As any other economic activity taking place in marine areas, offshore wind energy is also related to different physical restrictions that make harvesting offshore energy possible. These include wind conditions, water depth, ice conditions, physical location of the nearest electricity substation on shore, capacity of the grid and other factors. Some of the limitations might be overcome with the development of new technological solutions, for example, allowing deployment of floating wind turbines that would allow deploying offshore wind parks with more flexibility in terms of geographical location.

For grid connections (national or external), environmental restrictions and the opinions of the local communities are of great importance. Current planning processes show that coastal communities are often opposing offshore wind parks, which means that emphasis must be put on balancing different interests – environmental, commercial as well as social.

Offshore wind park development is prescribed by the physical space demand per turbine. Similarly, cable producers and deplorers are defining the safety requirements for setting up the grid system. These requirements are internationally well known as there are not too many producers. Planning of new cable lines can be impacted by existing cables or pipelines as well as cultural heritage sites (including wrecks). An important factor that is going to have an impact on the design and deployment of offshore wind parks is the growing capacity and efficiency of wind turbines: as the installed electrical capacity of turbines grows (comfortably offering 3MW and reaching even 7MW and more[2]) technical requirements also need to be adjusted in terms of space and safety measures. Thus development of technology creates both new opportunities and new challenges not only for the industry, but also for planners and decision makers.

Transboundary implications

Offshore wind energy is clearly a question of MSP as besides the licensing procedure, there are no particular regulations dealing with allocating space for offshore energy. It is up to the planners to coordinate deployment of offshore wind with other stakeholders before making any final decision. As deployment of offshore wind facilities will always concern interests across a number of sectors the planners have to be involved in decision-making to avoid situations when a decision taken by one institution conflicts with immediate interests of other sectors. Although as stems from the consultations with experts during the development of the Central Baltic Case study, offshore wind interests dominate the national level of planning and making of decisions, deployment of offshore energy installations at sea can potentially also have certain transboundary / cross-border implications.

The study of the Central Baltic Case indicates that transboundary implications for offshore energy are mainly threefold: geographical, spatial and conditional.

- Geographical

Certain marine areas are more suitable for offshore energy and the required technical grid connections than others. In some areas in the CBC, when all physical preconditions are met, offshore energy deployment could also become a cross-border issue. Conflicting of offshore

[2] See, for example, Wind Power Monthly, http://www.windpowermonthly.com/10-biggest-turbines

energy with the environment, shipping, fisheries, and defence interests has geographical implications, be it because of national or cross-border conflicts.

Border areas might raise the issue of coordinating near-border developments. Examples of such areas might be the border of Latvia and Estonia in the Riga Gulf, where development of offshore wind facilities in Estonian waters could impact Latvian side. Similar situation could potentially evolve near Latvian and Lithuanian sea border (which has not yet been clearly set by July 2016).

In view of the potential proximity of offshore wind farms to other countries' territories, developers of offshore wind farm projects in some cases find that their projects can potentially affect Natura 2000 sites in neighbouring countries, and that they or interested parties may wish to make those potential effects known as part of the development consent process. Such issues might be raised as part of the transboundary environmental impact assessment process, which may be required under EIA procedure.

- Spatial

This includes allocating space for energy production units and also cable connections. For example, electricity interconnections could be created between Latvia and Sweden in the long run and a third Estonian-Finnish interconnection could be constructed, which would among other gains for the energy system provide an opportunity to sell the output from offshore wind farms in neighbouring countries. Stakeholder meetings with the industry (transmission system operators or TSOs) indicate that a more distant future may see an interconnection between Estonia and Latvia via a submarine cable[3].

The Kurzeme Ring (KR) is an energy infrastructure project involving the construction of a 330kV high voltage overhead power line in the western part of Latvia to ensure the possibility of

[3] Estonian national plan Estonia 2030+

connecting the increased energy production capacities in the Kurzeme region, facing capacity limitations in some areas of the grid before the project is finalised. Part of the network upgrade has been implemented already by 2016. The KR project constitutes a part of the larger NordBalt underwater HVDC cable project, the implementation of which includes improving the interconnections between Latvia, Estonia and Sweden with a view to improving power supply reliability in the Baltic States and opening new possibilities to increase traded volumes of electricity on the Nord Pool Spot electricity stock exchange.

- Conditional

Conditional implications include the conditions set for developing wind farms. For example, what kind of research must be done, how the wind parks could be positioned in the park, how are the local communities involved, and similar issues.

Offshore energy developers are seldom national, therefore having the same or similar conditions might make offshore energy planning a bit easier and more transparent for the wider public and other sectors affected.

These also include different conditions for shipping lanes, the distance between turbines, environmental and other aspects. There is little homogeneity regarding such conditions in the Baltic Sea Region, but a framework could potentially be developed that would facilitate the development of energy industry as well as allow avoiding causing collateral damage to other sectors' interests, including any cross-border influences.

Planning evidence

Availability of information and data on existing or future infrastructure objects is crucial for the planning of the use of marine space in the near or distant future. CBC study illustrated that the information, although mostly available, is scattered among different stakeholders and effort is needed to get a full picture of what is happening and what are future plans of those different stakeholders.

The following points summarise the situation with the available or existing data:

- Existing wind parks and cables – data available as a matter of fact, and TSOs can provide the necessary information on capacities;
- Planned wind parks and cables – data ranges from vague indications to specific calculations by commercial enterprises planning deployment of OSW facilities;
- Scheme of possible connections to the grid (LV, EE and SE) – this data is usually available from the national TSOs and DSOs as no new power production capacities can be connected to the grid without prior coordination of the issue;
- Physical conditions: wind, depth, ice (GORWIND for the Riga Gulf) – certain stakeholders including the OSW industry have the relevant information based on commercial studies and scientific research.

Additional discussion with relevant stakeholders (particularly companies responsible for national energy infrastructure development – transmission system operators (TSOs) and the biggest producers of power and heat) and in-depth analysis on trends in energy sector might be needed to expand the relevant information.

Ten year electricity (and gas) network development (TYND) plans are another relevant source of information for MSP, especially in the context of developing new electricity or natural gas interconnections. TYND plans are part of a compulsory procedure that network operators for electricity and gas have to go through in order to get co-financed from the EU funds (Connecting Europe Facility or CEF). First, national TSOs prepare their vision of a new plan or project. Usually any new development initiative has to get local / national approval. Afterwards the plan is sent to the European network of transmission system operators for electricity (ENTSO-E) or gas (ENTSO-G) for approval. Only after approval by the respective ENTSO can a project get the status of a project of common interest (PCI) and get co-funded by the EU CEF funds. Thus the system of financing cross-border or sizeable national energy infrastructure projects can serve for the purposes of including relevant information in marine spatial plans. At the same time it can provide opportunity for spatial planners to get their concerns noticed at an early stage of planning of any future energy infrastructure project that can have significant impact on other sectors involved in MSP.

It is important to note the different approaches to planning that the energy sector and other sectors have, in particular in the context of MSP. While sectors other than energy believe that their interests will always dominate, energy sector approaches planning from the perspective of energy security, primarily – from the obligation of energy system operators to ensure uninterrupted supply of energy to the consumers. Therefore the energy sector will be planning its development regardless of what other sectors interests might be, allowing adjustment of plans where energy sector's interests dominate and changes are made only when conflict is imminent.

Motive/discussion for including this topic/sector in the project

Currently the energy sector is driven by national policies, energy industry as well as energy market. As the generation of offshore wind energy is generally more expensive compared to conventional (on-land) technology, subsidies or support system for the sector can play an important role. Normally the produced energy is fed into the national grid system primarily supplying the national electricity market. Being part of the Nord Pool electricity market facilitates cooperation between the countries involved in CBC study and this can help agreeing on closer coordination in energy policy, which subsequently can help to coordinate marine spatial planning. On the other hand, MSP can provide a good framework for planning any future development of the interests of energy sector when it comes to the use of marine space as policy planning is a horizontal issue that is relevant to all affected sectors.

Annex

Issues that have been discussed between EE, LV and SE participants during the 2015 December 16-17 meeting in Riga, and issues for further consideration

1 Technical limitations for deploying off-shore wind related to water depth and ice conditions in winter exist;

2 In the context of MSP the main attention is on deployment of off-shore wind farms;

3 More coordination between off-shore wind developers and TSOs and planners is needed;

4 TSOs see no need for special and spatial plans for HV cables, TSOs deal with the issue on an ad hoc basis, and similar problem persists with agencies that do not regard marine spatial planning relevant, also in the context of national interests;

5 Gap between policy planning and spatial planning, Baltic SCOPE might facilitate closer coordination;

6 Lack of data on cables (energy, telecom, military) exists and it remains to be seen how relevant this is an issue (this is related to military / state security, see notes on defence interests below);

7 Defence interests might be conflicting or are conflicting energy interests, constituting probably the highest level of potential conflict along with environmental interests. There is also interaction of defence interests with commercial fishing and fishing for recreation and social aspects, including recreation and tourism;

8 High uncertainty of development areas for off-shore wind farms as well as possible routes for power cables exists. Would be important to analyse what effects choosing one or another interconnection scenario might have on the rest of the potential projects (cable connections and / or deployment of wind farms);

9 From the perspective of the institutions responsible for marine spatial planning it is important to know who and how sets priorities and how this setting of priorities might interact with MSP;

10 Potential SE-FI interconnection can have market-based repercussions regarding decisions on EE-SE, EE-LV and SE-LV interconnection(s);

11 Transboundary issues:

a. Interconnections are clearly a transboundary issue that requires attention during the national MSP debate;

- SE-EE interconnection;
- SE-LV interconnection;
- EE-LV interconnection;

b. Deployment of RES (off-shore wind) in general does not have transboundary character, except for EE off-shore wind deployment near EE-LV border between Pärnu Gulf and Riga Gulf, which might affect nature protection area on the Latvian side of the border. SE could have interest in seeing the solution of EE-LV situation (above). South Baltic Case (SBC) could provide examples of potential approach(es).

12 Cables *per se* do not affect, for example, bird life, construction works might have temporary effect on biotopes;

13 Cumulative effect of sectoral activities on the environment, fishing (as it also depends on environment) have to be considered when planning energy activities;

14 Deployment of off-shore wind can have effect on transmission system [capacity] because of intermittency of production depending on wind: high supply / oversupply and / or undersupply needs balancing capacities, which can impact decision making on energy production (of all sorts – RES, fossil);

15 Exploration of hydrocarbons in LV waters can potentially represent a transboundary issue (ESPOO Convention) with SE (and potentially EE, LT and perhaps FI also as water in the Baltic Sea near LT and LV coast circulates from South to North) regarding nature protection. Hydrocarbons plus RES deployment might have cumulative effect on fish, birds and sea mammals;

16 Conflicting interests predominantly concern and are handled on the national level, except for EE-LV (off-shore wind in the Gulf of Riga) and LV-SE-EE;

17 Priorities in the energy industry usually have the following logic (but also need to look at this in the context of ENTSO-E framework):

- Secure supply of energy;

- Vulnerability of energy system;
- Balancing capacity (portfolio – RES, fossil, net electricity import);
- Policy planning;
- Environmental concerns;
- Land ownership.

Issues for further consideration

1 Green infrastructure zone in SE for nature protection, hotspots for environmental protection;

2 LV-SE electricity interconnection;

3 Hydrocarbons in SE waters near LV and LT;

4 TSO plans – ENTSO-E system development committee, Baltic Sea regional group, ENTSO-E, should be part of national plans, role of national regulators, related to EU financing;

5 SE need to reserve marine space for energy, energy planning does not take place within MSP;

6 Telecom cables SE-LV and EE-SE;

7 Policy planning rather a horizontal issue;

8 Differences in the detail of planning:

- detailed planning (energy);
- strategic planning (fisheries).

9 Different approaches: cables vs off-shore wind farms

- cables: limited options, limited choice, have to connect where it is technically possible;
- offshore wind farms: fisheries, maritime transport, environment come first.

10 Large-scale energy infrastructure project planning:

- National TSO does the initial research;
- Communicates with partner TSO;
- Both TSOs do common research / could be outsourced;
- Initiative put on TYND;
- Regulator (SE Energi marknads inspektionen, LV SPRK, EE PUC) approves + public consultation;
- Feasibility study;
- Environmental impact assessment (EIA) + public consultation;
- Land ownership;
- Technical project;
- Final investment decision (FID);
- Implementation.