BALTIC SEA

MUSES Multi-Use in European Seas

This project has received funding from
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OVERVIEW OF OPPORTUNITIES

The Baltic Sea has hosted many MU related projects to date, mainly driven by the large number of existing and planned OWFs and existing UCH sites. MU of **aquaculture with offshore wind farms** is seen as a potential opportunity to reduce costs of the two operators and open more suitable areas for aquaculture (including sites further offshore).

GOOD PRACTICES

→ A number of past projects have studied this MU, including theoretical concepts in Kriegers Flak, southern Sweden, as part of the MERMAID project [12] and tests in the real environment of the Rødsand 2 OWF off the south coast of Lolland, Denmark, as part of the SUBMARINER project [13].

Combinations with **extractive aquaculture** are found to be in general more suitable, given the lower environmental impacts and low maintenance requirements.

In the Baltic, the Danish Wave Energy Test Center has hosted trial sessions of wave MU concepts (e.g. in combination with aquaculture). However, the technology readiness level is still low for the Baltic conditions with major barriers including small waves, winter ice, and the lack of a wave energy market and incentives.

In the coastal areas of Denmark, Sweden, Germany **offshore wind farms** are already being consciously integrated into regional **tourism** activities.

GOOD PRACTICES

→ Several EU projects have also been exploring OWE development in the Baltic from tourism perspectives, amongst others. These include: 4POWER, OFF.E.R and Baltic InteGrid.

By initiating offshore wind with tourism MU (e.g. boat tours for sightseeing), OWF developers may build a sense of pride around the OWF, so it becomes a symbol for the local region. This may, in turn, overcome acceptance issues and the "NIMBY" phenomenon (Not In My BackYard). As such, MU presents a mitigation option for potential negative impacts of the OWF. Tour operators see this MU as an innovative way to attract visitors and offer further educational content to their tours.

This MU also provides benefits to local communities in terms of employment and new sources of recreation. Added financial value can also be derived if the two sectors share some of the operational activities, such as environmental monitoring, surveillance and data collection.

MS which have yet to develop OWFs are considering such solutions in their maritime spatial planning processes.

Although many MU combinations with the offshore wind sector have been examined in the southern Baltic in the past, MUSES have found that other less visible combinations involving UCH, environmental protection and tourism, might also have a strong potential in contributing to Blue Growth in the region. The Baltic Sea hosts exceptionally well preserved wooden shipwrecks, designated as **UCH**, attracting tourists (particularly divers) from all over the world. Coastal tourism is also an important blue growth sector in the Baltic, although highly seasonal (mainly summer). **Tourism** combined with UCH (e.g. diving and walking trails) provides additional, innovative tourism opportunities that could potentially sustain the tourism sector all year round. Such initiatives could also provide an additional sustainable source of funding for UCH and environmental protection.

Combination with offshore wind could enable scaling up of **extractive aquaculture**. Calculations of annual biomass production (mussels and seaweed) in the Rødsand 2 OWF (DK), imply that nitrogen could be considerably reduced, potentially **contributing to lower levels of eutrophication in the Baltic** [14] [17].

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OVERVIEW OF MAIN BARRIERS

Offshore wind related MU:

- **Low financial power** of individual aquaculture and tourism operators due to dispersion of the sector, implying that significant investments are required for aquaculture to be developed further offshore;
- **Lack of cost benefit analysis. Negative perceptions about financial viability** (mainly resulting from the high insurance premiums, distance to shore, low product quality/value for invested resources);
- **Lack of legal and planning incentives** to promote MU of OWFs with other activities;
- Difficulty obtaining necessary environmental permits due to **environmental impact** uncertainties and varying perceptions.

Tourism and UCH MU:

- **Low visibility** of the sectors involved and associated services, low individual **funding power**;
- **Short season** limiting suitable sites and economic sustainability throughout the year.

MULTI-USE POLICY OVERVIEW

Country	MU at national policy level	MU at individual administrative decision level	Economic incentives for MU	MU at MSP level - explicit reference to MU in National Marine Plans	MU in strategic documents	Barriers noted in reports and documents
FI	NO	NO	NO	YES (not explicitly MU, but other terms)	YES	
EE	NO	NO	NO	YES (not explicitly MU, but other terms)	YES	→ Heritage Conservation Act and Regulation No 9 requires that divers have specific training and a UCH permit, restricting opportunities for UCH exploration → Seasonality due to climatic conditions (e.g. ice cover)
LT	NO	NO	NO	NO	NO	
LV	NO	NO	NO	NO (rather based on avoiding conflicts)	NO	
PL	NO	?	NO	YES (MSP under development, incl. key sea areas with assigned priorities and secondary functions)	YES (MSP)	
SE		YES	NO	Yes (Swedish MSP Roadmap Marine Spatial Planning – Current Status, 2016)	YES (MSP Roadmap)	→ Relevant authority for policy making, planning and permitting of maritime uses depends on the sector, specific topic and distance from shore → Cost-benefit analysis must be conducted for OW developments, currently discouraging new ventures due to the high financial cost involved
DK	YES The Act on MSP, 2016	YES (for individual themes such as fishing)	NO	YES	YES	→ Lack of legal and planning incentives → Licensing procedures differ depending on type of organisms cultivated and locality of the planned aquaculture site → Environmental impact uncertainties make it difficult to obtain necessary environmental permits
DE	NO	YES (endorsement of MU, referring to specific MU combinations)	NO	YES/NO (rather integrative planning in order to co-ordinate growing spatial conflicts of maritime uses)	YES	→ Lack of legal and planning incentives for MU with offshore wind → Current MSP specifies 'priority' areas assigned to single-use only → Stringent, complicated and lengthy permitting processes (aquaculture and OW) → Concerns regarding the environmental impact of all types of aquaculture → Open net cage farming is not allowed → Cost of sustainable aquaculture Best Available Technology (BAT), most of which still in the research stage → Lack of pilot facilities and areas to showcase MU combinations

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CASE STUDIES

OFFSHORE WIND, TOURISM AND AQUACULTURE

SWEDISH ISLAND OF GOTLAND

The study area is located in the southern part of Gotland, the largest island of the Baltic Sea. Gotland is one of Sweden's most renowned tourist destinations. In Sweden, mussel aquaculture for the culinary market occurs in the west coast. In the Baltic Sea, mussels are too small to be used as food (due to low salinity) and can instead be used as feed for poultry and fish. Bockstigen, Sweden's first wind farm (1998), situated around 4 km from the coast, is exploring opportunities for combination with boat trips or aquaculture (seaweed and mussels).

Key questions, to be answered by future studies and pilots, include the logistics of attaching aquaculture infrastructure to OWF foundations, appropriate depths to put lines, how to cope with ice formation, etc. Moreover, cumulative and in-combination effects need to be carefully assessed to address potential impacts of increased tourism activity. While developers are open to join pilot projects, policy support is required [16].

Presented on a map as **7**

OFFSHORE WIND AND AQUACULTURE

SOUTH COAST OF LOLLAND-FALSTER – DENMARK – BALTIC SEA

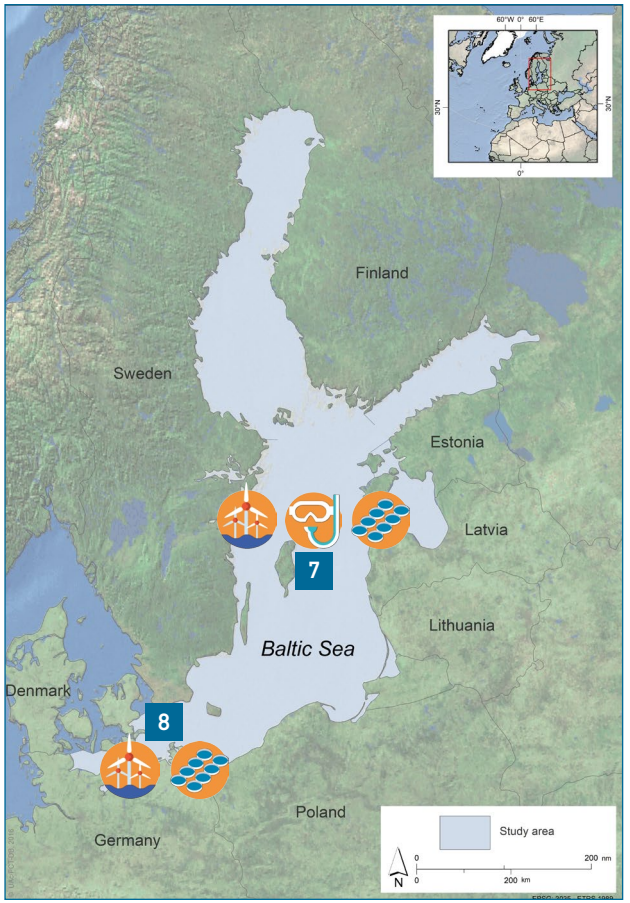
This case study focuses on the MU combination of offshore wind farms and mariculture as an approach to nutrient remediation, against the background of the current state of algal blooms in the Baltic sea waters and existence of Denmark's oldest OWF in Lolland-Falster.

The main economic drivers of the island include maritime transport (trade and ferry lines), wind energy and tourism (land and sea). MU combinations in the marine sector have never occurred in Denmark or been considered at the local level. Therefore, this case study provides an opportunity to take advantage of the economic drivers of offshore wind and tourism and the need for nutrient remediation, to test and explore possibilities for making additional gains and integrate current sectors for economic, environmental as well as social (local and institutional) benefits.

The success of any proposed MU combination depends on in-depth assessment of the impacts (social, economic and environmental) of these combinations, proof of concepts and business models for financial and investment support. Integration into local marine and coastal development planning and cross-sectoral multi-stakeholder dialogue, backed by strong institutions with the capacity to function effectively, is also vital [17].

Presented on a map as **8**

LOCATION OF MUSES CASE STUDIES IN THE BALTIC SEA



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RECOMMENDATIONS

MU with OWF

Future OWF developments in the central and north Baltic have an opportunity to consider MU options right from the pre-planning stage to ensure their easier realisation.

EXAMPLE

→ In Poland, nine binding concessions have already been given for OWFs and their suitability for MU is being discussed through the ongoing MSP process.

Early engagement of local communities to discuss site selection, layout and design, as well as clarification of relevant regulations, funding and ownership of an OWF can contribute to higher rates of acceptance, the identification of suitable tourism activities related to OWF and the establishment of necessary agreements between the two users.

In Germany, the new Arkona wind farm could potentially be suitable for the development of such MU activities in the future. However, further support for local tour operator activities is necessary, by means of **entrepreneurial guidance, financial support and wider promotion**.

EXAMPLE

→ Middelgrunden OWF in Denmark provides a good example of early engagement of the local community, resulting in cooperative ownership and attractive layout of the wind farm.

For combinations of OWF with seaweed or shellfish aquaculture, **more site specific studies** on pilots in the real environment will be needed to assess cumulative impacts and identify profitable sites.

EXAMPLE

→ The Baltic Blue Growth project [15] is developing a pan-Baltic map on viable regions for mussel growth which can be used in future MU siting exercises.

MU with Tourism

While diving is not possible in all areas of the Baltic due to low visibility, other options, such as virtual tours and walking cultural trails, can establish synergies with UCH and are also less dependent on seasonality. Sufficient **funding, marketing and promotion** of UCH tourism activities at the Sea Basin level is needed in order to realise such endeavors.

Sea basin/macro-regional projects involving the business community built on the results of initiatives carried out so far shall be further encouraged, while **macro regional strategies can serve as strong cooperation platforms** and dissemination mechanisms.

→ Projects such as BalticRIM are important in this regard, aiming to identify UCH sites suitable for combined use.

→ The Finnish Heritage Agency shares information with the public on UCH diving permitted areas. This has fostered better relationships and coordination between the UCH authorities and diver clubs to promote Tourism, UCH and Environmental Protection MU and divers feel a sense of pride and duty in monitoring and conserving these sites.

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ACTORS

National wind industry associations, and public-private clusters and partnerships (e.g. State of Green, Denmark, and the German Offshore Wind Energy Foundation) support MU and are likely to be important in the future to bring relevant public and private actors together.

For less visible tourism combinations, **intermediaries and associations** have a strong role in creating new perspectives for business partnerships by gathering relevant tourism stakeholders and maintaining networks of local tour operators.

A SELECTION OF SEA BASIN ACTORS RELEVANT TO MU IN THE BALTIC SEA

BASREC
Baltic Sea Region Energy Cooperation

BALTFISH FORUM

BDF
Baltic Development Forum

BSAG
The Baltic Sea Action Group

BSSSC
Baltic Sea States Sub Regional Co-operation

CBSS
Council of the Baltic Sea States (Monitoring Group on (underwater) cultural heritage)

CCB
Coalition Clean Baltic

CPMR BSC
CPMR Baltic Sea Commission

HELCOM
Baltic Marine Environment Protection Commission

NCM
Nordic Council of Ministers

SUBMARINER
SUBMARINER Network for Blue Growth EEIG

Interreg BSR
EU Strategy for the Baltic Sea Region (array of instances participating in the coordination and implementation)

VASAB
Vision and Strategies Around the Baltic Sea

WWF – Baltic
World Wildlife Fund

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