Main opportunities and challenges of Multi-Use: EU sea basins & case studies

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Common aim and specific objectives

Sea basins and case studies analysis were **complementary** MUSES activities aiming to:

- explore the variety of MU experiences and possibilities across different European Seas and in site-specific locations and identify **most promising MU combinations;**
- provide knowledge on what are the **maritime sectors that could drive** MU development;
- identify MU **Drivers** and **Barriers**, as well as effects (**Added Values** and **Impacts**) on the environmental-socio-economic system (**DABI**);
- inform the **Action Plan** with relevant issues for MU promotion.

Sea basins analysis

Overview of MU experiences and opportunities.

Identification of most relevant MU combinations.

Identification of DABI elements.

Case studies analysis

Detailed analysis of MU combinations relevant for site specific-locations.

Detailed evaluation of MU potential and overall effect.

Identification of key actions to promote MU, suggested by local stakeholder arenas.

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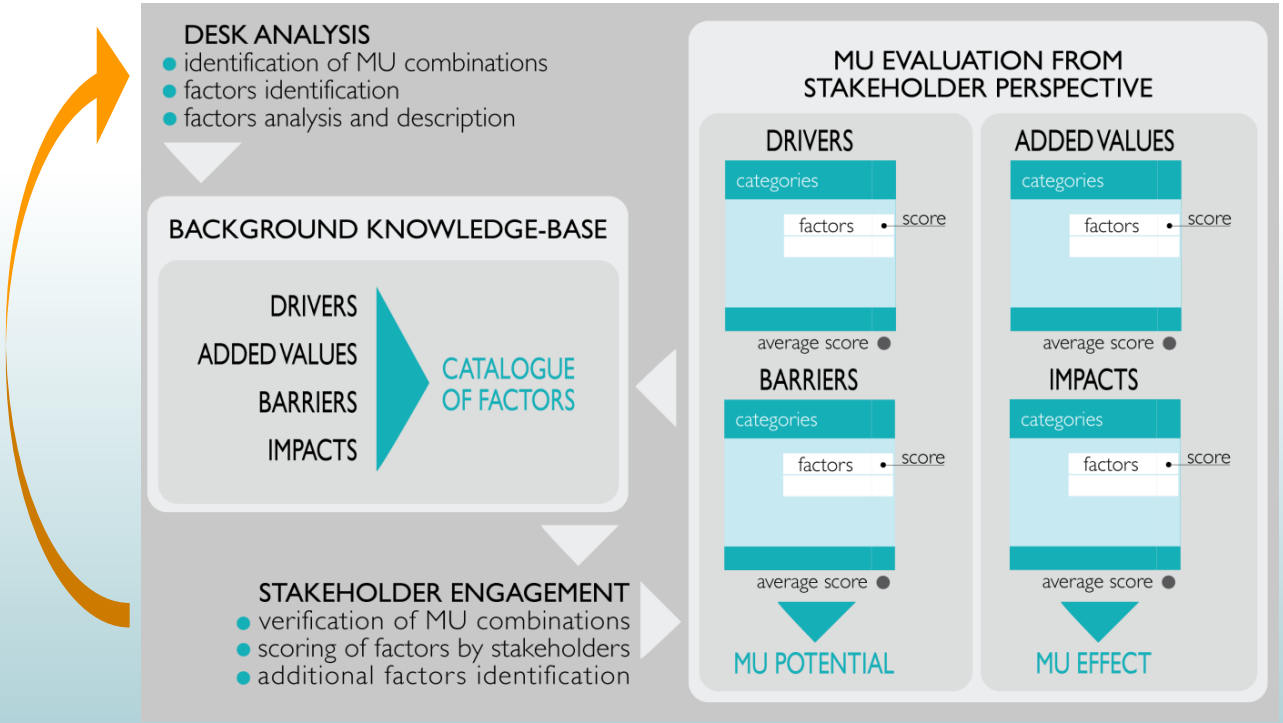
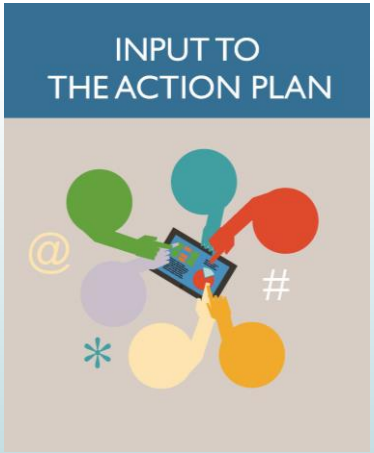
Methodology





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Promising MU combinations
Baltic Sea

Mix of Hard and Soft sectors involved in MUs		
MU combinations	**Sea basins**	**Case studies**
Offshore Wind Energy & Aquaculture	✓	✓
Offshore Wind Energy & Tourism	✓	✓ Also combined with environmental protection
Tourism & UCH, eventually combined with environmental protection	✓	

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Promising MU combinations
North Sea

Energy driven MUs		
MU combinations	**Sea basins**	**Case studies**
Offshore Wind Energy & Fisheries	✓	✓
Offshore Wind Energy & Aquaculture	✓	✓
Offshore Wind Energy & Tourism	✓	
Offshore Wind Energy & Wave Energy	✓	
Wave Energy & Tidal Energy	✓	
Wave Energy & Aquaculture	✓	
Tidal Energy & Environmental Protection		✓
Re-use of O&G decommissioned installations	✓	

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Promising MU combinations
Eastern Atlantic

Hard sectors involved in MUs at north vs Soft sectors at south

MU combinations	Sea basins	Case studies
Wave Energy & Aquaculture	✓	✓
Shipping Terminal and Green Energy Generation		✓
Tourism & Aquaculture	✓	✓
Tourism & Fisheries	✓	✓
Tourism & UCH & Environmental Protection	✓	✓ Also as Tourism & Environmental protection

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Promising MU combinations
Mediterranean Sea

Tourism driven MUs and Energy-related MUs in specific areas

MU combinations	Sea basins	Case studies
Offshore Wind Energy & Aquaculture	✓	
Wave Energy & Aquaculture	✓	
Renewable energy and desalination		✓
Tourism & Aquaculture	✓	✓
Tourism & Fisheries, eventually combined with environmental protection	✓	✓
Tourism & UCH & Environmental Protection	✓	✓ Also as two-uses combinations
Re-use of O&G decommissioned installations	✓	✓ MUs involving tourism, aquaculture and/o renewable energy

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Promising MU combinations
Black Sea

Soft sectors involved in MUs	
MU combinations	**Sea basins**
Tourism & Fisheries	✓
Tourism & UCH & Environmental Protection	✓

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Drivers

FACTORS PROMOTING Multi-Use

Sea basins analysis	Case studies analysis
Strategies and legislation at the EU and macro-regional levels encouraging multi-purpose uses (e.g. MSP Directive). However, there is the need to further mainstream the concept of MU in macro-regional strategies and especially at the national level.	Confirmed. The relevance of energy policy was also highlighted.
Availability of funds and funding mechanisms (e.g. EMFF and FLAGs), which are however often sector-focused.	Confirmed. Funds should target development of concrete business cases, promotion of operators' skills, etc.
Increasing demand for sustainable tourism, green energy and high-quality food products.	Confirmed. Need for spatial efficiency, energy savings, cost reduction were also highlighted.
Availability of natural, historical and cultural asset at the coast and sea which can be further valorised in a sustainable perspective.	Confirmed. Need to expand environmental protection was also pointed out.

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Barriers

FACTORS HINDERING Multi-Use

Sea basins analysis	Case studies analysis
Lack of macro-regional and especially national frameworks supporting MU and of uniform approaches.	MU development would benefit from national/sub-national legal frameworks supporting the concept
Administrative procedures are often designed from a sectoral perspective and neglect MU specificity: lack of harmonization, severe regulations, long and risky licensing procedures, complex safety regulations, unclear insurance policy framework.	Confirmed. These are seen as very severe barriers. Harmonization of administrative rules and licensing procedures at sub-national level was also pointed out.
Lack of dedicated incentives and funding for pilot and scaled up MU projects. Technological progress is a key enabling factor for renewable energy and aquaculture related MUs and is often “investment intensive”.	Confirmed. Need for larger investments, lack of adequate incentives for pilot projects and for their scaling-up, and to sustain MU implementation over time, after the pilot phase.
Lack of adequate skills, sector fragmentation, lack of dialogue among stakeholders, limited awareness on MU benefits of society at large.	Confirmed. Issues related to technical capacity and technical compatibility were also underlined, claiming for joint design and co-development of the uses.

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Added values

BENEFITS FROM Multi-Use

Sea basins analysis	Case studies analysis
Increased and/or diversification of income through the creation /expansion of new markets and new job opportunities.	Confirmed. This was highlighted with reference to static or declining sectors e.g. small-scale fisheries and aquaculture.
Reduction of costs due to synergies between different uses, including transfer of technologies and practices (from one sector to another).	Confirmed. In addition better risk management and safety, with related sharing of costs.
Spin-off effects of MU, e.g. fostering local actions towards renewable energy goals, development of local products, enhanced structural support for new SMEs and specialized jobs involved in the MU value chain.	Confirmed. The societal dimension was emphasized as well like the opportunity to maintain traditional jobs and sustain local communities.
Contribution to resolution of spatial conflicts.	Environmental added values related to e.g. low carbon footprint, sustainable aquaculture and fisheries practices, creation of artificial reefs, etc.
Better understanding of needs and expectations of MU leading to R&D inspirations and innovations.	Not identified.

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Impacts

NEGATIVE EFFECTS FROM Multi-Use

The term “impact” refers to the negative effects of MU implementation on the entire **socio-economic-environmental** system.

Few negative impacts have been identified in both sea basins and case studies analysis.

MUs impacts are to a large extent unknown and uncertain, and there is the need to better understand the cumulative impact of MU combinations on the socio-economic-environmental system.

Some site-specific impacts have been identified through the case studies analysis.

- Development of tourism-driven MUs could generate conflicts with other traditional touristic activities as well as additional environmental pressures on marine environment, over-crowded coastal areas and UCH sites.
- Lack of practical experience on MU could lead to damages of infrastructures/devices, loss of income due to incompatibility and other negative economic impacts on the single sectors involved (e.g. MUs involving wind energy production and fisheries or aquaculture).

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Conclusive remarks

- **Renewable Energy**-driven and **Tourism**-driven MU combinations demonstrate the greatest potential for implementation, with the former having prominence in the North Sea and the Norther part of the Eastern Atlantic, and the latter in the Mediterranean Sea and the Southern part of the Eastern Atlantic.
- In the case of Tourism-driven combinations most promising MUs are the ones involving other **soft sectors** while in the case of Renewable Energy-driven combinations most promising MUs are the ones involving other **hard sectors.**
- Within the case study analysis MU between hard sectors are estimated to have a higher **MU potential** then MU between soft sectors (hard sectors are considered by stakeholders more prepared to face challenges than soft sectors) but MU between soft sectors are associated to a higher **MU Effect.**
- MU is a **scalable concept**: MU starting with two uses may be expanded to other uses.

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Conclusive remarks

- The case study analysis showed that MUs located **nearshore** have higher potential: the offshore environment is considered more difficult to be approached by two or more combined uses.
- The sea basin analysis showed that depending on the country's specificity (in terms of "density of maritime uses") the distance from the shore is of lower importance: the possibility to include new uses in an area where **some uses are already located** is more important, even though it involves higher costs.
- **Effective spatial management** has greater demand in areas experiencing greater competition among uses, and thus these are the areas where MU is viewed more positively.
- A number of **knowledge gaps** contribute in preventing MU implementation:
  - ✓ technological gaps, particularly relevant for MU involving offshore energy and aquaculture infrastructures;
  - ✓ full understanding of the value chain (in particular in terms of socio-economic benefits – particularly relevant for tourism-driven MUs) and whole life cycle (from planning to decommissioning) of the MU combination;
  - ✓ cumulative environmental impacts of MUs are to a large extent unknown and uncertain.

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