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POLICY BRIEF

Assessment on the added value of Marine Multi-Use within UNITED pilots.

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INTRODUCTION

ACRONYMS

- MU: Ocean Multi-Use
- OWF:Offshore Wind Farms
- GHG: GreenHouse Gases

POLICY BRIEF FRAME

Is Marine Multi-Use (MU) worth it?
The **objective of the economic assessmen**t, of UNITED pilots, was:

- to **determine whether the concept of MU colocations is currently or potentially worthwhile to consider** in the future.
- to **investigate the added value for existing marine uses to profit from the combination of activities** in a MU setting and if and how touristic opportunities could be promoted and upscaled.

When assessing the viability of marine MU options, one needs to **evaluate the trade-offs associated with each option against their potential single-use alternatives**. Special attention needs to be paid to the consideration of all significant **relevant impacts, including those that affect other marine users** (the so called in economics externalities) and that may be of a positive, such as marine habitat creation, or a negative character, such as restricting access to other marine uses.

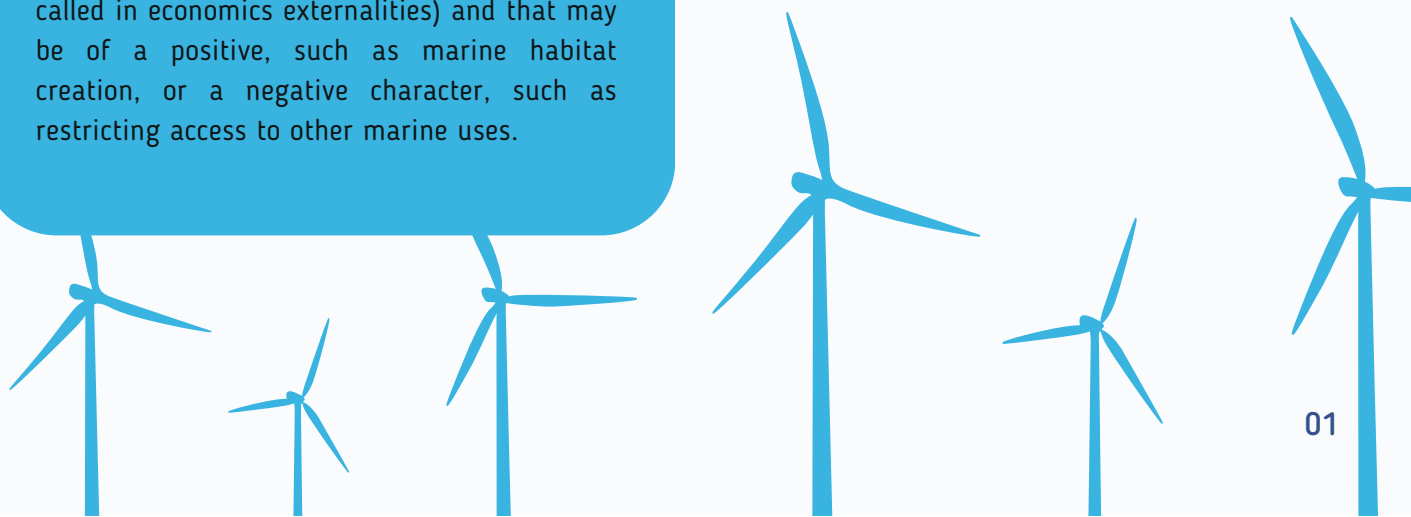
OUR ANALYSIS

UNITED has performed an economic impact assessment of MU under the context of four different pilot projects:

- **Germany**: combination of blue mussels and seaweed cultivation with offshore wind energy
- **Belgium:** flat oyster aquaculture, restoration, and seaweed cultivation with offshore wind energy
- **Denmark:** tourism with offshore wind energy
- **Greece:** fish-aquaculture with tourism

The findings for the pilots introduce a series of **positive environmental, economic and social impacts of MU.** Thus, highlighting that **MU is likely to deliver economic benefits of greater magnitude than the single-use** options alternatives.

Read more about these findings in D3.1



DEVELOPMENTS

To ensure that all important costs and benefits are accounted for, **we developed a structured, sequential approach that was implemented in the pilots** (see graphic below). Following the development of an Assessment Framework, a guidance for application was developed.

UNITED ASSESSMENT FRAMEWORK

1. **Environmental, social and economic characterization of marine use/s**
2. **Baseline and options**
3. **Baseline and options**
4. **Identify and calculate cost and benefits for baseline and options**
5. **Discounting and calculate decision criteria**
6. **Dealing with uncertainty: Risk and Sensitivity test**
7. **Report quantified and non -quantified results**
8. **Recommendations and advice**

ASSESSMENT OF ECONOMIC IMPACTS

BLOCK 3 UNITED ASSESSMENT FRAMEWORK

Pilots are analysed under two different blocks.

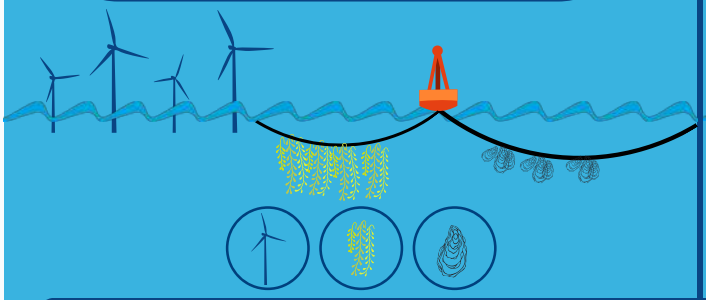
o **Block 1 - Pilots are those characterized by combinations of Offshore Wind Farms (OWF) with other marine uses (**these included different aquaculture types: mussels, oysters, and seaweed). This is found in the DE and BE pilots.

o **Block 2** - P**ilots are those characterized by a combination of existing successful independent marine activities**. Specifically, a combination of existing uses (e.g. aquaculture, OWF) with touristic add-on activities, as introduced in the DK and EL UNITED pilots.

SIGNIFICANT ECONOMIC IMPACTS PER PILOT

BLOCK I

Pilots OWF + AQUACULTURE



BELGIAN

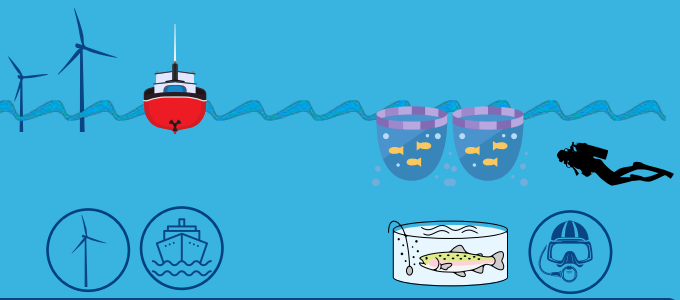
- Substitution of non-renewable energy, and energy provision, independence, and security
- Reduction in GreenHouse Gases (GHG) and carbon sequestration
- Local sustainable food provision
- Habitat and fish stock improvement

GERMAN

- Acceptance of developments offshore
- **Fish stocks and fisheries yields**
- **Diversification of incomes**
- **Added value creation**
- **Substitution of non-renewable resources**

BLOCK II

Pilots OWF/AQUACULTURE + TOURISM



DANISH

- Substitution of non-renewable energy, energy provision, independence, and security.
- Reduction in GHG
- Benefits for local economy
- Habitat and fish stock improvement

GREEK

- Improved diving experience in fauna rich area
- Increased education environmental protection of the area
- Marine citizen science (MCS) supporting aquaculture and biodiversity monitoring and marine conservation.
- Increased local acceptance of aquaculture

*Legend: bold - highest positive impacts in the pilot. Italics: impacts found across more than one pilot.

CONCLUSIONS FOR BLOCK I PILOTS

CONSLUSIONS FOR BLOCK I

- A number of environmental, social and economic positive impacts have been identified from combining offshore wind energy and aquaculture (mussels and seaweed) in the UNITED pilots located in the North Sea.
- Significant impacts include **more efficient use of marine space, added value creation and local food production, reduction of GHG, substitution of non-renewable resources and carbon sequestration and habitat and fish stock improvement.**
- **MU OWF and aquaculture can help reduce ecosystem pressure by maximizing marine space use, while individually and collectively contributing to carbon sequestration and GHG emission reduction.**
- **OWFs have the potential to cut around 270,000 tonnes of CO2 per year** by replacing fossil fuels.
- **Seaweed and mussel aquaculture (if not harvested) can also potentially act as CO2 sinks (for mussels,** particularly the typically discarded shells[1])
- **Aquaculture also offers renewable resources in the context of a Blue Bioeconomy,** for instance in the production of medicines, and cosmetics.
- Added value creation and local food production is also an interesting positive impact that have emerged from our analysis. **Harvested seaweed and mussels from offshore operations could potentially provide a high-value market for local areas, especially for material and fuel applications,** although their promotion as sustainable and nutritious local food needs enhancing.

CONSLUSIONS FOR BLOCK II

- The combination of **marine activities sharing existing infrastructure with tourism activities is likely to result in win-win situations.**
- Our assessment has **identified a series of positive environmental, social, and economic impacts.** The greatest benefits of the discussed MU collaboration are:

1.Greek pilot: to i**ncrease local acceptance for aquaculture operations by reducing local residents' negative opposition to aquaculture** (and farmed fish in general) by increasing transparency about its operations and potential negative environmental and quality impacts.

2. Danish Pilot: **benefits for the local economy from the increased touristic use of existing marine infrastructure (OWF)**

[1] Note: this only holds true if seaweed is used for ecosystem restoration, as biomass, if left in place, sinks to the seafloor fixing CO2. If harvested, the CO2 is again released in the atmosphere. Evidence suggests seaweed harvesting can be carbon intensive (Ross et al, 2022).

CONCLUSIONS FOR BLOCK II PILOTS

RECOMMENDATIONS

- As a way forward and specifically relevant for the OWF sector, **clearer and more comprehensive regulatory frameworks to facilitate faster and more straightforward permitting and licensing procedures are needed**. As part of this process, **early-stage MU planning could be encouraged to ensure that MU activities are integrated into the initial design of OWFs,** avoiding the complications of retrofitting additional activities later on. An example can be found in the recent Belgian initiative, which prioritizes granting licenses when several offshore MU activities are considered in the planning process.

- **Stronger political support for MU is needed**. At the moment MU is not sufficiently recognized as a valuable tool to bring forward a variety of strategic EU policies, for instance on climate change mitigation through the promotion of renewable energy or the development of the blue economy. **Only through decisive political support, it will be possible to create the required incentives for MU projects to develop**, such as the licensing requirement in Belgium mentioned above.

- **The analysis unveils some interesting arguments to inform discussions relevant to future developments within Maritime Spatial Planning and the role of touristic activities under a MU context**, especially using existing marine infrastructure (aquaculture and OWF). There is a need to ensure consistency and long-term regulatory vision (rules and planning permissions). For example, to openly allow for the exploitation of the combination of aquaculture and scuba diving touristic activities in Greece.

- There is an **urgent need to create new financing opportunities,** such as dedicated grants, to enable relatively new MU businesses to establish themselves in existing competitive markets.

- **Policy makers play a crucial role in facilitating trust between marine activities** in order to bolster collaborative efforts and streamline MU implementation, as it has been seen for example between the wind and other offshore sectors in the community in practice that has been created in the Netherlands under policy support.

- **Encouraging MU combinations may serve as a policy tool to support the further economic growth of coastal aquaculture in Europe**. Especially when novel policy measures are sought now to reverse the stagnation of the sector in the Mediterranean. **A MU setup with touristic activities may prove a good option to deal with local acceptability as one of the key barriers to the expansion of the sector in many coastal areas.** Although likely to be of high magnitude, further research is needed to quantify the scale of this potential positive impact.

- There is a **theoretical potential to generate jobs, economic opportunities, and reduce reliance on imported seafood, while providing a healthy food source for local communities.** But despite the theoretical potential of seaweed and mussel aquaculture in increasing value added and strengthening local food production, the extent to which this potential can transform into viable business models is yet to be seen. This is an element of the analysis that will be discussed in the forthcoming" D3.4 Sensor technology design".

- An ex-post analysis of the **implementation of MU requirements would be very helpful to evaluate whether such regulatory measures could facilitate or not new OWF applications,** for instance by giving OWF a comparative advantage during the licensing process against other marine uses because of the potential positive impacts of MU.

CHALLENGES AND NEXT STEPS

CONCLUSION

We assess the **added value from MU from an economic efficiency perspective with an aim to explore the trade-offs associated with single options versus potential MU combined alternatives**.

Key findings:

- A number of **environmental, social and economic positive impacts** have been identified from combining offshore wind energy and aquaculture (mussels and seaweed) in the UNITED pilots located in the North Sea. Significant impacts include: **more efficient use of marine space, added value creation and local food production, reduction of GHG, substitution of non-renewable resources and carbon sequestration and habitat and fish stock improvement.**
- The **combination of marine activities sharing existing infrastructure with tourism activities** is likely to result in win-win situations.

More policy support is needed to maximise the likely benefits derived from MU. This involves:

- **MU is a valuable tool to bring forward a variety of strategic EU policies**
- But **comprehensive regulatory frameworks needed to facilitate faster and more straightforward MU** permitting and licensing procedures
- **Financial support needed to help MU activities** to establish in already functioning competitive markets.

Read more about the economic analysis here
Business models here:
Business Analysis of UNITED Pilots
UNITED business and economic framework
Ocean Multi-Use Commercialisation Roadmap (upcoming November 2023) here

Check out UNITED´S follow-up project ULTFARMS!

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