

## **D10.3. Maribe recommendations for future funding calls in Blue Growth MUS and MUP**

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## **1 Maribe recommendations for future funding calls in Blue Growth MUS and MUP**

### **1.1 Introduction**

Section 1 of this deliverable focuses on the funding recommendations that the MARIBE project will make to the EC. The EC wants to promote and support Blue Growth and assist projects and companies reach commercialisation phase. In order to do, projects have to successfully complete a pilot phase (pilot TRL 6 or 7). This pilot phase is usually the most risky part of the commercialisation journey, as access to financial support at this stage is most risky and uncertain, often called the “Valley of Death”. Maribe used 9 case study company examples to explore the financial requirements and economic feasibility of 5 types of Blue Growth combinations (other combinations were either not rated highly by the Consortium or Maribe could not find companies to cooperate as case study examples).

The Maribe project conducted 4 key evaluation exercises for all the projects. Most important of these was the financial techno-economic analyses conduct by BVG. Both commercial (3rd phase) and pilot financial analyse were conducted.

Section 6.4 of each company report conclude with the “Gap of Finance for Pilot”. This is the financial grant support needed for the project to attain a €0 NPV, or a be cost neutral project.

The funding recommendations below are based on these results.

## **2 Funding Mechanisms for BG MUS/MUP projects**

### **2.1 H2020 funds – Pot 1 total funding of €30M: Pilots**

The purpose of this section is to recommend EC H2020 funding pots for pilot Blue growth development. The DG RTD and project officer considered that the €25M and €50M funding requirements for pilots were outside the scope of the H2020 funding mechanism, and these options are discussed in section 2.3.

In the Maribe case study evaluations, 3 Blue Growth combination sectors emerged as economically viable.

<u>Combination</u>	<u>Time frame</u>	<u>TRL</u>
Floating wind and desalination	2020-2025	TRL7
Aquaculture in fixed wind park	2020-2025	TRL7
Wave and aquaculture	2020-2025	TRL7

Maribe recommended a total fund pot of €30M to fund 4 possible projects, consisting of:

- €5M project X 2
- €10M project X 2

The project examples are presented in order of ranking in Maribe:

**1) B8 Floating offshore wind and desalination (Mediterranean)**

**Maribe ranking 1 out of 9 (most promising project). (1=most potential; 9=least potential)**

**Advantages to EC:**

- a. Innovation ready - both technologies are proven at TRL5 individually. A Greek project demonstrated successfully for 2 years at a small scale showing the combination works. Offshore floating wind provides the perfect energy solution for desalination. Desalination can operate when energy is available, thus the process does not need diesel generator backup or significant energy storage.
- b. Socially desirable,
  - i. Supplies an environmentally friendly solution to a social need in water scarce countries
    1. renewable powered
    2. briny water eliminated out to sea
  - ii. No unsightly desalination plants or wind turbines near populations centre
- c. Small scale, one 2MW unit suitable for small island requirements,
- d. Massive desalinated water market need in the Mediterranean in the near future

**2) Wave and Aquaculture (Mediterranean)**

**Maribe ranking 2 out of 9. (1=most potential; 9=least potential)**

**Advantages to EC:**

- a. Aquaculture is already a successful mature sector and the potential synergy with wave can support the development of the nascent wave energy sector

- b. Wave energy use in small scale, providing autonomous electricity supply could be a successful business model compared to large scale electricity supply to the grid.

**B. Advantage for Aquaculture:**

- a. Green electricity which also enables a more marketable product,
- b. Autonomous supply independent of Diesel
- c. Wave energy extraction provides calmer seas
- d. Less equipment visible above water surface

**C. Advantage for Wave**

- a. Guaranteed market for electricity with no third party customer
- b. High market potential for wave energy product due to strong aquaculture sector
- c. Low loss of supply risk due to proximity to customer

**3) Wave and Aquaculture (Atlantic and North Sea)**

**Maribe ranking 3 out of 9. (1=most potential; 9=least potential)**

**Advantages to EC:**

- a. Struggling wave energy sector would benefit by EU support for this combination by enabling combination with aquaculture which has the potential for a good levelised cost (LC).
- b. The combination would satisfy the EU drive for multiple-use of space in maritime Spatial Planning.
- c. Welsh government support is already strong for this project, with intentions to deploy in a Welsh demo zone.
- d. Wave energy is close to demonstration stage. Combining with another Blue Growth sector might provide sufficient impetus to fund a successful pilot

**B. Advantage for Aquaculture:**

- a. Green electricity, Autonomous supply avoiding use of Diesel
- b. Wave energy provides calmer seas, allowing seaweed to be produced offshore in more nutrient rich and cleaner seas.

**C. Advantage for Wave:**

- a. Guaranteed market for electricity
- b. Low loss of supply risk due to proximity to customer

**4) Aquaculture and Fixed Offshore Wind (Atlantic and North Sea)**

**Maribe ranking 5 out of 9. (1=most potential; 9=least potential)**

Following from the work done during the **MERMAID** project, Maribe examined the feasibility of incorporating mussels within a wind farm with fixed foundations. The individual technologies are developed at TRL 7 or higher but their interaction has not been tested in a real environment. €1 million would allow the feasibility of sharing of space to be fully examined.

**Why this project should be supported**

**A. Advantages to EC:**

- a. Combination BG projects with fixed wind are difficult projects to progress as fixed wind companies are averse to risk and diversifying their portfolio. EC sanctioned and co-funded projects would drive this innovative and high potential combination
- b. Innovation required for combination is low
- c. Mussel farm lines could provide calmer seas for fixed wind allowing longer weather windows to access the turbines, providing higher returns for wind
- d. Can be deployed in the short term in existing wind farms
- e. Low investment required

## 2.2 H2020 funds – Pot 2 total funding of €5M: Early stage pre-pilot projects

Maribe is recommending small funding pots for Early Stage projects.

- €1M project X 5: supports early TRL (3,4)

Maribe reviewed 12 sector combinations in WP8 C reports. These combinations were not progressed to WP 9/10 (A and B projects) either because their Maribe rating was not high enough to be considered, or that there was no company that would underpin the combination investigation. The following four BG combinations are examples of the most promising of the combinations.

- 1) Tourism and Aquaculture (all basins)
- 2) Seabed Mining and Fisheries
- 3) Tidal Lagoon Tourism/Leisure and Aquaculture
- 4) Biotechnology and Aquaculture

## 2.3 Alternative funding mechanisms for large scale pilots

The Maribe project conducted case studies on a number of large budget Blue Growth combination projects. The DG RTD and project officer deemed that future funding for these large scale pilot deployments was outside the scope of H2020.

For these large scale pilots, this section describes:

- Various funding sources that Maribe uncovered
- Examples of large scale deployment projects and their pilot funding requirements

The following is a list and description of large scale funding sources

### 1. Regional development funds

Regional development funds are based on European Infrastructure funds. These funds are primarily targeted at peripheral European countries.

The prime example and most well funded example is the Welsh regional development fund. The total potential fund is €1.2B, of which €100M is dedicated to ocean energy. €60M of this fund is already allocated to projects, leaving €40M remaining. There is a potential for 2-3 large scale ocean energy projects to be funded from this pot.

## **2. European Investment bank (EIB)**

The EIB historically has not provided funds for any ocean energy projects or aquaculture projects. There has been a recent change in strategy, and these two sectors are now considered for funding. A recent H2020 proposal awarded H2020 funding combining Wavestar's wave devices and a fixed wind park, also obtained some of its investment funding from EIB. The sum promised for the project is unknown.

## **3. Public private partnerships**

The public purse from national or state revenue can be a source of large investment in large scale projects, driven by the private sector. Historically ocean energy projects have been unable to form PPPs. Aquaculture has similarly been unsuccessful, due to insurance concerns.

Recent developments at EC level mean that PPP is now being considered as a method to drive Blue growth.

- This was stated at the recent Blue economy Business and Science forum in Hamburg.
- EASME Blue Technology call 2016 is a funded project which proposes to examine PPP as a investment vehicle to drive Blue growth. Maribe2 project is one of the project applications.

## **2.4 Key conclusions and funding recommendation of the Maribe project**

Maribe demonstrated that combining BG sectors which are currently struggling to exit the “Valley of Death” with more established sectors makes their overall value proposition more attractive.

There has been much scepticism of the value of combining which today has favoured the more established BG sectors (e.g. fixed offshore wind) which are continuing to thrive having proven they can achieve low LCOE EC targets. MUP wave and wind platforms have had numerous FP7 funding to explore technical and financial viability (Oceans of Tomorrow (OoT): Tropos, Mermaid, H2Ocean). The projects were not successful in enabling IP derived from the projects to progress to commercialisation. These unsuccessful OoT projects have reduced EC confidence in MUS/MUP.

Combining large scale wave energy with offshore wind (either MUP or MUS) will never fully compare financially with large scale offshore wind by itself and there is no EC market where offshore wind itself will not be a competitor. The large scale wave energy sector will consistently require EC support in the medium term. Combining wave with more established wind, reduces the risk for wave development, enables learning, and conforms to EU MUS and MUP directive.

Maribe has identified that small niche MUS/MUP offerings are very attractive even at pilot scale. Both of the high ranking Maribe small scale projects displaced diesel, one from desalination, the other from aquaculture operations. The wind driven desalination project is very financially viable from all the economic benchmarks investigated, while it also addresses a very high societal challenge (water scarcity and salification, and associated socio economic challenges). Maribe strongly recommends that there should be a dedicated call for this specific combination. Maribe only explored floating wind with desalination but further evaluations can be expanded to include other renewables (e.g. wave and solar PV for example) in the most promising business models. A structured cost benefit assessment needs to be formally part of the project assessment.

Maribe case study evaluations of projects combining aquaculture with ocean energy showed them to have good financial performance, and they attracted high panellist/consortium ratings. The mature aquaculture sector assisted derisking the less mature ocean energy by ensuring good financial returns for the combined projects. Aquaculture benefits from using green powered electricity thereby increasing its public image. Incorporating ocean energy is also relatively easy for aquaculture, and increases its position within the MSP directives, leasing/licencing etc.

Maribe had the opportunity of exploring large scale shipping terminals MUP which had not been explored in previous FP7 or H2020 projects due to their large scale €bn required. These MUP platforms providing services to the combined Blue Growth sectors surrounding them, for example habitation, storage, and processing facilities. These projects take the form of public-private partnerships which cannot easily be directly compared with the most private output-driven Maribe projects (energy/fish outputs). These large scale public projects can have an impact on the host nation by providing transnational cooperation benefits for trade and facilitate other offshore sectors and state agencies by providing offshore base. In conclusion, the large scale floating platforms could enable the movement and expansion of the onshore economy offshore and trigger the development of new blue economy activity. However, it should be realised that the cost base of such projects will be higher than traditional on-shore ports and it will be difficult for them to compete on a purely economic basis with existing facilities.

### **In summary,**

Maribe has identified a range of MUS and MUP combinations that have the potential to be economically viable at 3rd phase of commercial deployment. The results should give confidence to the EC to pursue policy to promote appropriate MUS and MUP combinations both in the Strategic Energy Technology Plan (SET-Plan) and continued funding for MUS and MUP in H2020 . EC's drive to promote Multiple-use of space (MUS) (an important part of the Marine Spatial Planning directive) and multi-use platforms (MUP) has been justified by the positive outcomes from the Maribe evaluation.

*Maribe recommends three EC driven initiatives:*

1. The first, is further CSA Maribe type projects to continue explore the financial viability of MUS/MUP and provide further business accelerator support to a host of projects.
2. The second is to recommend that the EC set aside a pot of funding for the next stage of future EC funding calls in BG. Blue Growth projects would range from small autonomous projects to larger scale prototype machines and combinations. Maribe recommends a total fund size of €35M in

2017/18 H2020 calls. The funding would enable pilot deployments, and explore financial instruments for large scale roll-out of the projects.

3. Maribe also recommends that further exploration should be conducted into the feasibility of tapping into regional infra structure fund, EIB and public private partnership funds to fund large budget pilot projects (outside the scope of H2020 funds) and ultimately commercial projects.