OCEANS OF TOMORROW: OVERVIEW OF FP7 MULTI-USE OF SPACE AND MULTI-USE PLATFORM PROJECTS

PEDRO DÍAZ SIMAL

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 652629

MARIBE Overview

- MARIBE is a Horizon2020 project that aims to unlock the potential of multi-use of space in the offshore economy.
- This forms part of a long-term Blue Growth strategy to support sustainable growth in the marine and maritime sectors as a whole.
- Led by a consortium of 11 partners. Coordinated by University College Cork with partners from the UK, Netherlands, Italy, Belgium, Spain and Malta.

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Objectives of the Analysis

- Assess key projects that focus on multi-use of space and multi-purpose platforms to ensure maximum use of their outputs, contacts, excellence, recommendations and information.

- Assessment of past Oceans of Tomorrow Project plans (MERMAID, TROPOS and H2Ocean), including financial excels and business plans.

- Create a report with findings of the analysis, particularly regarding the viability of the financials and business plan and provide solutions where possible.

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Tasks involved

- TASK 5.2. Assess key projects that focus on multi-use of space (including H2Ocean, TROPOS, MARINA and MERMAID).

- TASK 9.4 Assessment of past Oceans of Tomorrow Project plans
  - T9.4.1 Assess the financial excels of MERMAID, TROPOS and H2Ocean
  - T9.4.2 Assess the business plans of MERMAID, TROPOS and H2Ocean
  - T9.4.3 Create a report with findings of the analysis, particularly regarding the viability of the financials and business plan and provide solutions where possible.

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D5.1. Report on the Oceans of Tomorrow Projects


MARIBE

MARIBE
Marine Investment for the Blue Economy

WP 5: Technical and non-technical challenges, regional and sectoral

Deliverable D5.1

Review of multi-use and multi-purpose platform projects

Status: Final

07/09/2015

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- Main description (title, initial and final date, total cost, EU contribution).
- List of members and partners.
- Main objectives.
- Project structure (work packages).
- Deliverables summary, classified into technical, environmental, socio-economic or financial.
- Developed concepts summary, with:
  - Concepts description.
  - Full technical specifications.
  - Socio-economic results.
  - Environmental analysis.
  - Economic results.

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D9.4. Economic assessment of ocean of tomorrow projects


MARIBE
Marine Investment for the Blue Economy

WP 9: Group consultation Think Tank

D9.4 – ECONOMIC ASSESSMENT OF OLD OCEAN OF TOMORROW PROJECTS

Status: Final

Version: 005

01/07/2016

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- Projects descriptions and its financial information
- Normalised data by sector
- Financial analysis by project
- Sensitivity analysis
- Risk analysis

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METHODOLOGY

- Review available information from projects' plans.
- Homogenize available information.
- Perform financial assessment.
- Perform sensitivity analysis.
- Perform risk assessment.

OUTPUTS

- Normalized flows.
- Financial NPV and rate of return.
- Critical parameters of each project.
- Probabilistic distribution of the FNPV.

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NORMALISATION OF PROJECT'S FLOWS

- Aquaculture
- Energy
- Leisure
- Container

	Parameter	Normalised value	Reference		Common value range (ref)
TROPOS Aquaculture					
European Seabass	Production	152.1 ton/cage year	n.a.	in-project internal data	
	Price	825 €/ton	n.a.	in-project	
Meagre	Production	152.1 ton/cage year	n.a.		
	Price	1 043 €/ton	n.a.		
Greater Amberjack	Production	146 ton/cage year	n.a.		
	Price	1 365 €/ton	n.a.		
Total	CAPEX	5 094.18 €/ton	n.a.		
	OPEX	7 651.71 €/ton year	n.a.		

MERMAID Atlantic Ocean				
Wind+Wave	Power Installed	616 MW	n.a.	in-proje interna data
	Production	887 040 MWh/year	n.a.	in-proje interna data
	Price (8 first years)	150.0 €/MWh	n.a.	in-proje interna data
	Price (after 8 years)	170.0 €/MWh	n.a.	in-proje interna data
	LCoE	167 €/MWh	n.a.	in-proje interna data
	CAPEX (mix)	3 664 683 €/MW	n.a.	in-proje interna data
	OPEX (mix)	46 926 €/MW/year	n.a.	in-project internal data

TROPOS Container terminal					
Container Terminal	Throughput	1 000 000 TEU/year	Ali, 2005	article	
	Transhipment	500 000 TEU/year	Ali, 2005	article	
	Price	125 €/TEU	Ali, 2005	article	
	Levelized costs				240 – 335 €/TEU (1)
	CAPEX	426.23 €/TEU	Ryu et al. 2008 Vries el al. 2011 De Alegría et al. 2009 Other commercial reports	article, reports	135 – 530 €/TEU (1,2,3)
	OPEX	26.07 €/TEU year	Ryu et al. 2008 Vries el al. 2011 De Alegría et al. 2009 Other commercial reports	article, reports	21.8 €/TEU year (2)

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	Price (after 8 years)	170.0 €/MWh	n.a.	in-project internal data	
	LCoE	167 €/MWh	n.a.	in-project internal data	100 – 190 €/MWh (1)
	CAPEX (mix)	3 664 683 €/MW	n.a.	in-project internal data	
	OPEX (mix)	46 926 €/MW/year	n.a.	in-project internal data	

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Greater Amberjack	Production	146 ton/cage year	n.a.	in-project internal data	
	Price	1 365 €/ton	n.a.	in-project internal data	
Total	CAPEX	5 094.18 €/ton	n.a.	in-project internal data	1.87 – 9.41 €/kg (*)(1-5)
		7 651.71 €/ton		in-project	1.74 – 7.65 €/kg

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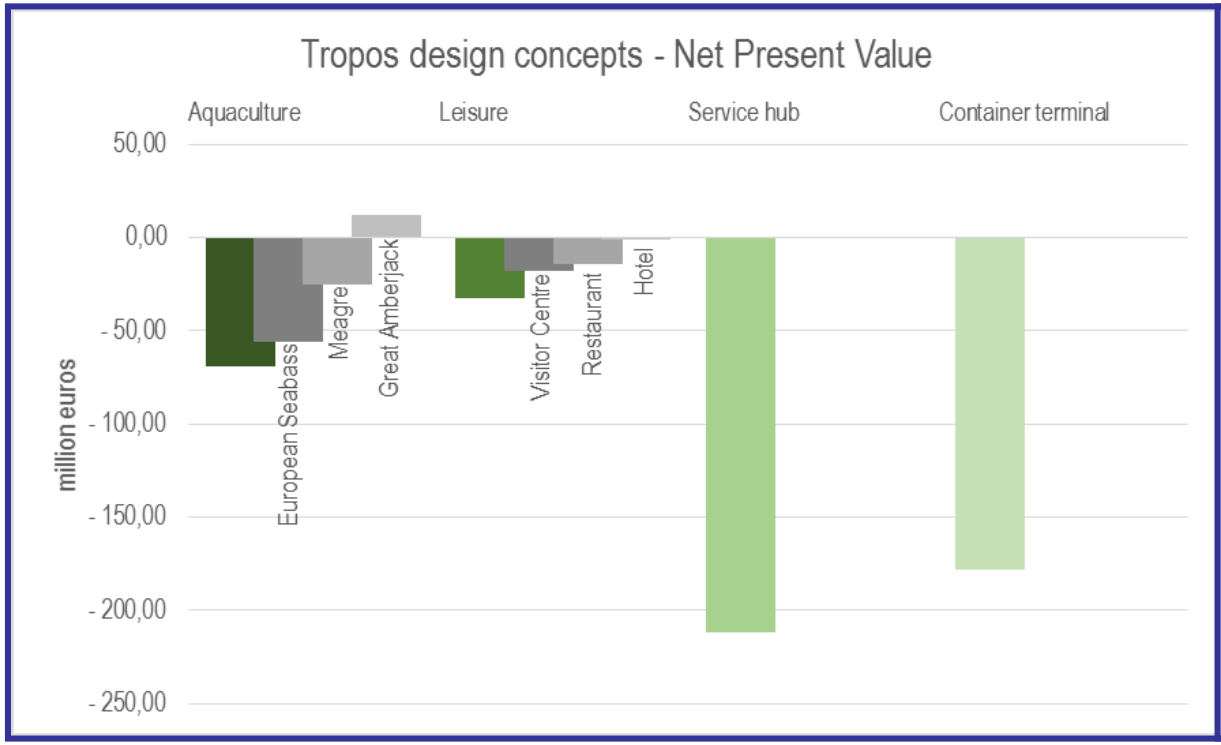
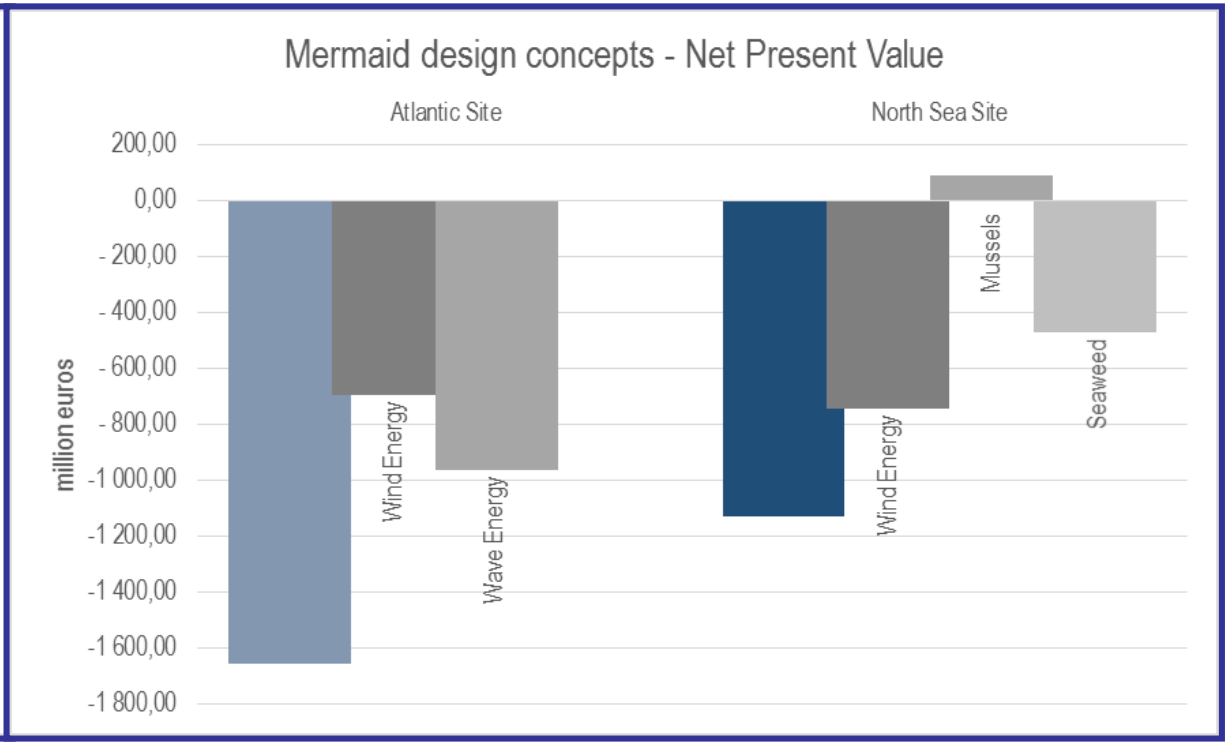
FINANCIAL ANALYSIS





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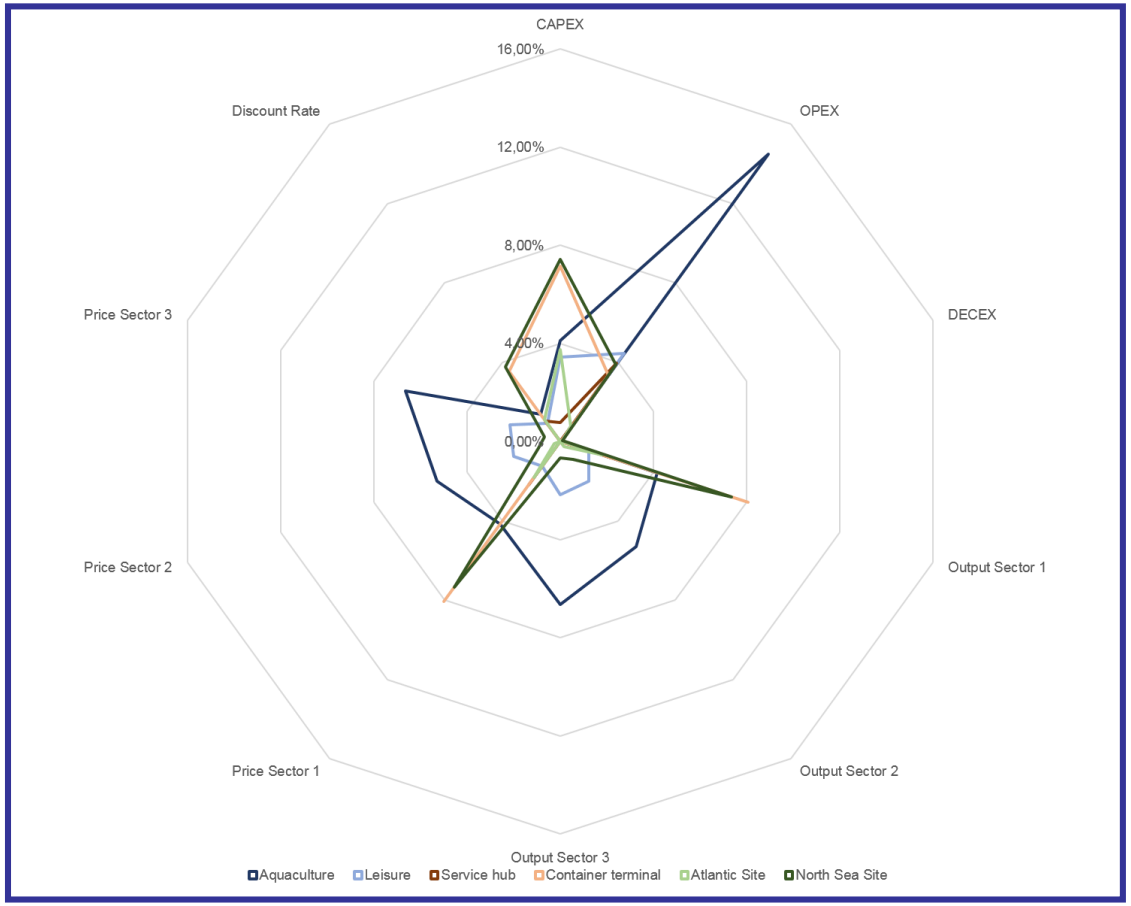
SENSITIVITY ANALYSIS



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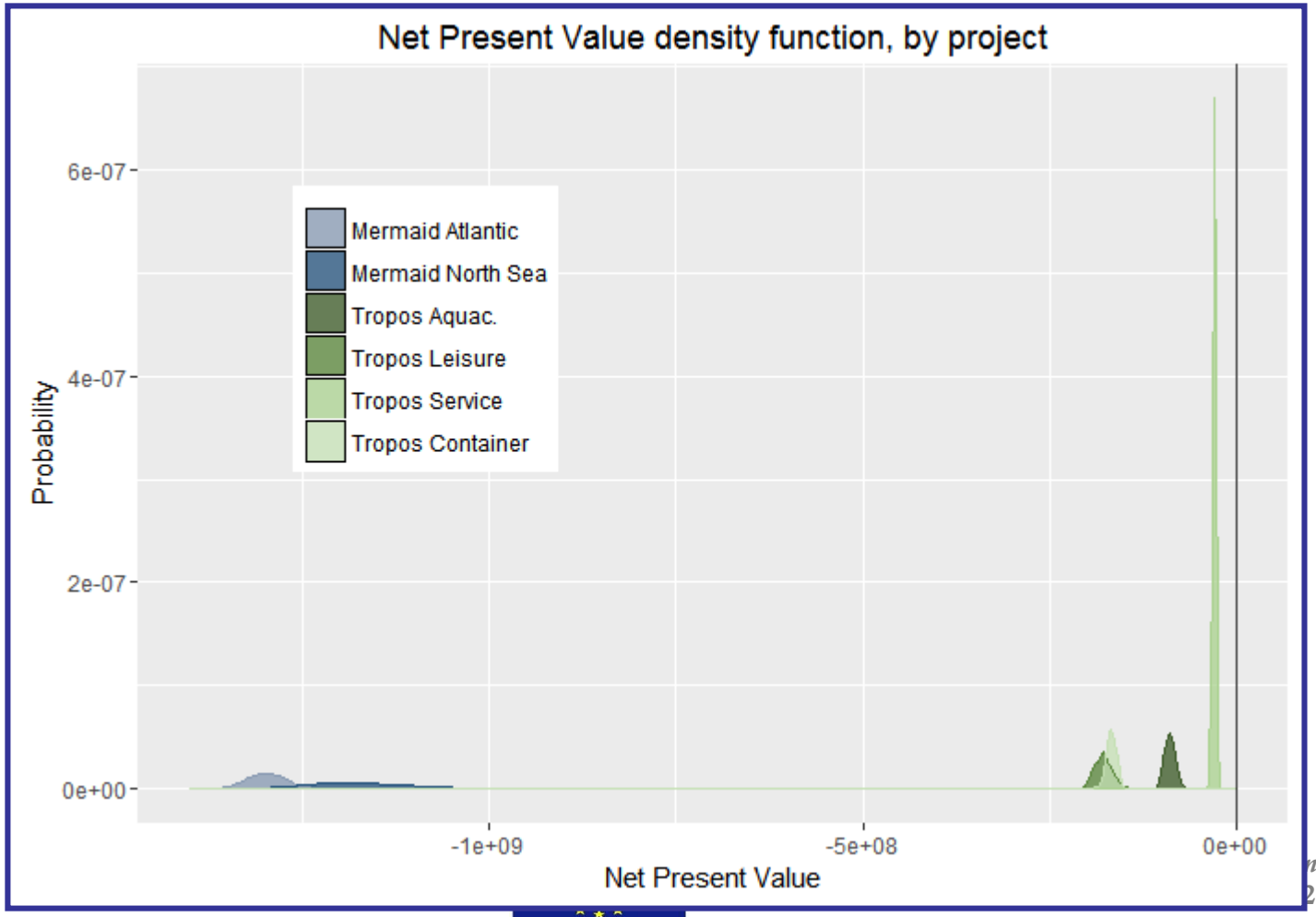
RISK ANALYSIS



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Conclusions (1)

- Most of the data used in the projects fit with the most common values of these parameters found in the literature. In some sectors there is a lack of references so no detailed analysis is possible.
- A direct comparison between data is not possible, due to the different characteristics of each project.
- For energy sector projects, it can be seen that CAPEX varies from 3.66 mill€/MW from Mermaid Atlantic to 4.66 mill€/MW from Mermaid North Sea, with a value for Tropos of 4.16 mill€/MW. The production of each proposal varies from 1 796 000 MWh/year in Tropos project with 500 MW installed, to 2 600 000 MWh/year for Mermaid North Sea with 600 MW installed, and 887 040 MWh/year for Mermaid Atlantic with 616 MW installed.
- In the case of aquaculture, CAPEX shows wider variations, from 5 094.18 €/ton in the case of Tropos to 145.83 – 229.17 €/ton for mussels or 262.50 – 5 000 €/ton for seaweed in Mermaid North Sea. The rest of the parameters (OPEX, production or selling price) also show important variations, but this could be clearly explained in the fact that very different species are considered (seabass, meagre, amberjack, mussels or seaweed).

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Conclusions (2)

- No concept design in either Tropos or Mermaid was profitable. (H2Ocean was separated from analysis due to their preliminary analysis which gave a NPV of -21.6 billion €, out of range with the rest of the projects.)
- Although all of them result being non profitable, Tropos numbers are better than Mermaid's. But as Mermaid is focused on energy sector, and as this sector is highly dependent on subsidies and energy tariffs, a change in the situation of the project (i.e. UK) could result in a change in revenues that make projects profitable.
- In the Tropos project, if the production of Great Amberjack is the sole aquaculture species modelled, an overall positive NPV is resultant.
- In the Mermaid North Sea, a positive NPV is resultant if only mussels' cultivation is modelled.
- In the Tropos project, a positive NPV is resultant if the Hotel business case is kept, and removal of the service hub and restaurant.

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Conclusions (3)

- The quality and detail of the data used for the analysis could be considered “limited”. However, a high level of detail in the financial analysis has been followed. To reach it, some considerations and assumptions needed to be done. If the results of the use of these hypothesis differ considerably from the reality, the final financial results here presented could be significantly different.
- The cost structure models created in each project to assess their financial viability are extremely opaque, so identifying the data for the homogenous financial analysis here performed has been a hard exercise. The lack of references in some cases limit the contrast of the data used. The results obtained rely on the data used, which could be as opaque as the models and information presented by the projects.
- When asked about the non-viability of the projects (high negative NPV in the case of Mermaid project), members of the teams stated that the projects were focused in analyzing the technical viability of the solutions and concepts performed, but not to achieve their financial viability. First question to address should be “if it is possible to make” and then, at a second stage “if it is viable”. This second question was not a main objective for the projects, which could explain the negative results.

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LINKS

How to access the deliverables

MARIBE website

- (link) D5.1. Report on the Oceans of Tomorrow Projects.
- (link) D9.4. Economic assessment of ocean of tomorrow projects

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