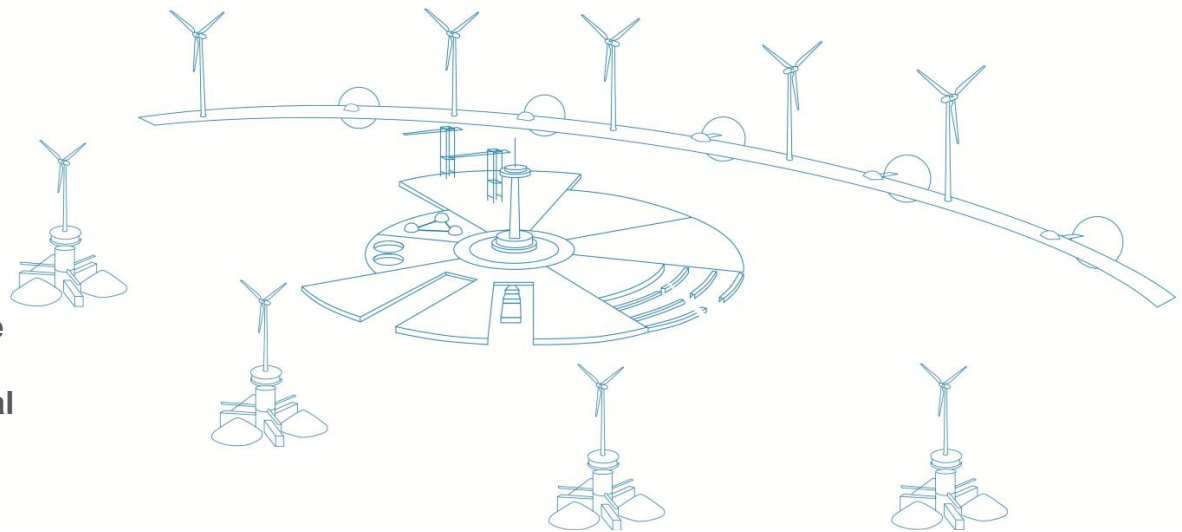




Modular multi-purpose offshore platforms, the TROPOS Project Approach

Joaquin Hernández Brito
Project Coordinator

Modular Multi-use Deep Water Offshore Platform Harnessing and Servicing Mediterranean, Subtropical and Tropical Marine and Maritime Resources.



The TROPOS Project

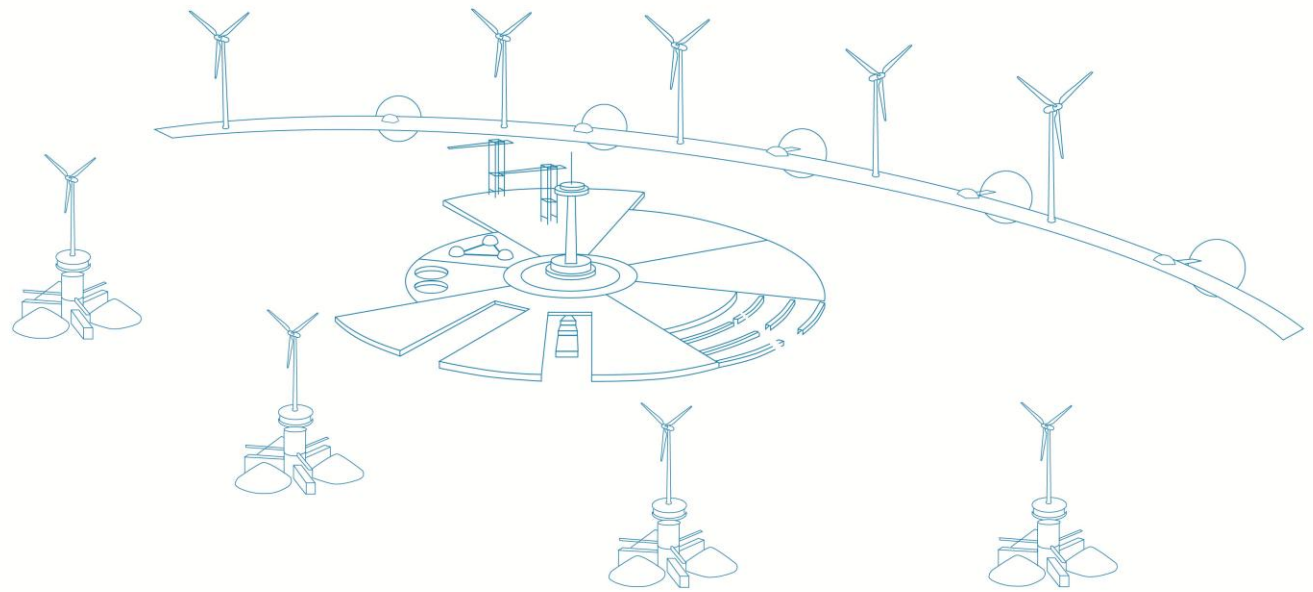
Project cofinanced by the European Commission under the Seventh Framework Programme



CONTENT

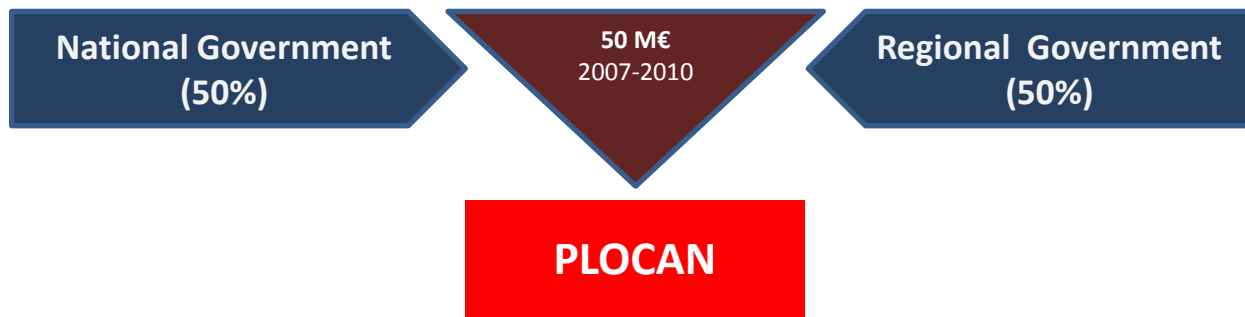
1. Introduction
2. Challenges
3. Objectives
4. Consortium
5. Plans
6. Deliverables
7. Vision and Progress

INTRODUCTION



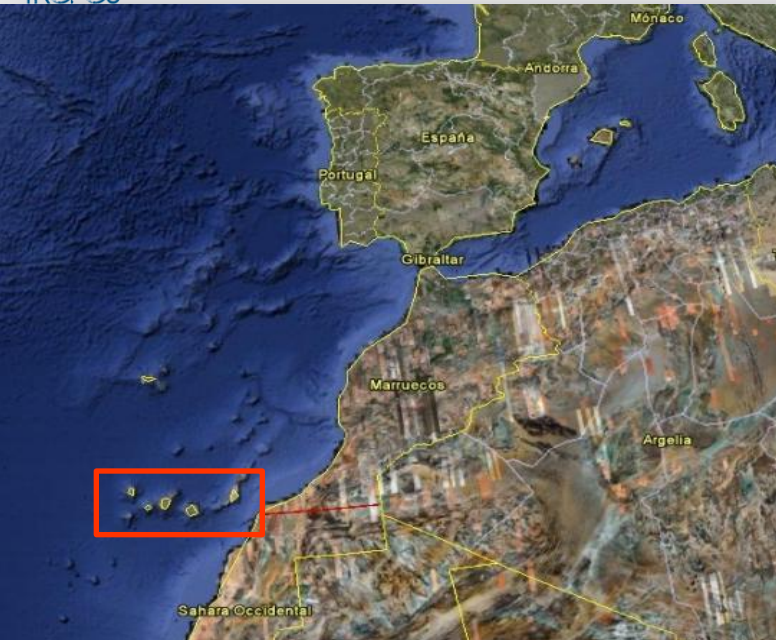


The **project** is sponsored by the Public Consortium Canary Islands Oceanic Platform(PLOCAN), held 50% by the Ministry of Economy and Competitiveness (MINECO) and the Autonomous Government of the Canary Islands

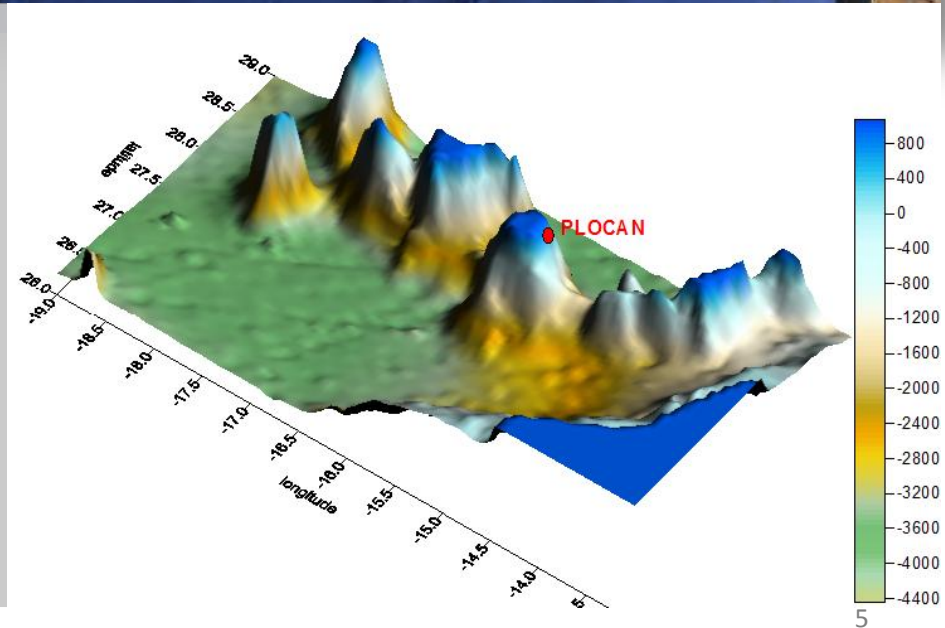
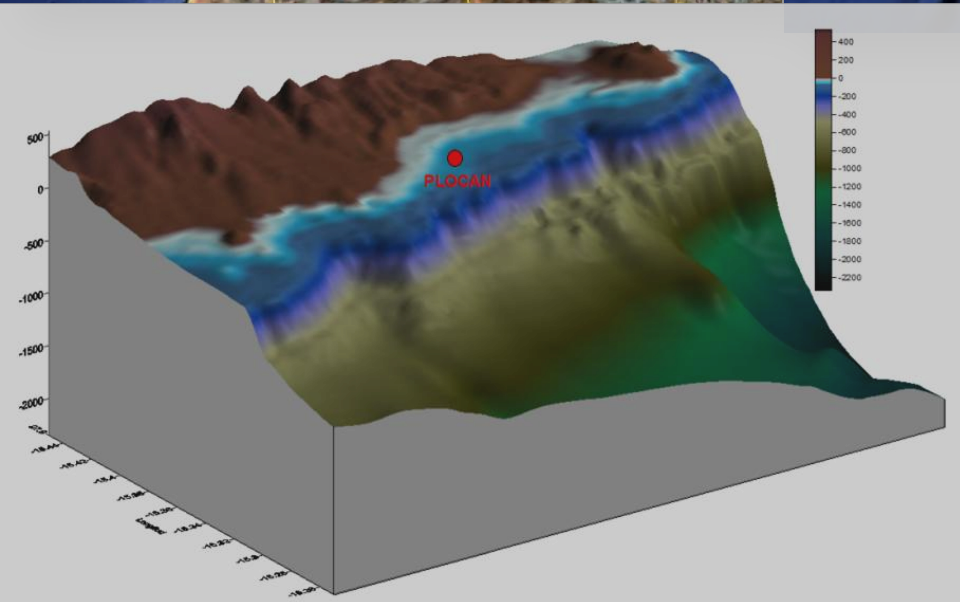


- The main objective in the PLOCAN's project is the **design and construction** of an offshore platform which aim is the investigation in the marine science and technologies.
- The PLOCAN Platform will be a fixed structured located off the East coast of the Canary Island, in a distance from the coast of 4km, in depths around 30m.

INTRODUCTION - Where are we?



The Canary Islands





2007	Establishment of the Consortium	✓
2011	Implementation of a public tendering process for management and construction	✓
2012	Adjudication and start of phased construction	
2013	Coming into operation	

*The TROPOS Project plays a key role in the PLOCAN Strategy.
The design of a multi-use offshore platform will be conducted
parallel to the construction of the PLOCAN Platform*

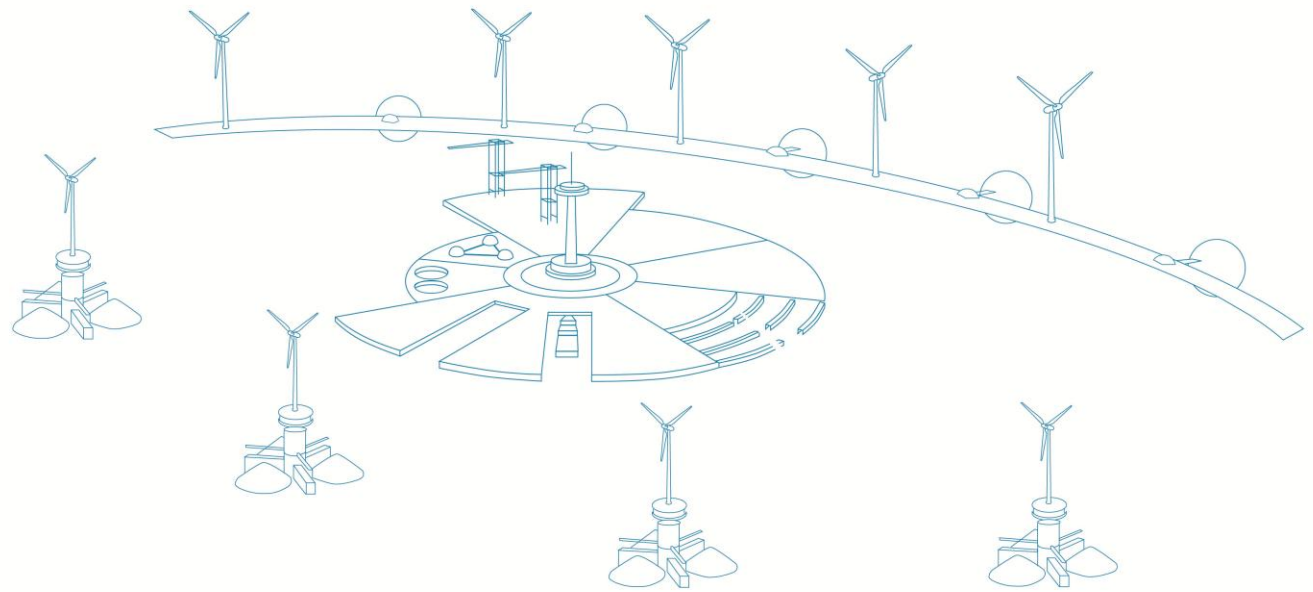


- Year 2005 → More than half of the population lives within 200 km of the coast
- Year 2025 → Number of citizens living in these areas will be doubled

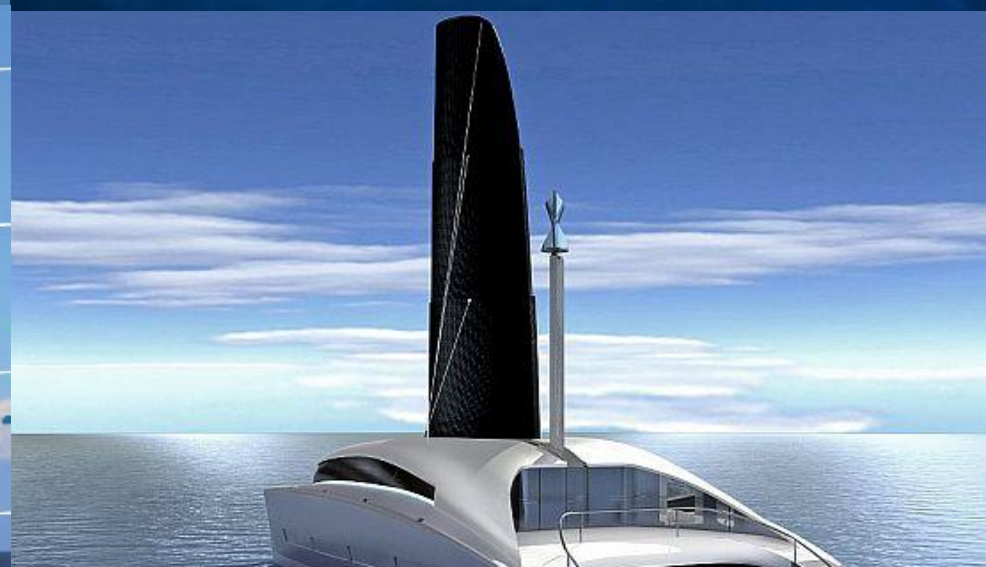
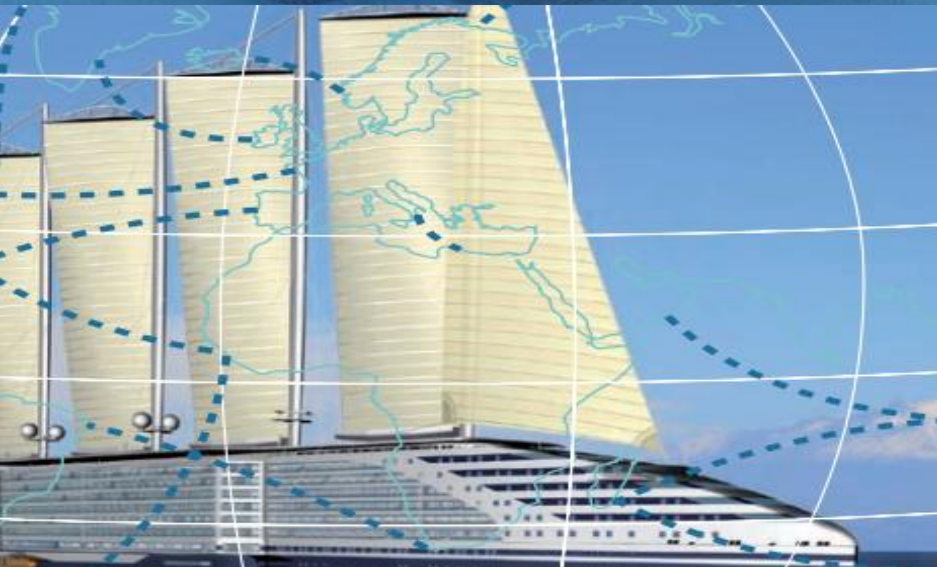


Challenge: To share sites, infrastructures and costs in diverse activities to be implemented offshore, such as transport, energy, aquaculture or leisure → Multi-Use Oceanic Platforms Concept

CHALLENGES



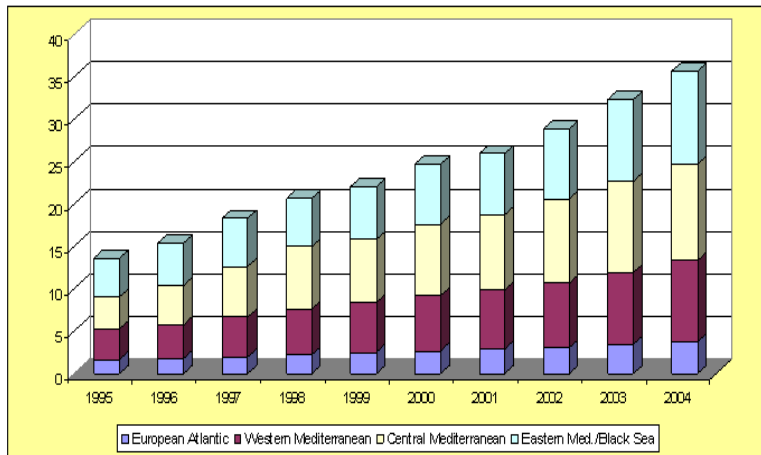
Maritime Transport





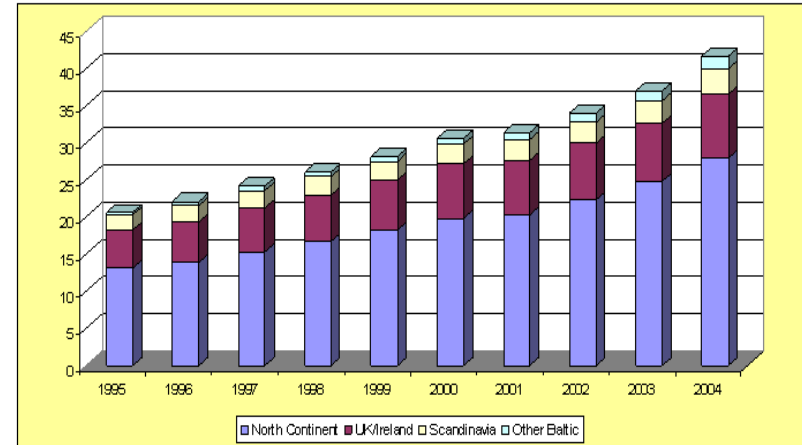
Transport evolution

Container throughput by port region in Southern Europe / Mediterranean (m TEUs)



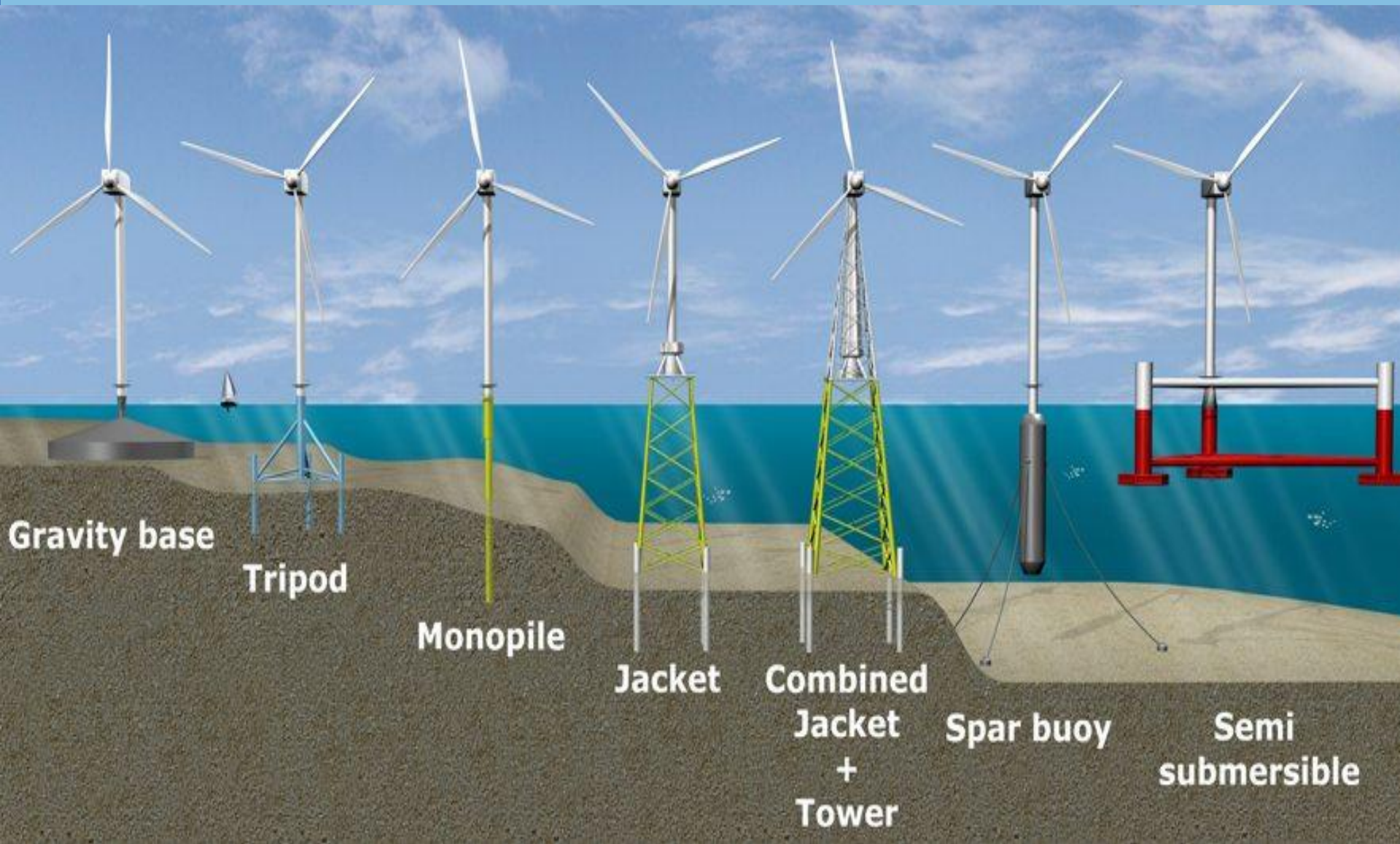
Source: OSC European Container report Outlook to 2015, p. 53

North Europe: Container throughput by port region (m TEUs)



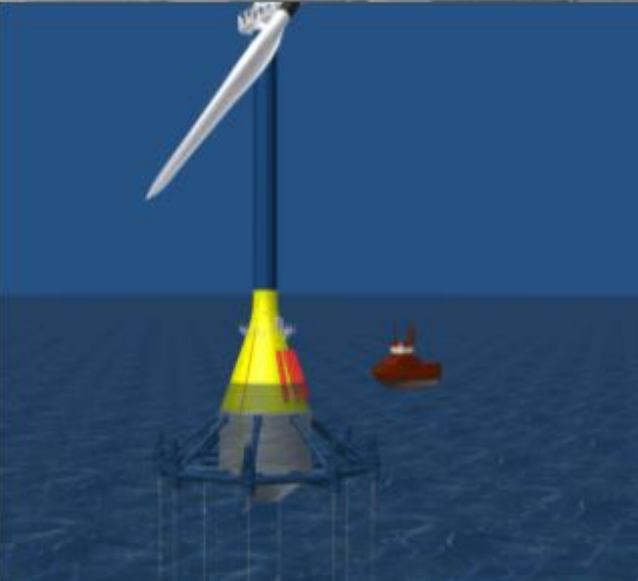
Source: OSC European Container report Outlook to 2015, p. 38

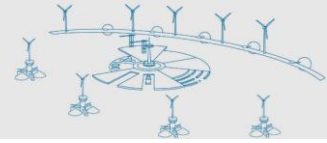
Renewable energies





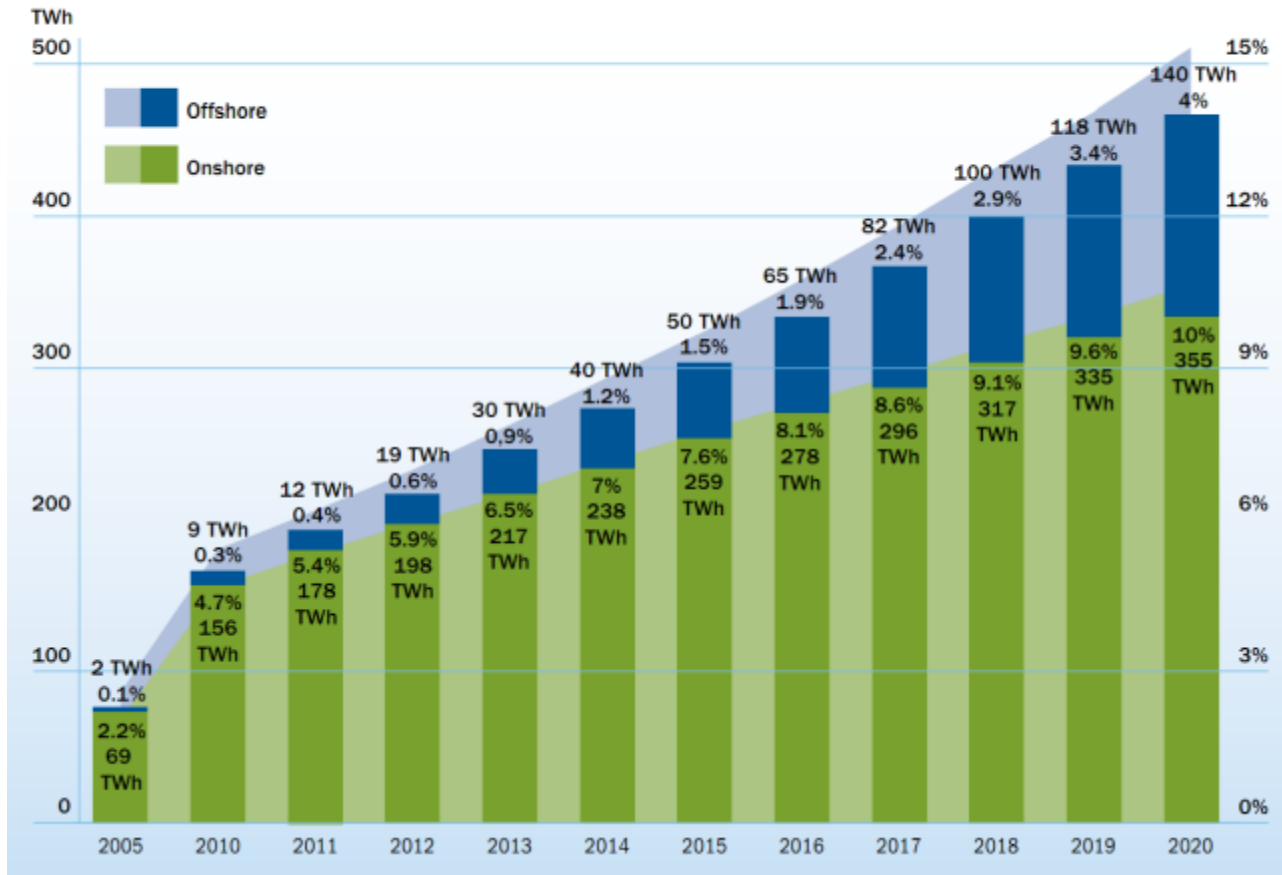
Offshore Renewable Energies





Wind Power - 2020 Target

FIG 13: WIND POWER PRODUCTION IN THE EU – TWh/SHARE OF CONSUMPTION ACCORDING TO THE NREAPS



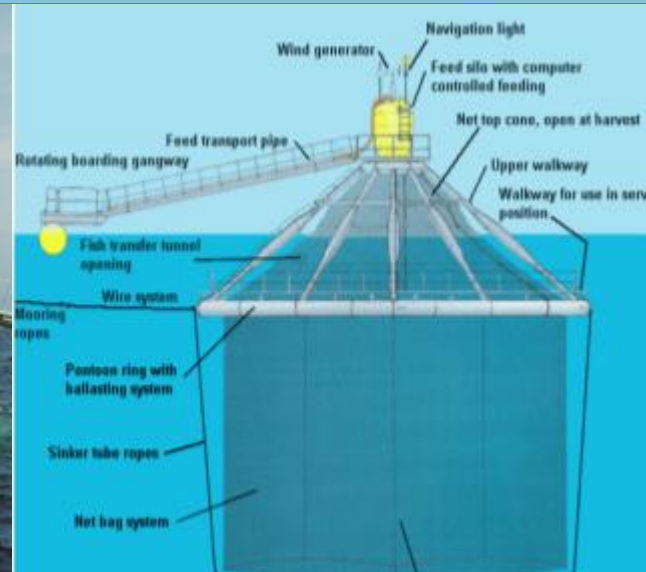
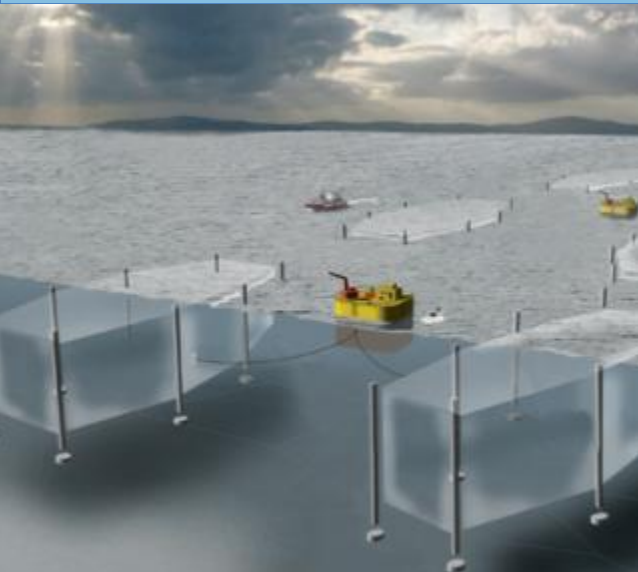


Energy evolution



The annual **offshore** wind capacity will increase steadily from 1.1 GW in 2011 to 6.5 GW in 2020, an average net **increase of 21.5% per year**

Offshore Aquaculture





Aquaculture evolution

Global Aquaculture Production (includes plants)

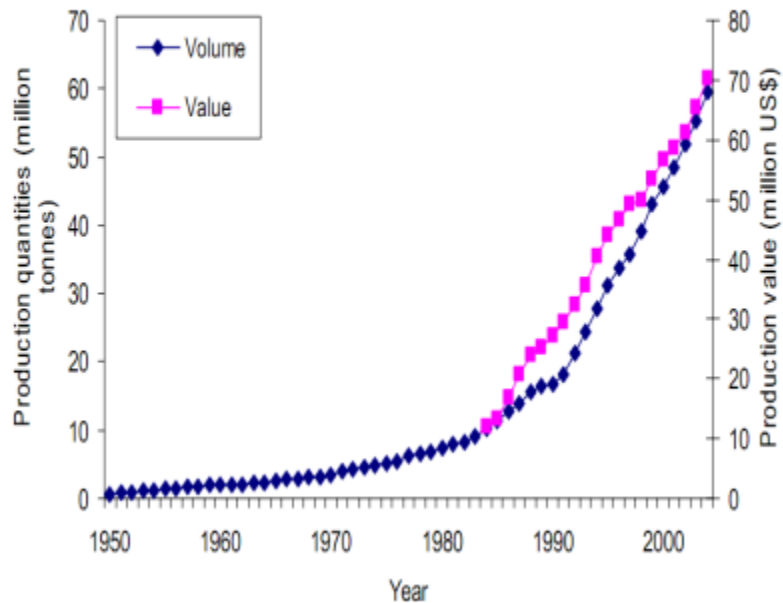
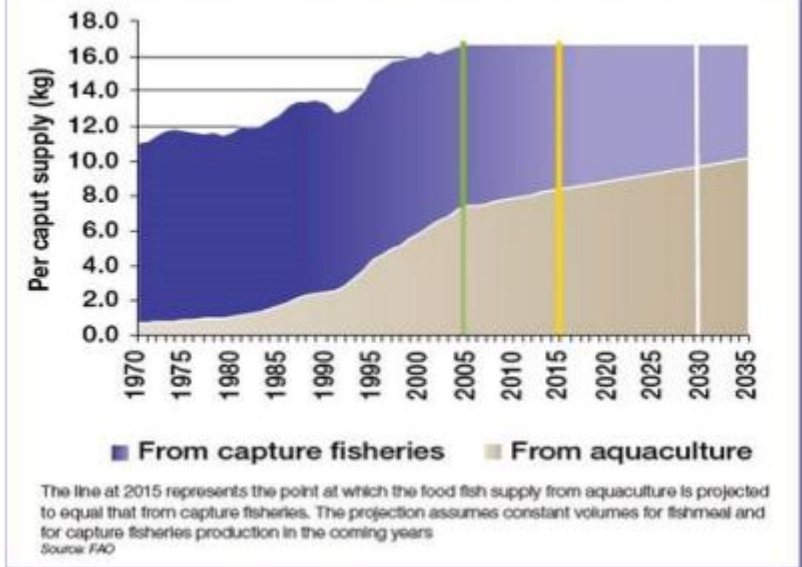


Figure 1: Projected supply of food fish originating from aquaculture and capture fisheries, 1970-2035

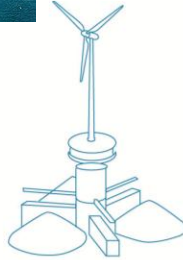
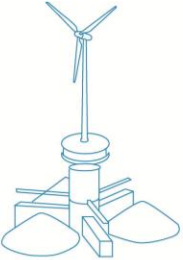
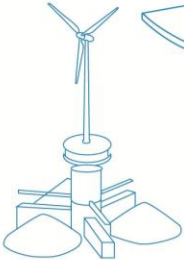
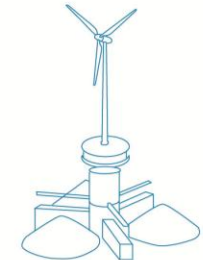
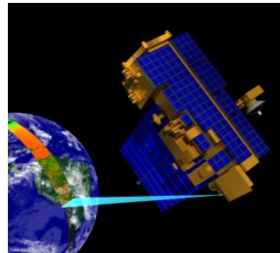
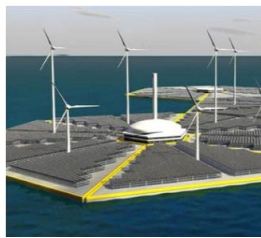


Leisure





Multi-use oceanic Platform - Hybrids, synergies - Why not?, Business model



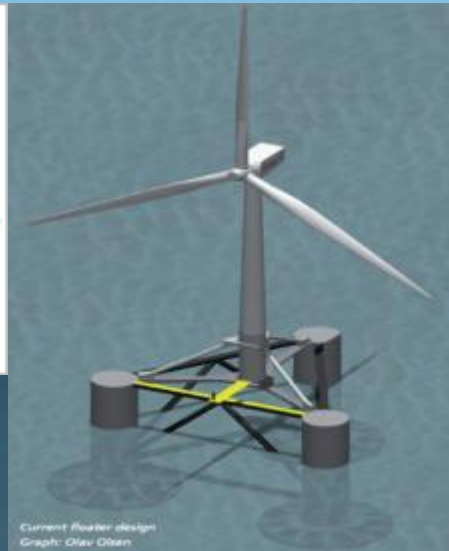
ENERGY

TRANSPORT

AQUACULTURE

TOURISM

Building the future



HiPRWind

High Power,
High Reliability Offshore
Wind Technology





“Bring together research efforts to face the challenges in ocean management”



OCEAN.2011-1: Multi-use offshore platforms

Directorates concerned:

- Transport
- Energy
- Food, Fisheries and Biotechnology
- Environment

- Develop new and innovative designs for multi-use platforms
- Assess the technical, economic and environmental viability to build, set into motion and dismantle multi-use platforms, together with the related transport issues
- Platforms should focus on renewable oceanic energy, in particular:
 - Offshore wind
 - Aquaculture
 - Services related to maritime transport

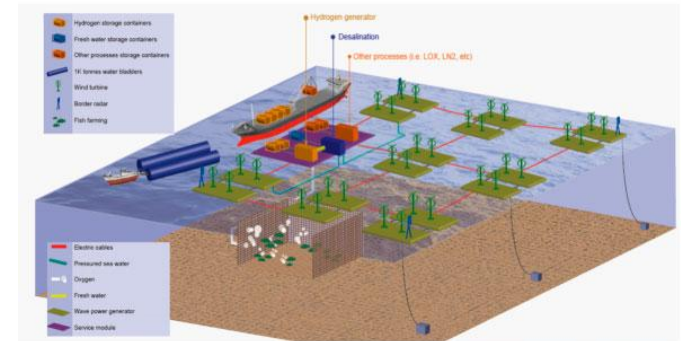


3 funded projects



H2OCEAN DEVELOPMENT OF A WIND-WAVE POWER OPEN-SEA PLATFORM EQUIPPED FOR HYDROGEN GENERATION WITH SUPPORT FOR MULTIPLE USERS OF ENERGY.

<http://www.h2ocean-project.eu>



H2OCEAN CONCEPT (©Copyright 2011 by VirtualPIE Ltd)

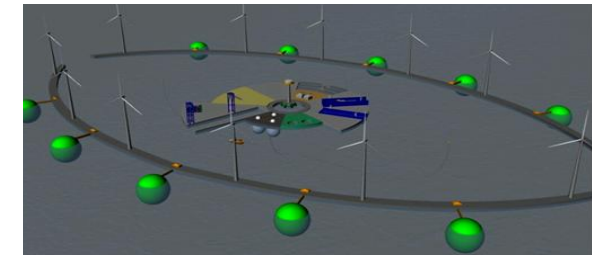


MERMAID: Innovative Multi-purpose offshore platforms: planning, design and operation

<http://www.mermaidproject.eu>

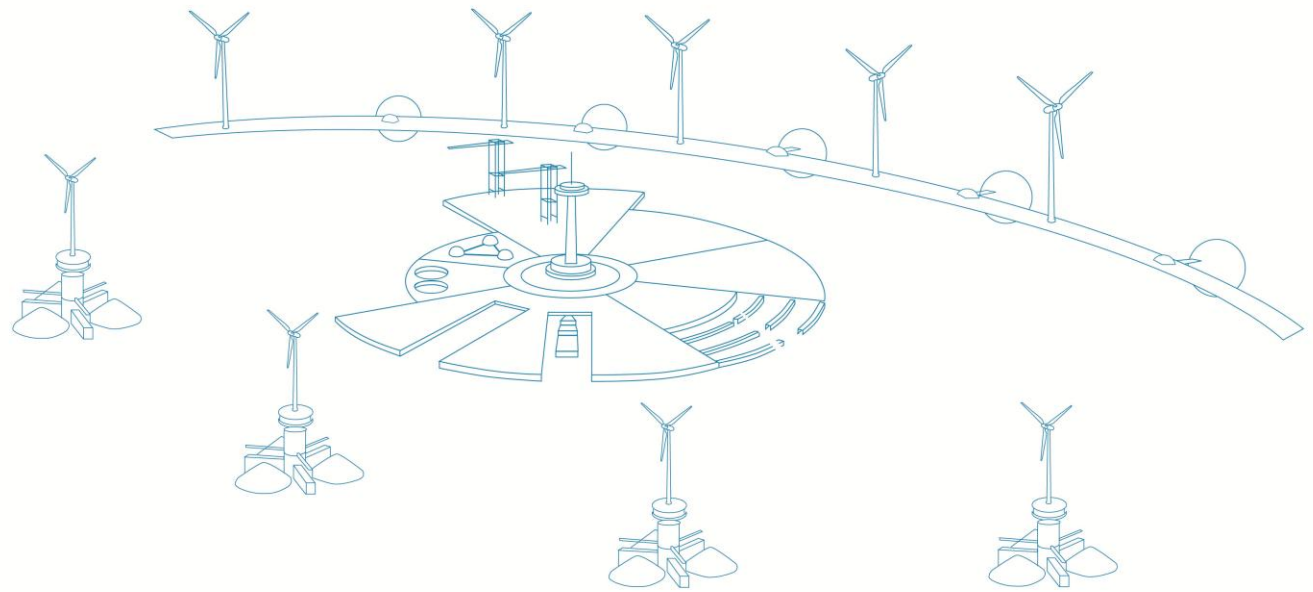


<http://www.troposplatform.eu/>



Modular multi-use deep water offshore platform harnessing and servicing Mediterranean, subtropical and tropical marine and maritime resources

OBJECTIVES





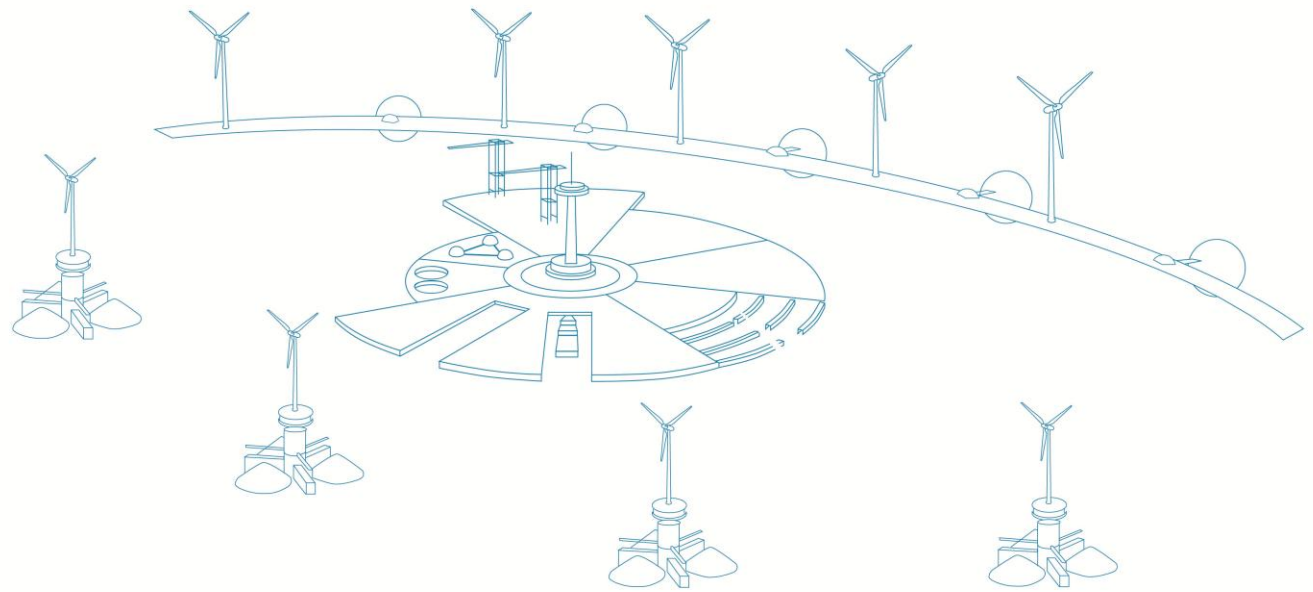
- Determine **ideal locations** for multi-use offshore platforms in tropical, subtropical and Mediterranean regions.
- **Research integration** renewable energies (wind), offshore aquaculture, maritime transport and recreational activities.
- Develop an **innovative design for a Multi-use Offshore Platform** that enables the integration of these activities.
- Develop an **innovative design for a Multi-use Offshore Platform** that enables the integration of these activities.
- Asses the **economic feasibility and viability**
- Develop **environmental impact methodology and assessment.**
- Configure **THREE COMPLETE SOLUTIONS:**
Mediterranean, Subtropics and Tropics scenarios.



Benefits

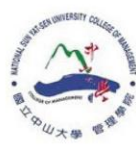
- New Business opportunities
- Cost reductions
- Efficiency
- Local Industry
- Educational opportunities
- Employment
- Synergies
- Environmental benefits
- European Strategy for Marine and Maritime Research
- Security: Energy, food, etc.
- Growth of aquaculture industry
- New green technologies
- Low carbon economy
- Strengthen role of European maritime sector
- Support the Europe 2020 strategy
- Tourism
- Eco-friendly

CONSORTIUM





Nº	Organisation	Acronym	Country
1	Plataforma Oceánica de Canarias	PLOCAN	ES
2	University of Edinburgh	UEDIN	UK
3	University of Bremen-Centre for Marine Environmental Sciences	Uni-HB	DE
4	Wave Energy Centre	WavEC	PT
5	Universidad Politécnica de Madrid	UPM	ES
6	Fraunhofer Gesellschaft zur Foerderung der Angewandten Forschung E.V.	FRAUNHOFER	DE
7	Toulon Var Technologies	PMP-TVT	FR
8	Norsk Institutt for Vannforskning	NIVA	NO
9	Danmarks Tekniske Universitet	RISØ-DTU	DK
10	Instalaciones Inabensa S.A.	INABENSA	ES
11	Phytolutions GmbH	PHYTOLUTIONS	DE
12	Hellenic Centre for Marine Research	HCMR	GR
13	National Sun Yat Sen University - Taiwan	NSYSU	TW
14	Advance Intelligent Development S.L.	AID	ES
15	Bureau Veritas	BV	FR
16	École Centrale de Nantes	ECN	FR
17	EnerOcean S.L.	ENEROCEAN	ES
18	University of Strathclyde-Fraser of Allander Institute	FAI	UK



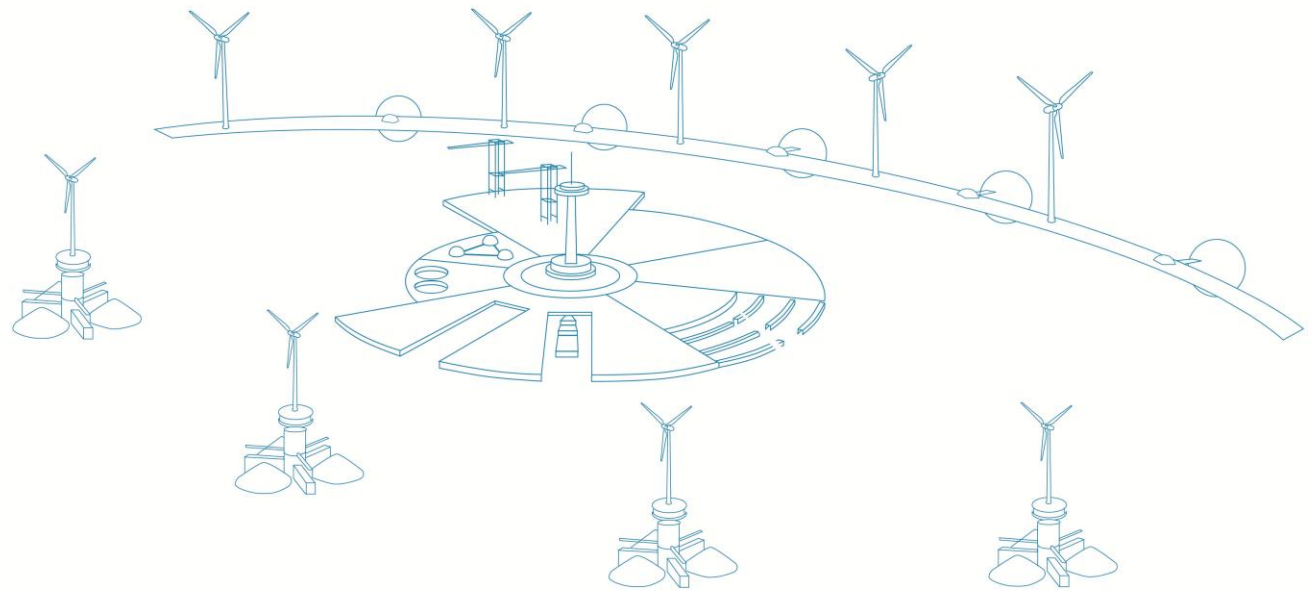


18 Partners



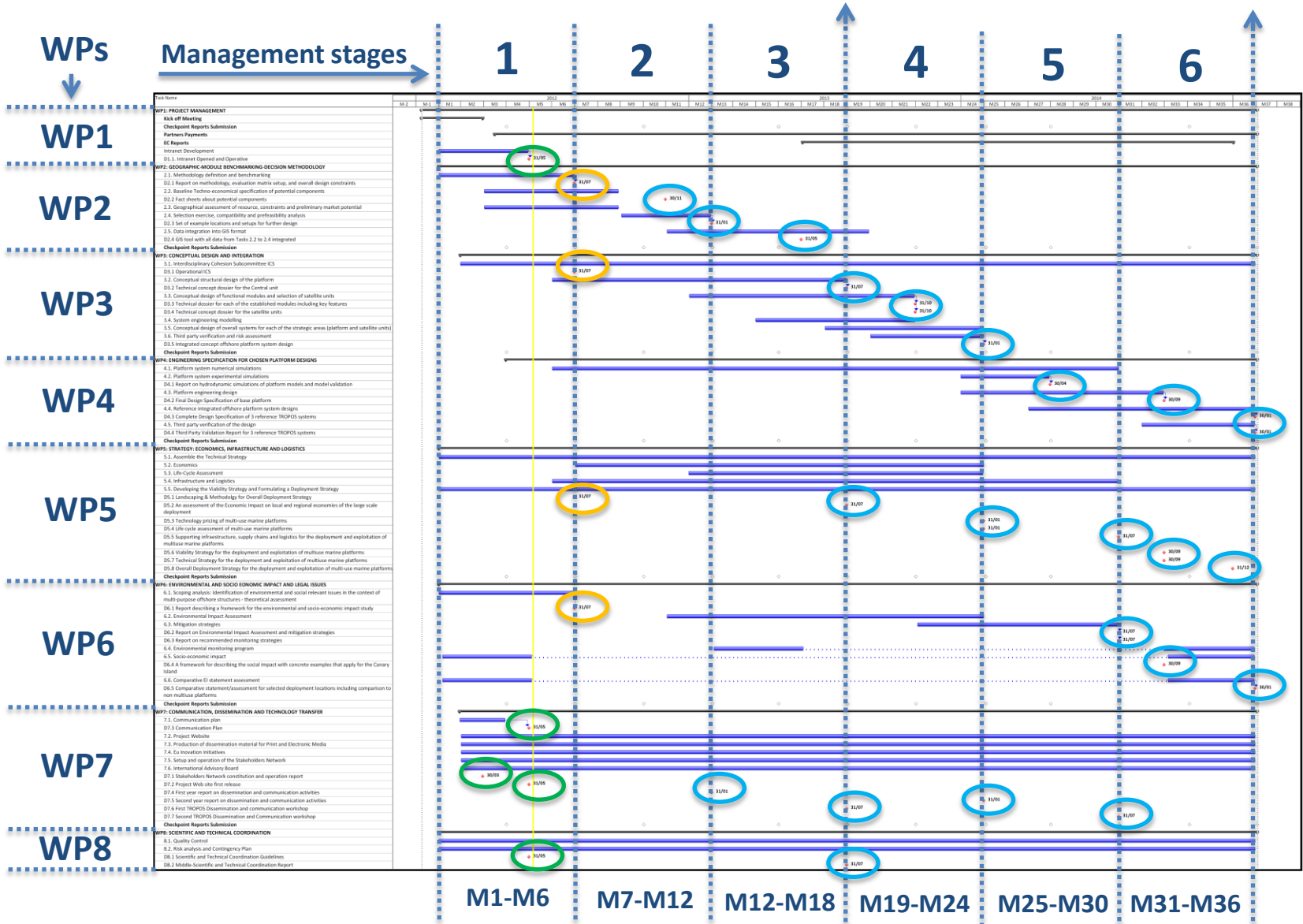
- 1 Public Consortium
- 1 Association
- 7 Universities
- 3 Research Organizations
- 2 Enterprises
- 4 SMEs

PLANS





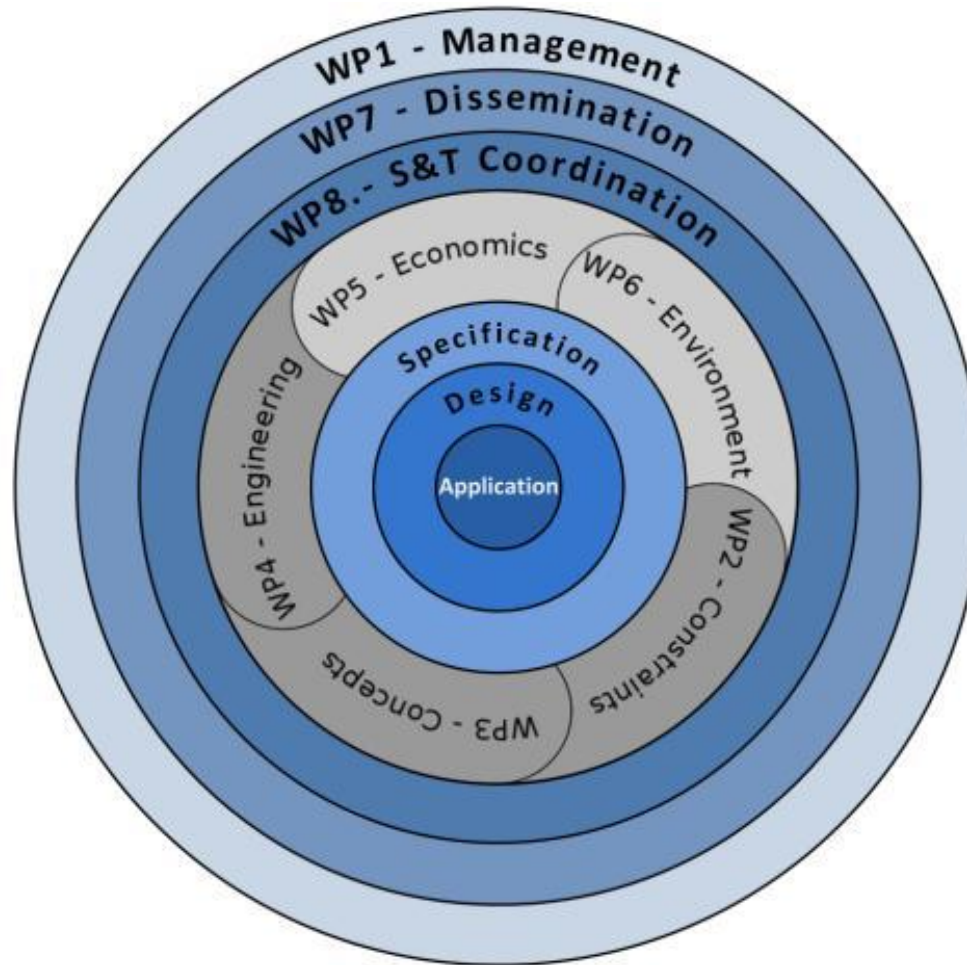
Work plan – 36 months



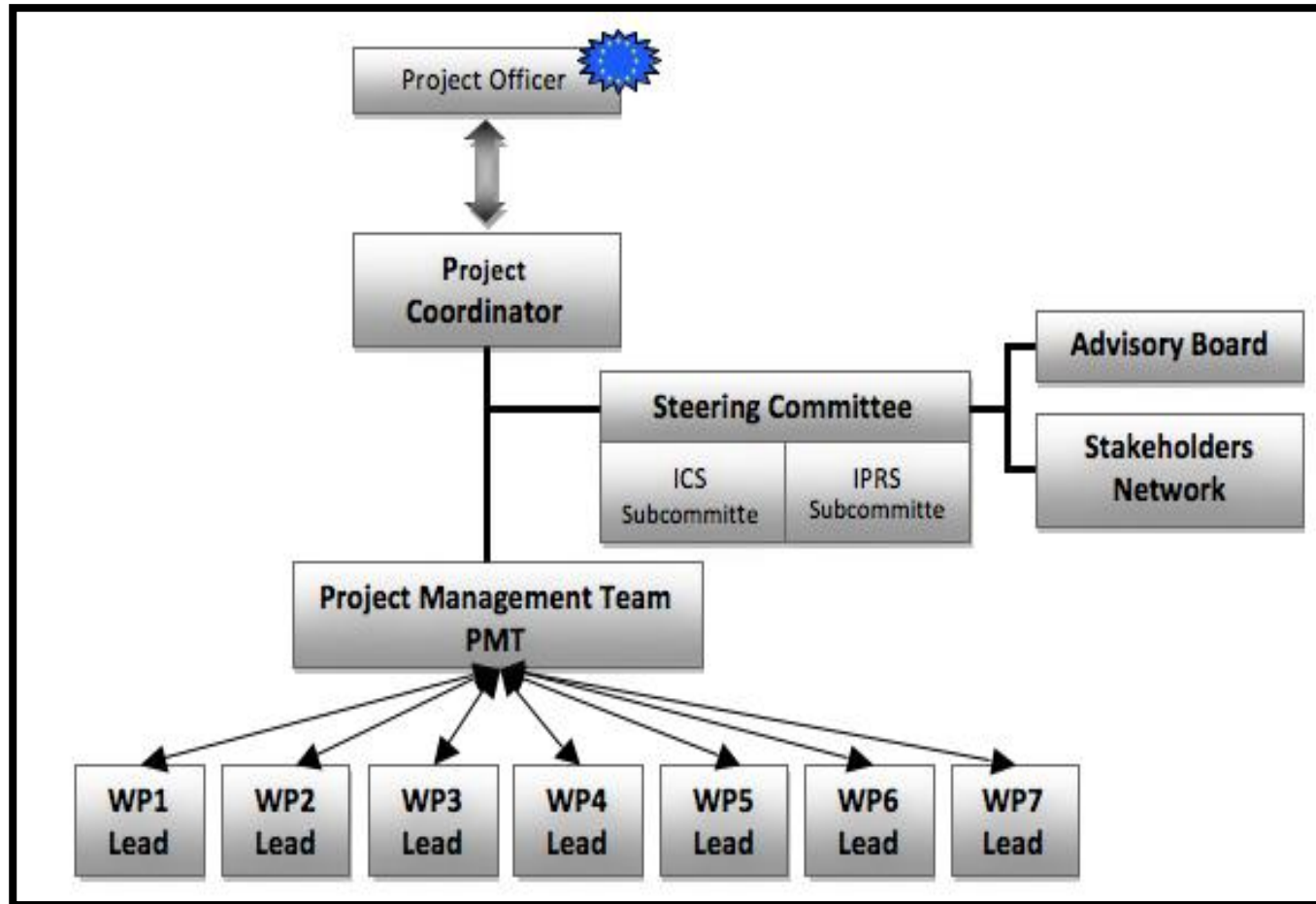


Work packages

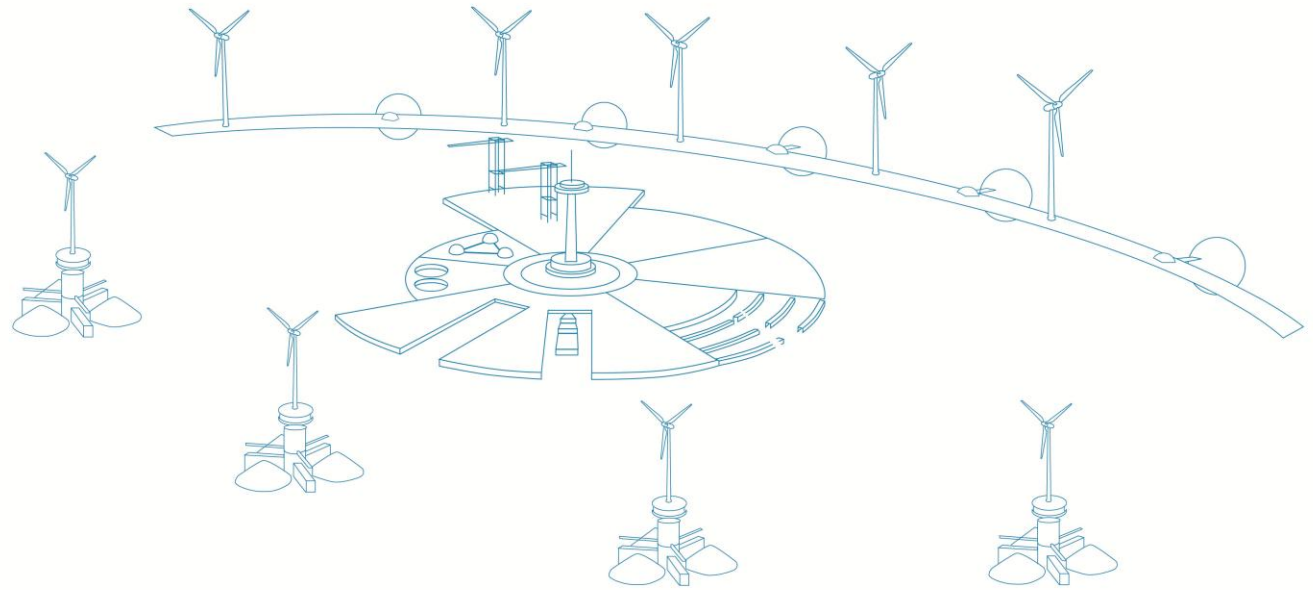
The entire project team will keep a focus moving from concepts to design to application



Project Management Structure



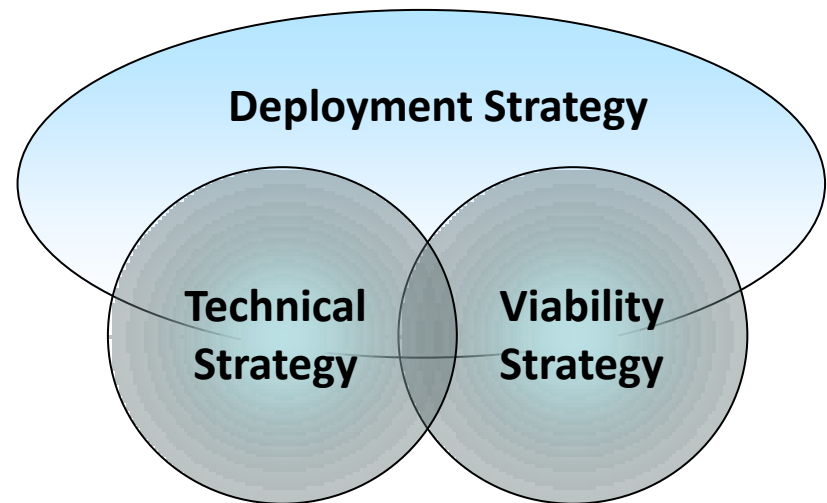
DELIVERABLES



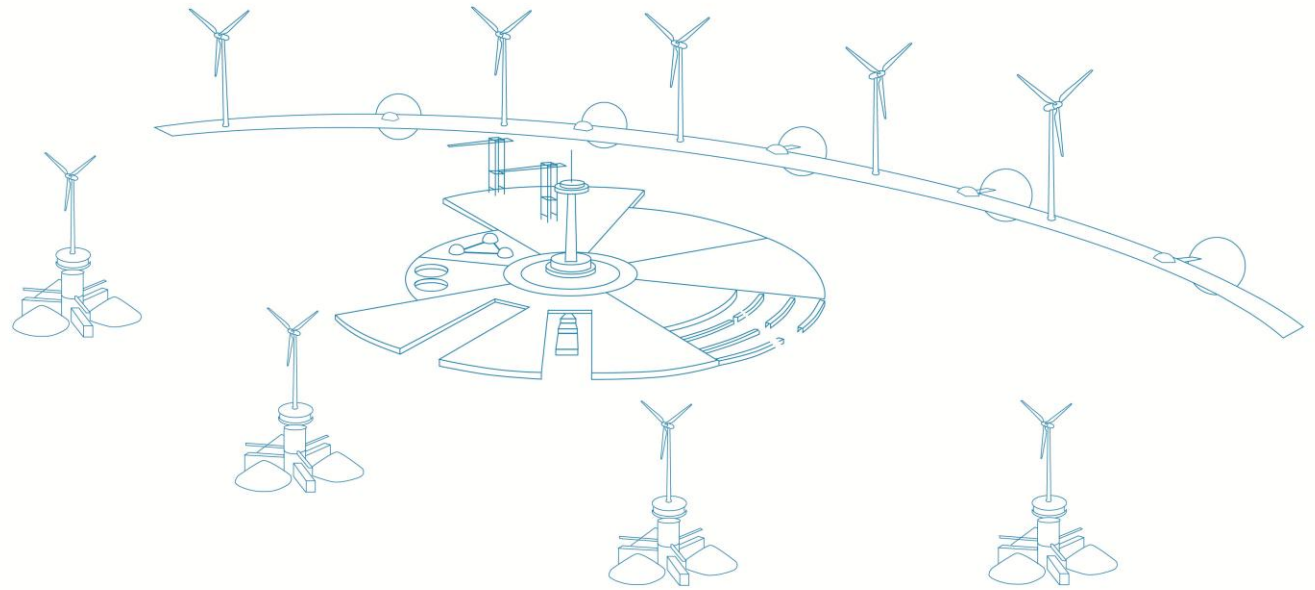


Focused on delivering products - General

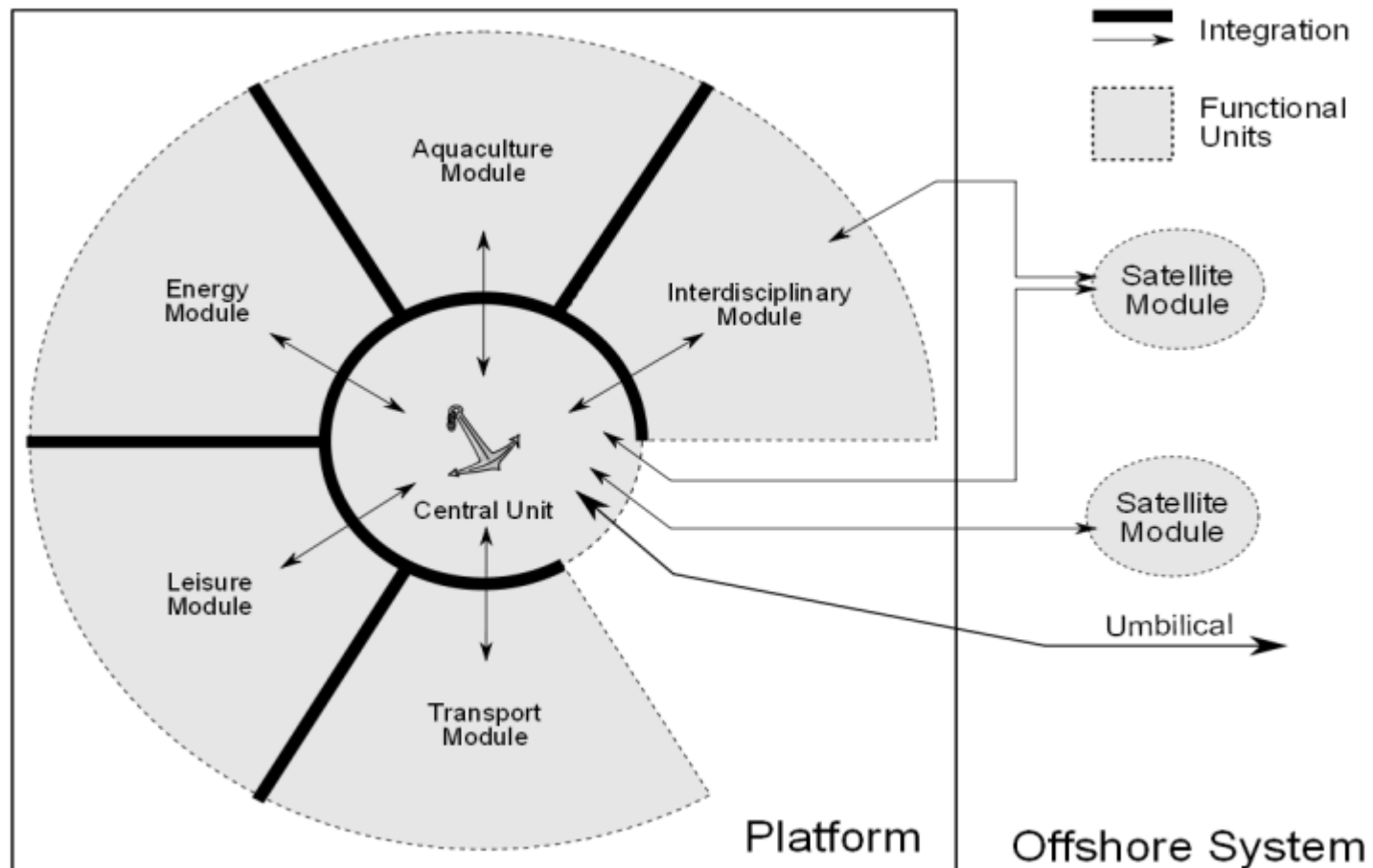
- **A map of optimal areas of installation** drawn from a comprehensive geographic information framework.
- **A novel design of a modular off-shore platform** with integrated technologies and services including: wind and ocean energy, aquaculture, maritime transport, tourism and ocean environmental monitoring.
- **A comprehensive viability strategy.**
- **A comprehensive environmental impact methodology and assessment.**



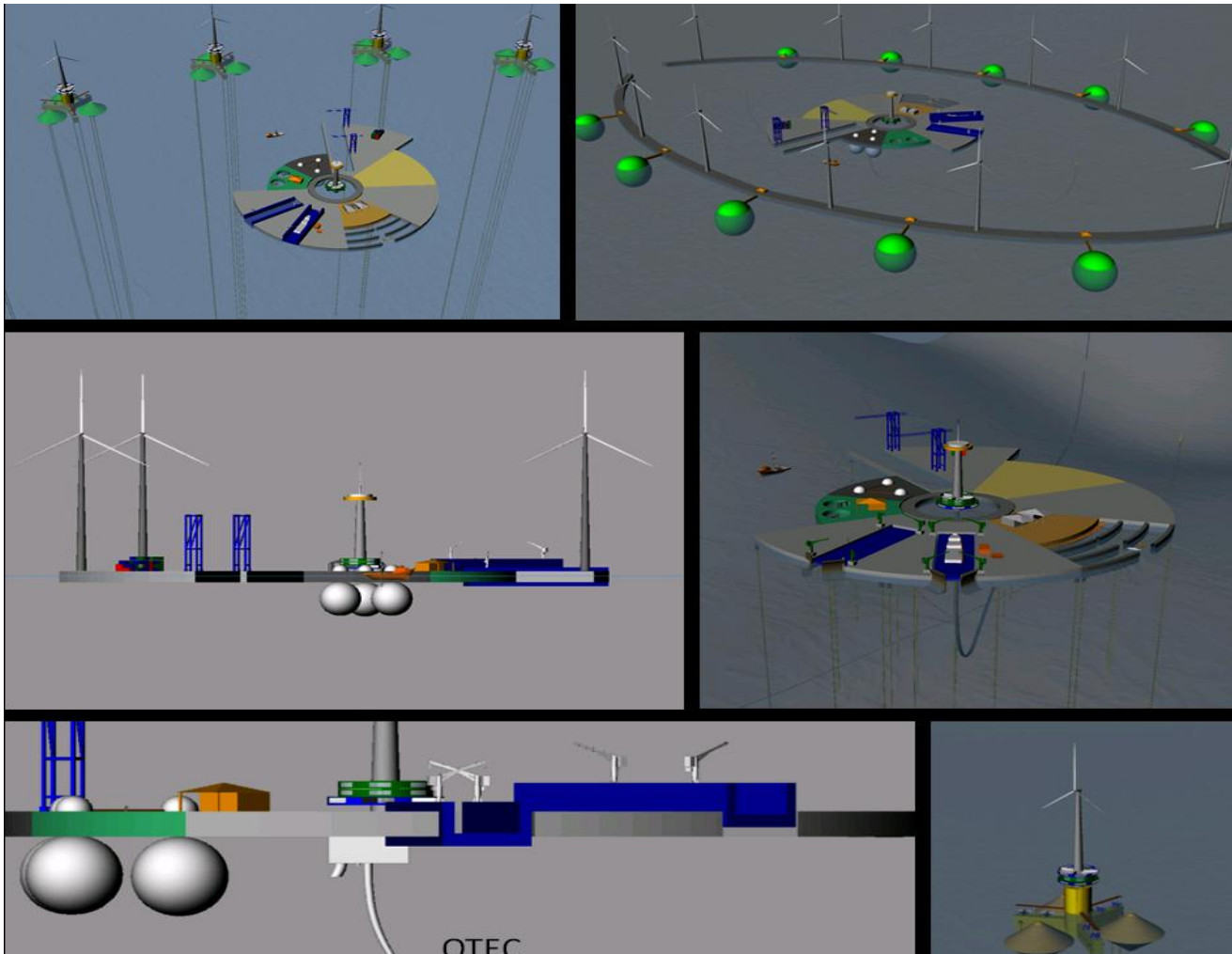
VISION AND PROGRESS



Modular approach

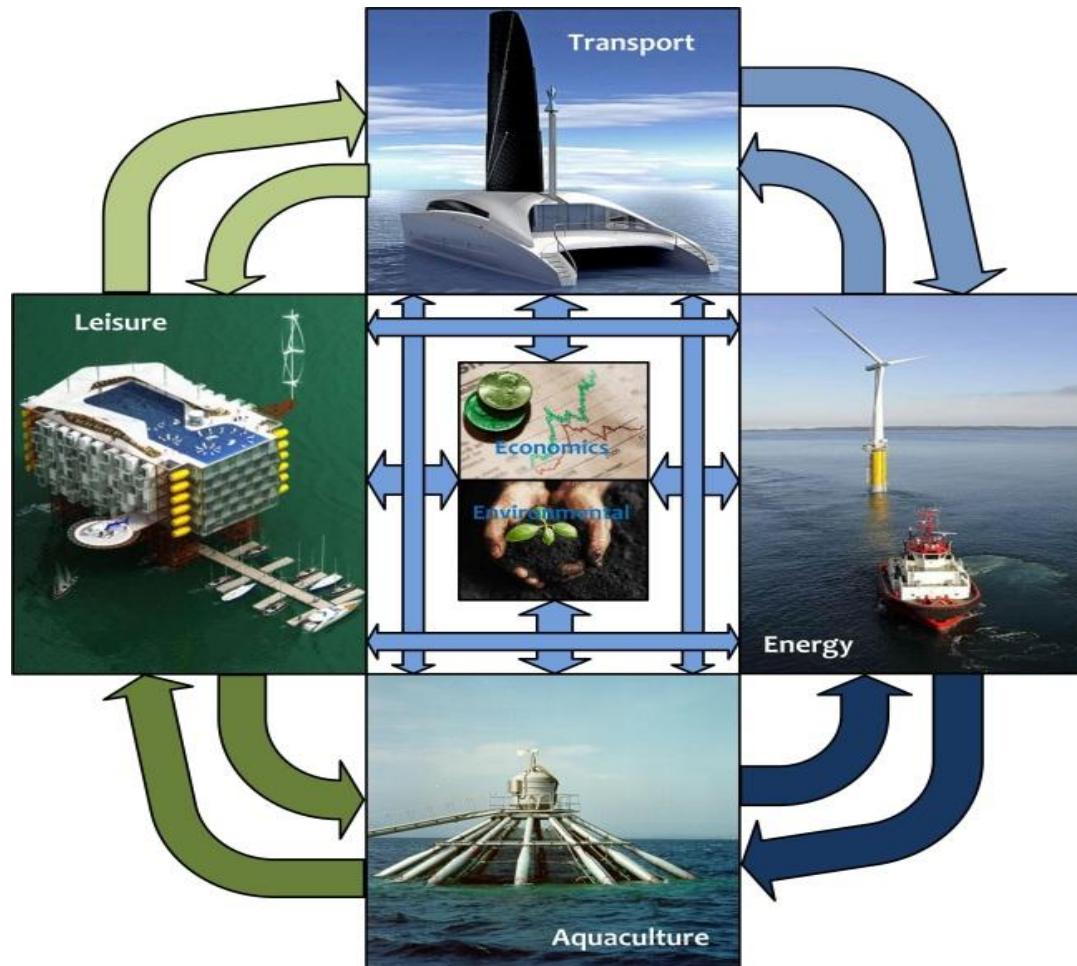


Modular approach - Artistic representation



Modular approach

The TEAL (Transport, Energy, Aquaculture and Leisure) Components



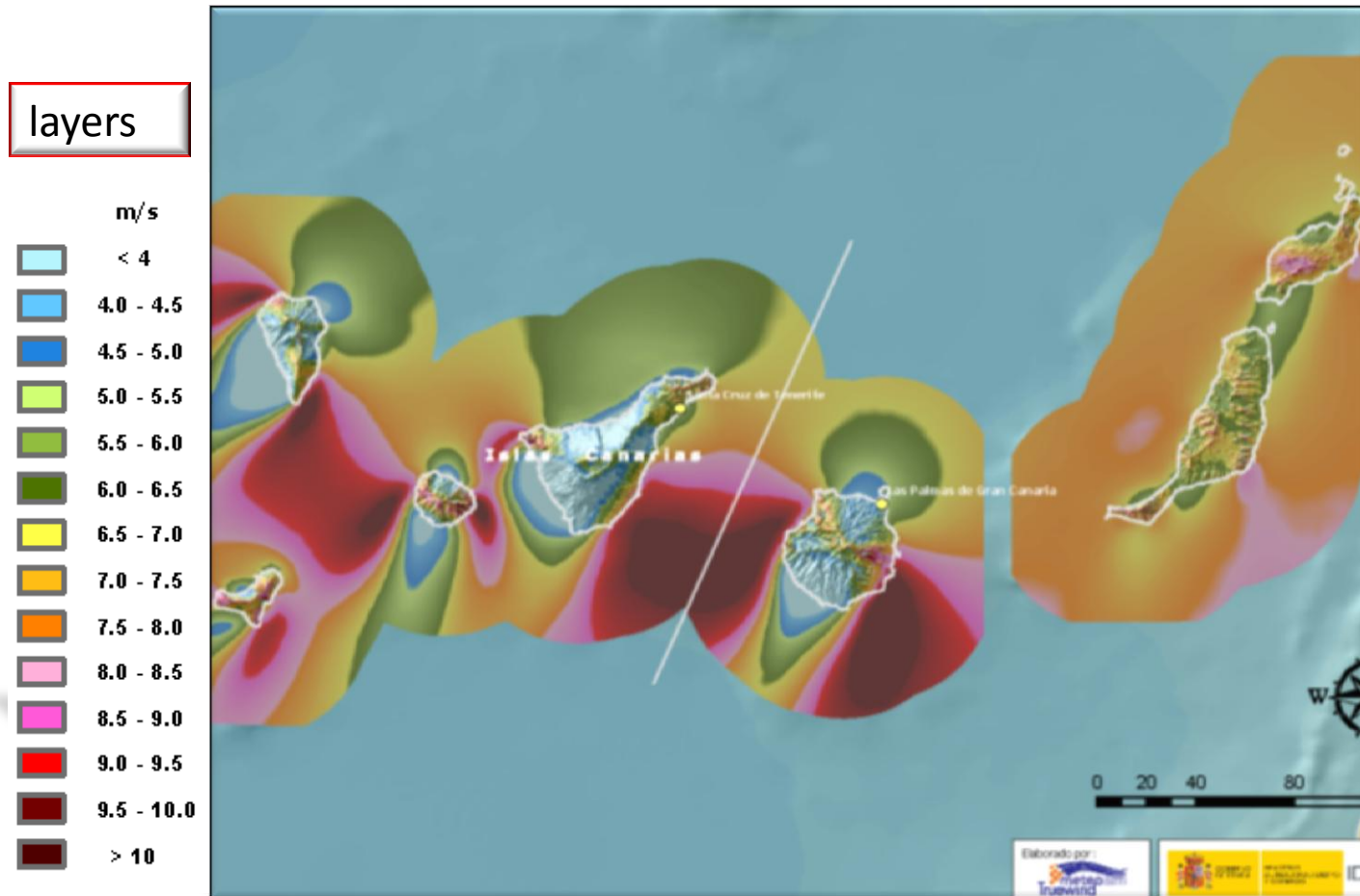
Modular Approach - The Example of the Canary Islands

Transport - Existing Port Infrastructures



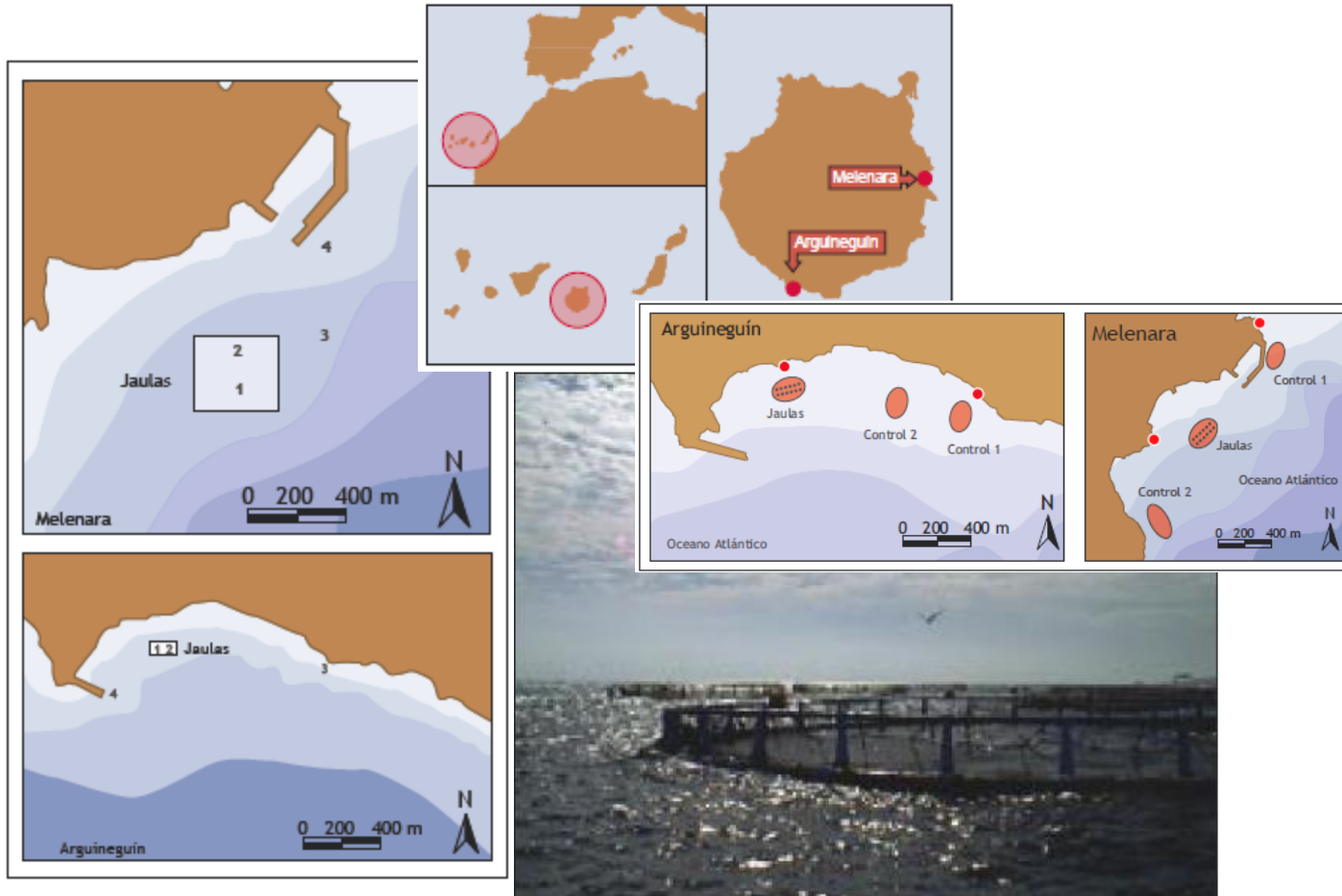
Modular Approach - The Example of the Canary Islands

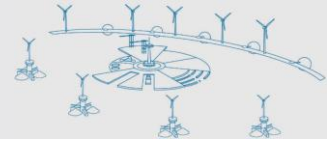
Energy - Local mix of resources - Example of Annual Average Wind Speed



Modular Approach - The Example of the Canary Islands

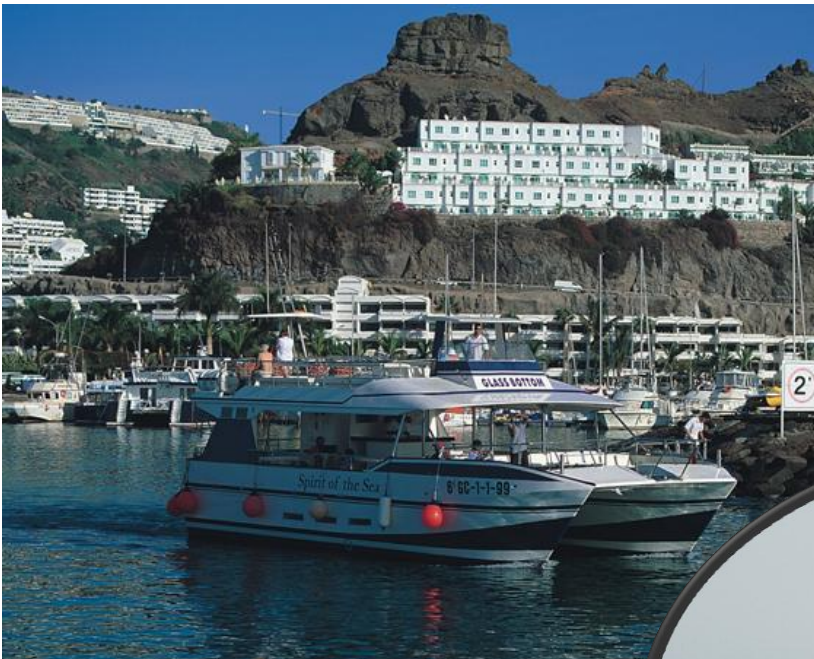
Aquaculture - Local market and several studies carried out





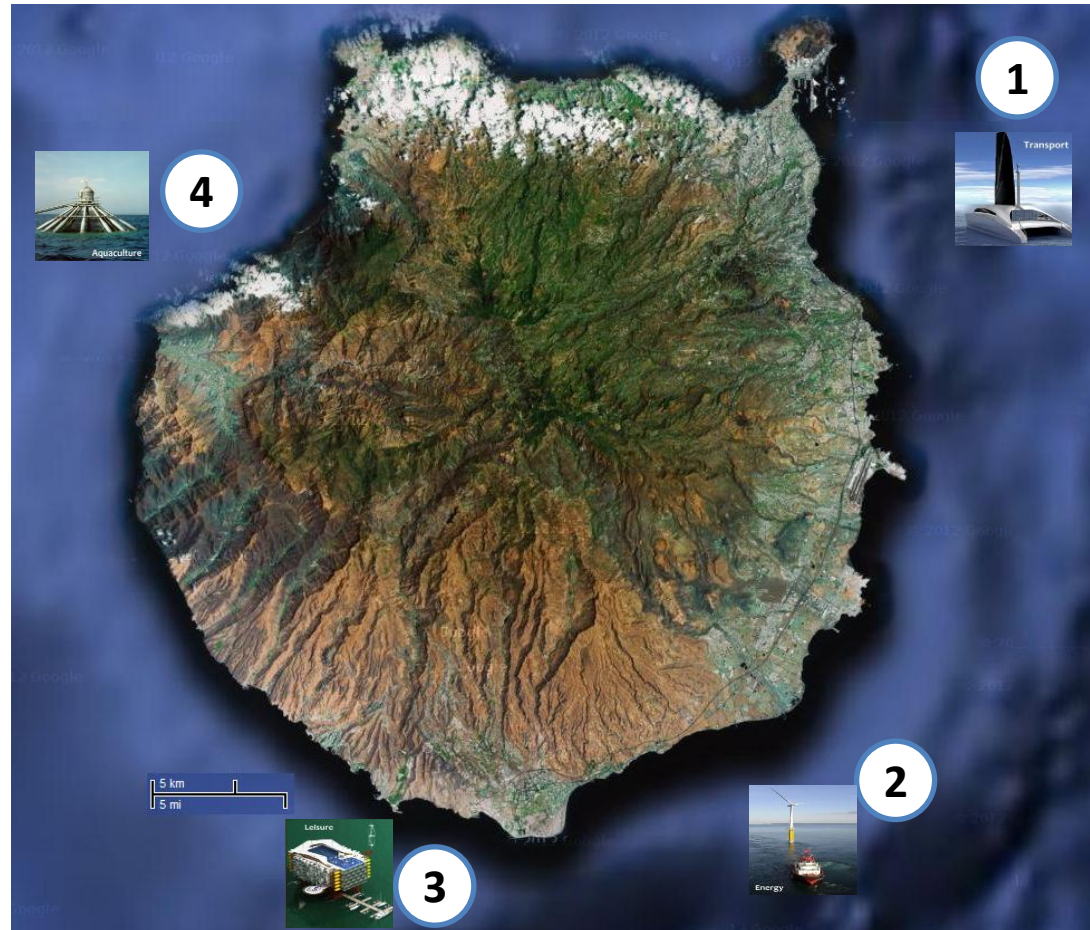
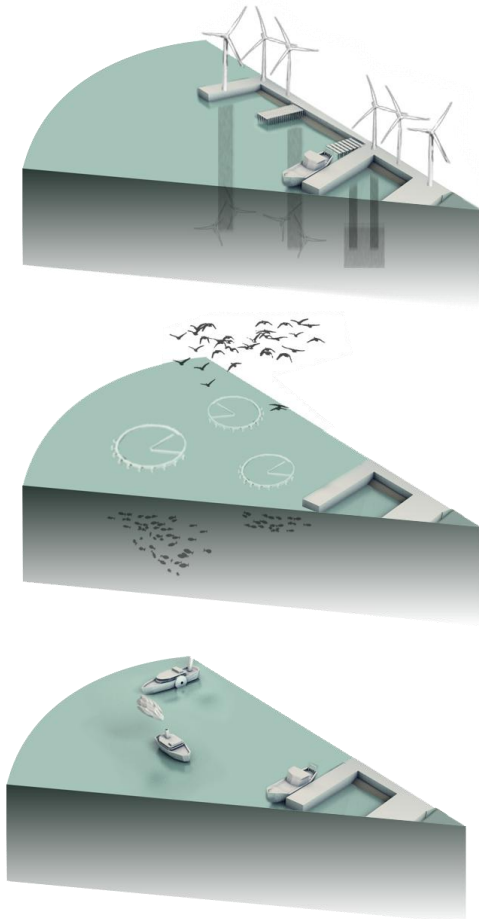
Modular Approach - The Example of the Canary Islands

Leisure - Local economy mainly based on tourism



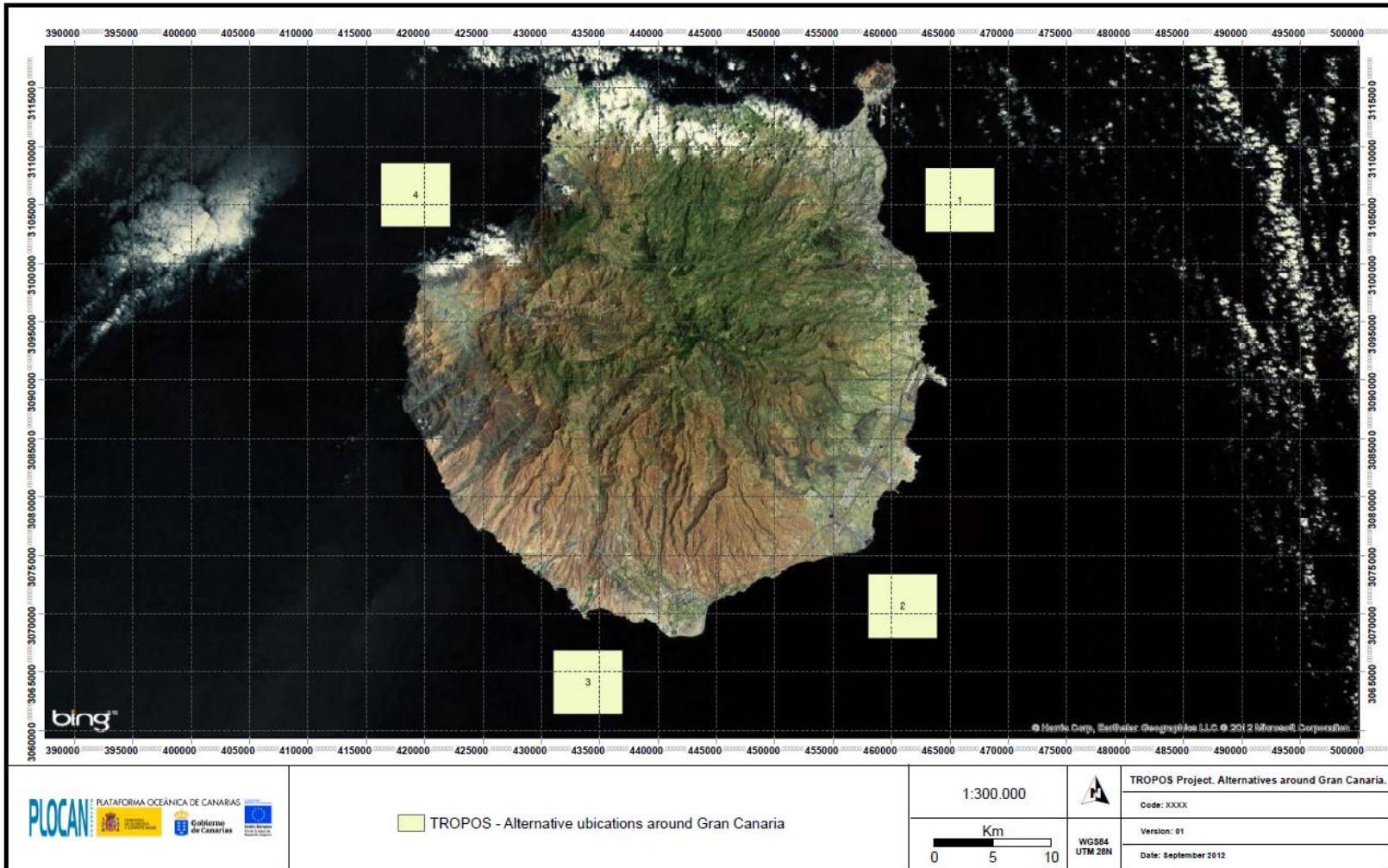
Modular Approach - The Example of the Canary Islands

4 possible locations have been defined as an initial draft



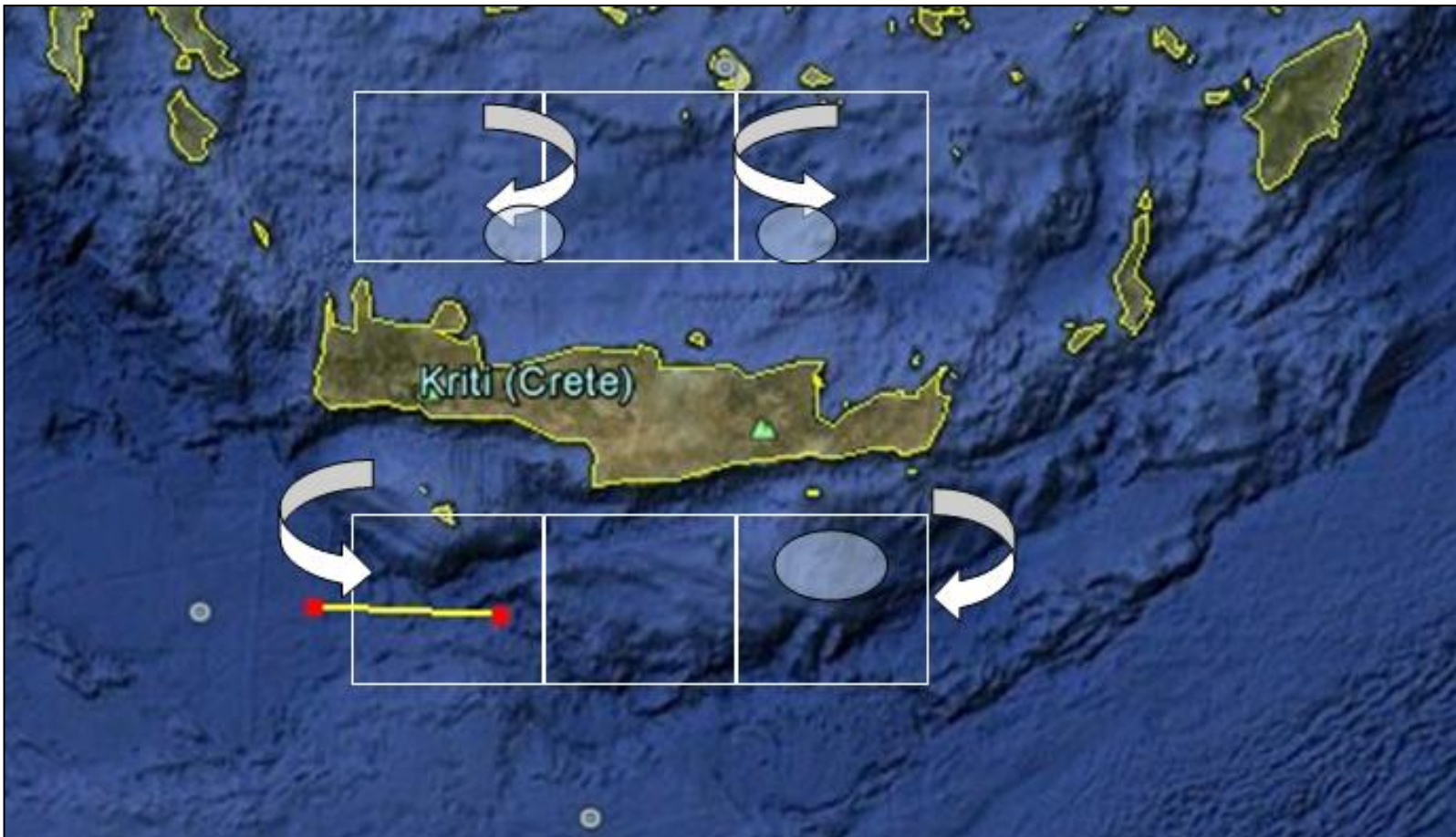
Modular Approach - The Example of the Canary Islands

4 possible locations have been defined as an initial draft

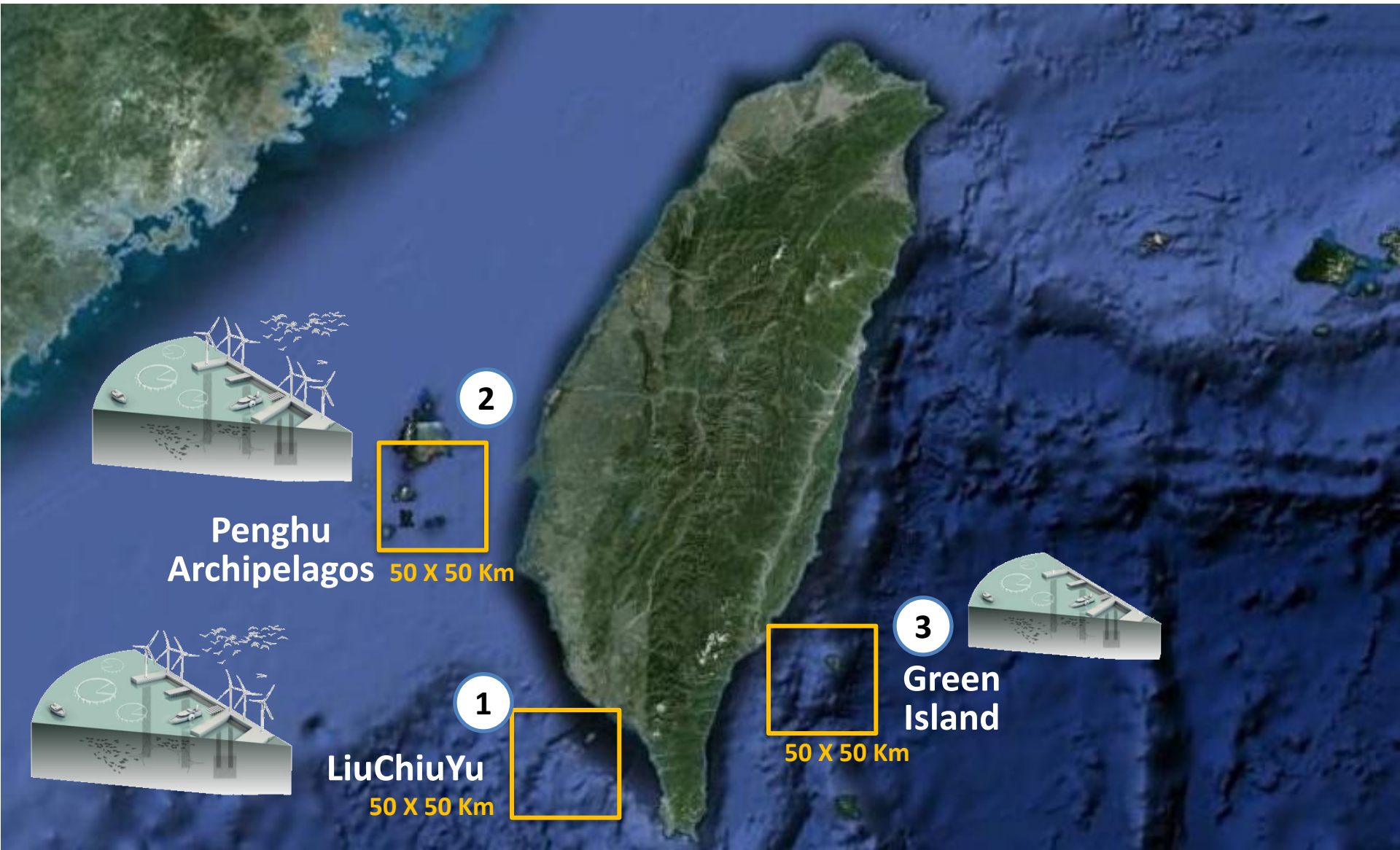


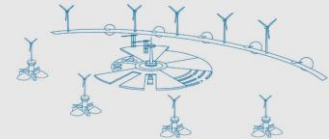
Modular Approach – The Example of Greece

Locations are also being defined in Greece...



Modular Approach - The Example of Taiwan and 3 possible locations in Taiwan





Modular Approach - The Example of Taiwan

1. LiuChiuYu, TAIWAN

potential for aquaculture, current energy & OTEC (submarine Canyon), leisure, Transport



Offshore Cage-net Aquaculture

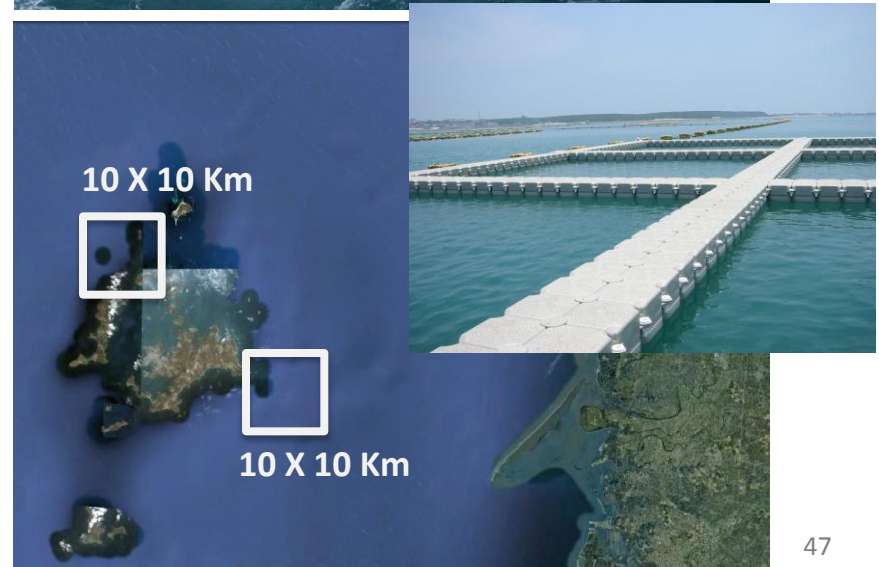
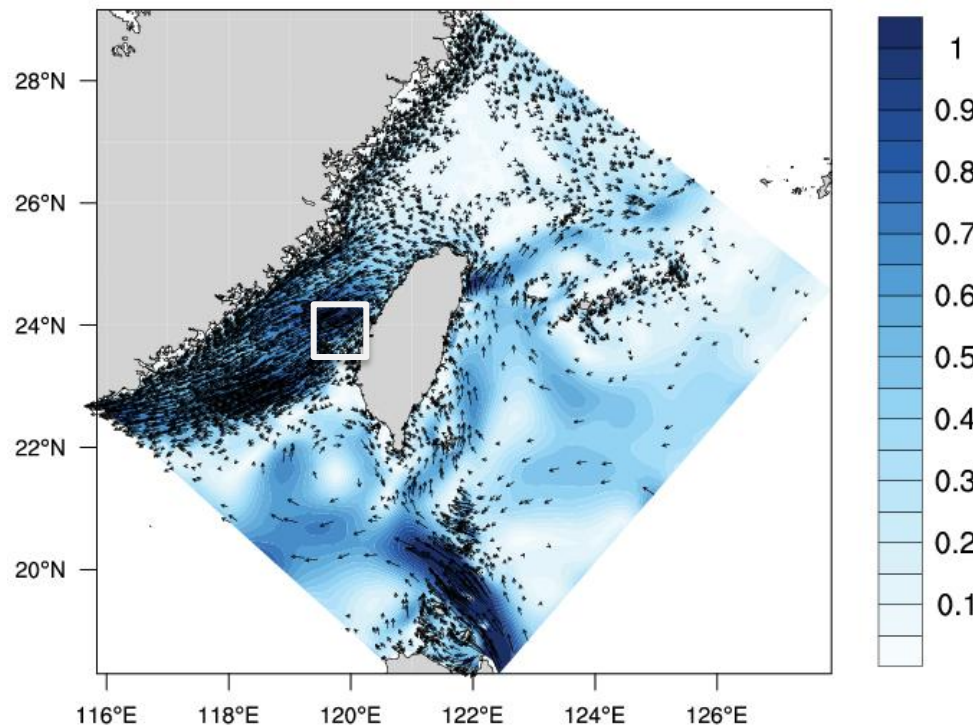




Modular Approach - The Example of Taiwan

2. Penghu Archipelagos, TAIWAN

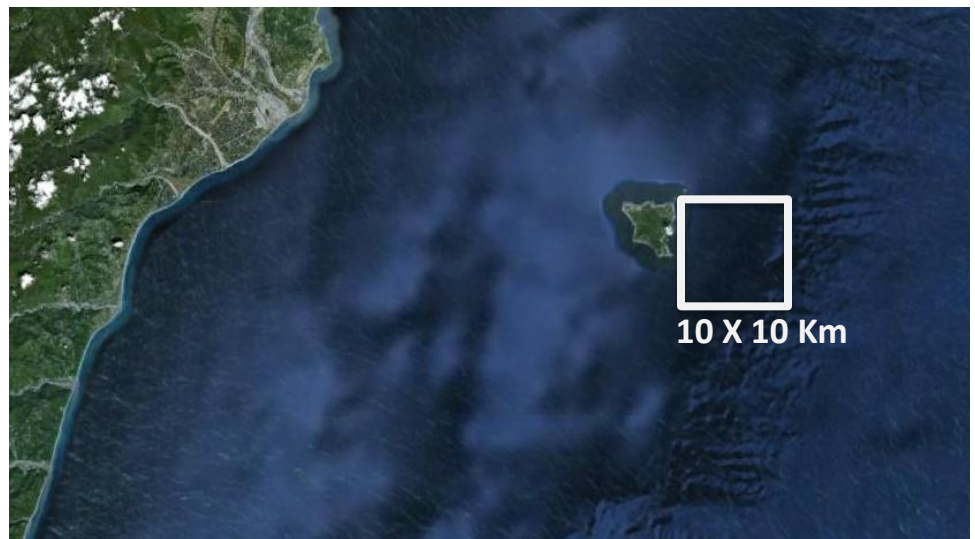
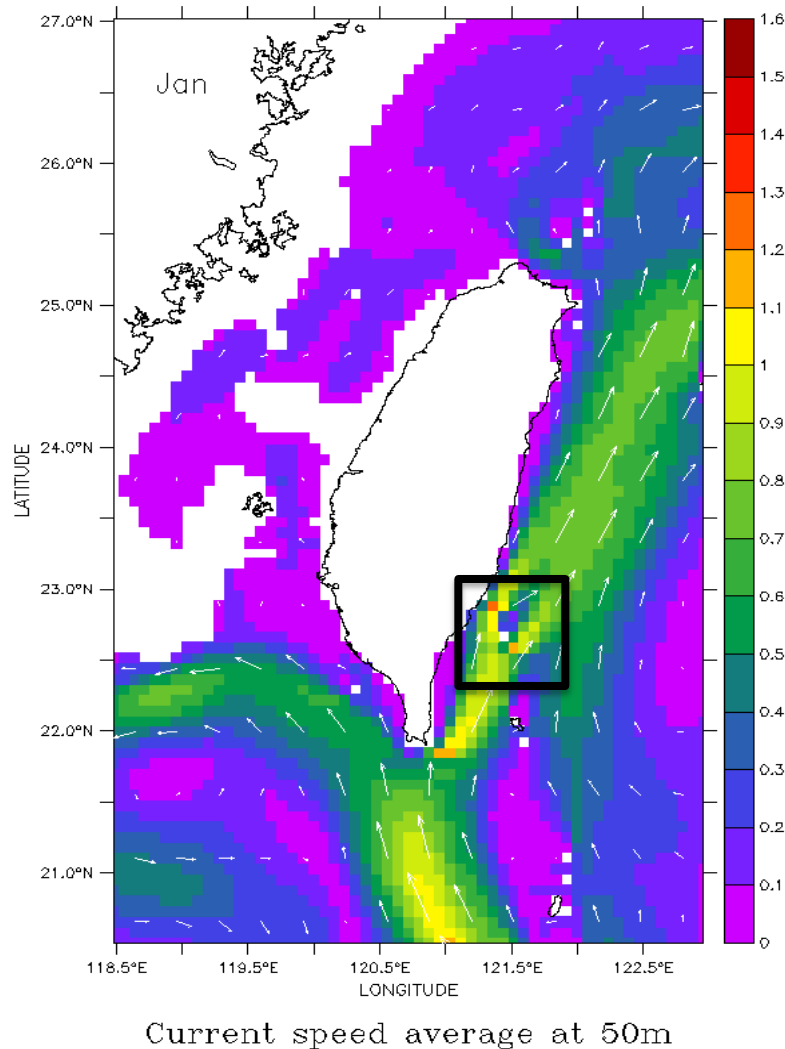
potential for aquaculture, current energy, wind energy, solar energy, desalination, leisure



Modular Approach - The Example of Taiwan

3. Green Island, TAIWAN

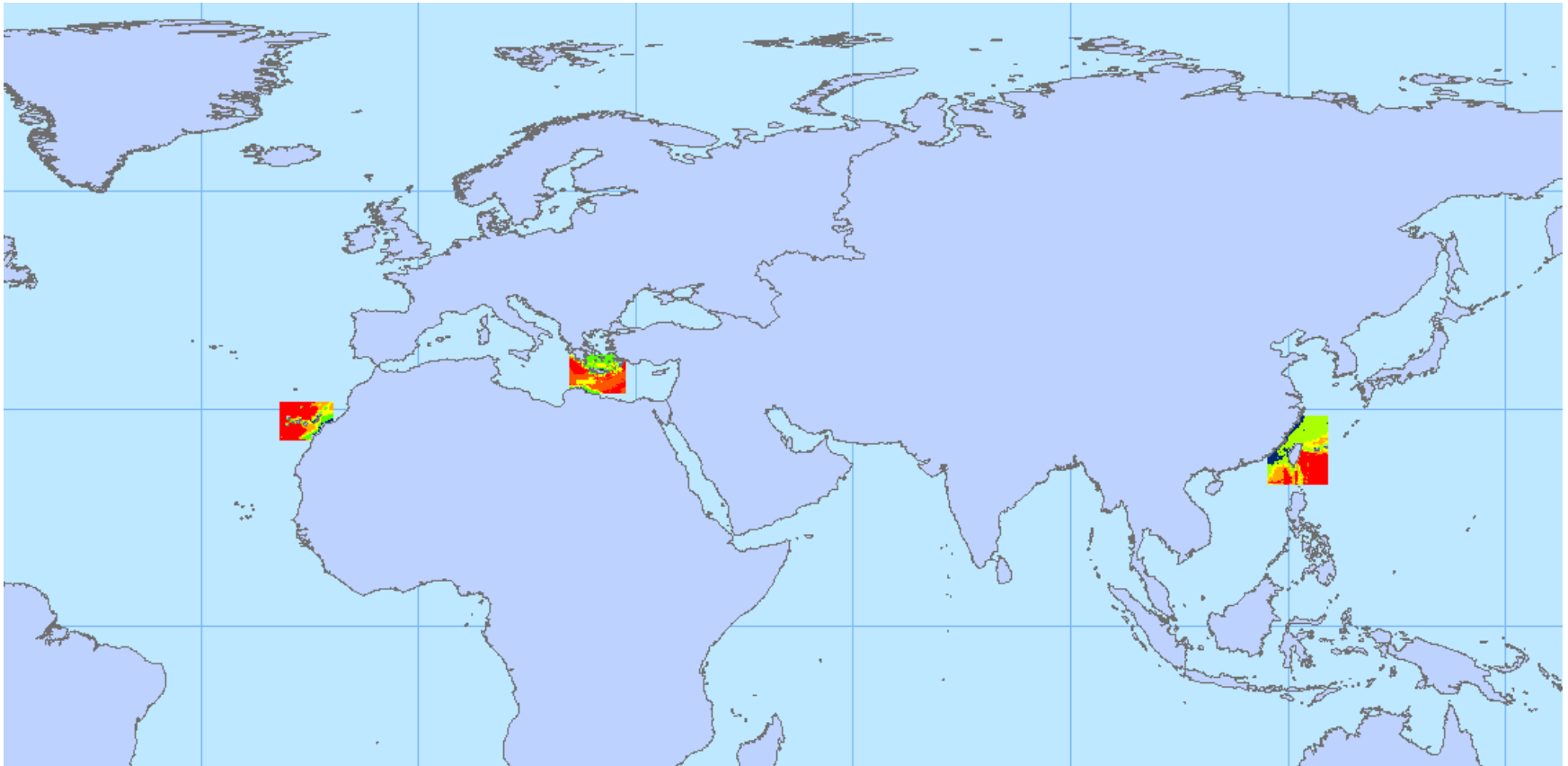
potential for current energy (Kuroshio), OTEC, leisure, transport





GIS Decision Tool

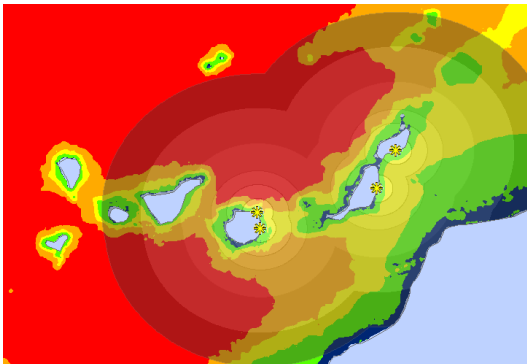
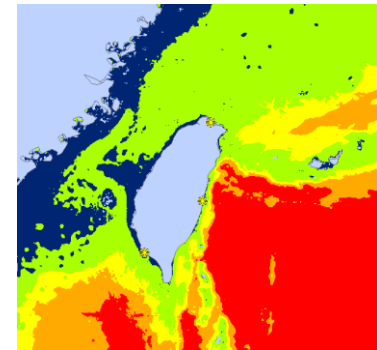
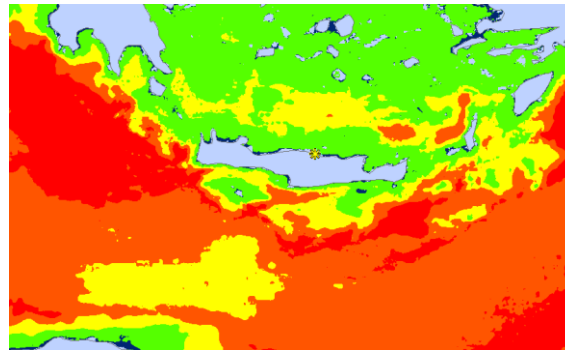
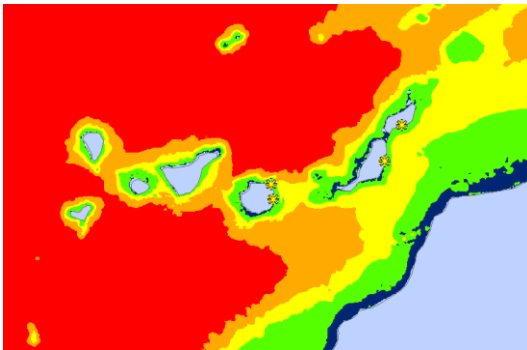
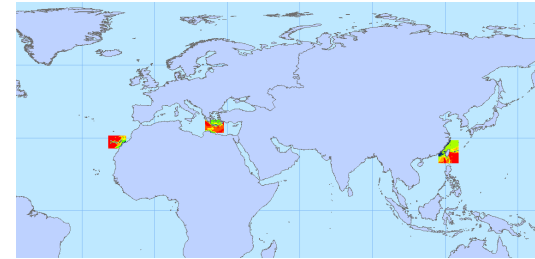
First approach providing the Gebco 0.8° bathymetry



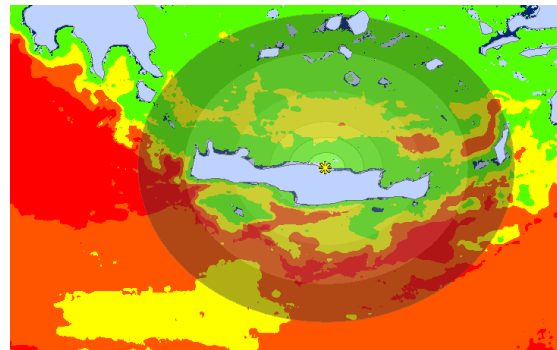


GIS Decision Tool

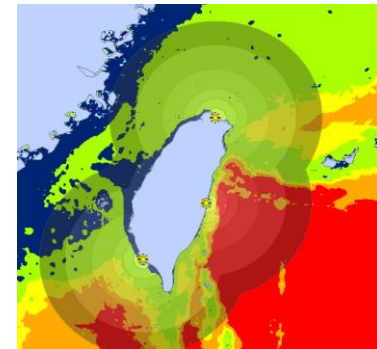
First approach providing the Gebco 0.8° bathymetry



Canary Islands



Greece

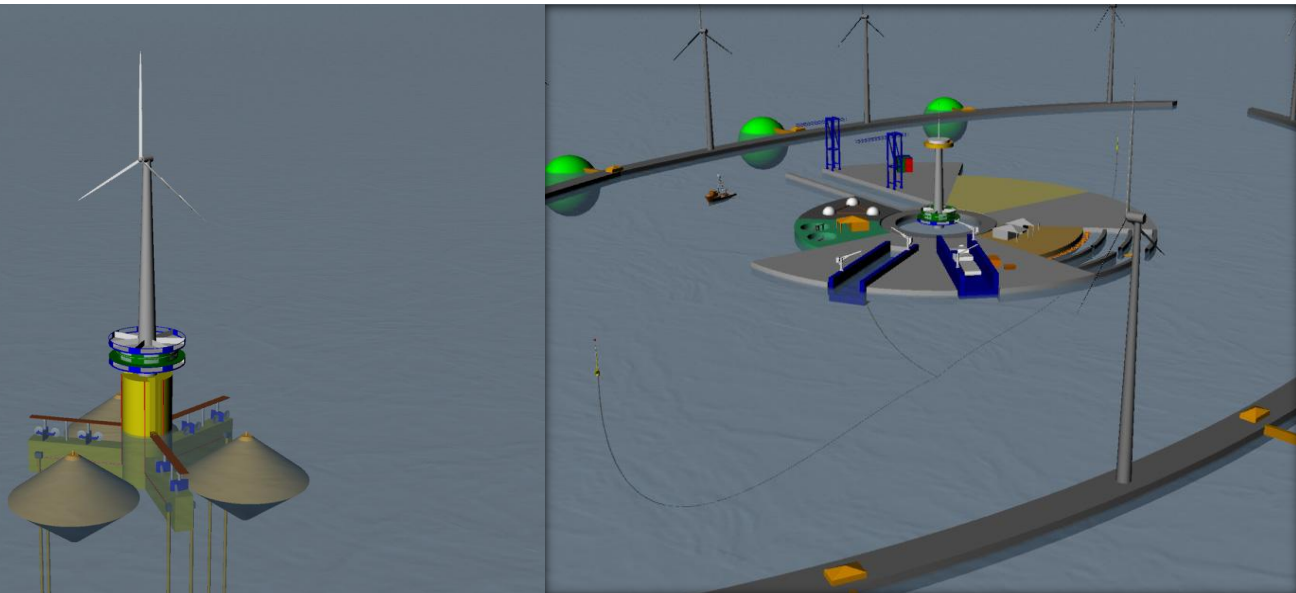
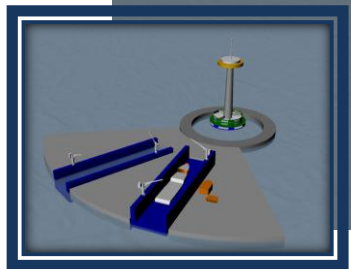
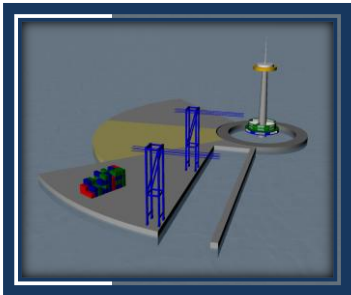
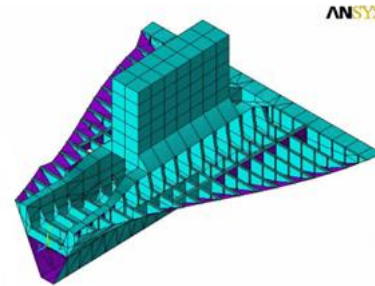
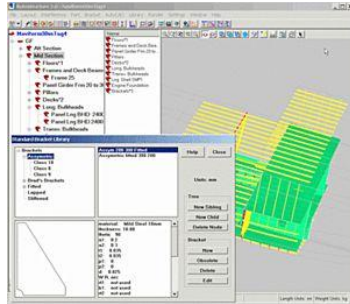


Taiwan



Modular Approach – Technological aspects

Technologies being defined at the moment





THANK YOU!

