

*EMODnet marine data for the offshore renewable energy sector in the Mediterranean Sea and Black Sea*  
*20-21 October 2022 Virtual event*

## **Utilizing marine data for the design of a floating multiuse renewable energy platform and expected data from its operation**

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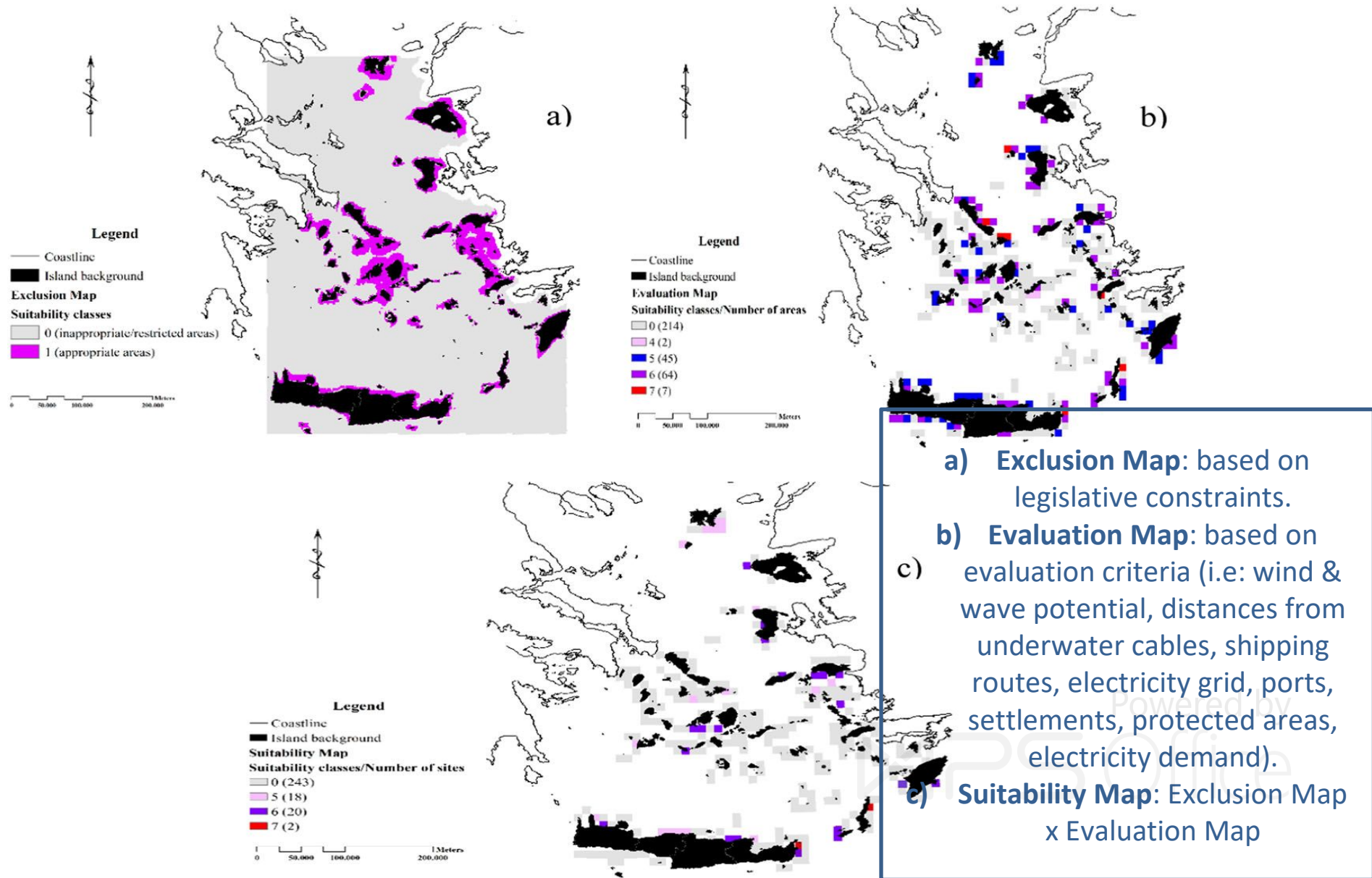
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# Introduction-Aegean Sea (Greece)

- Marine space of the Aegean Sea & the coastal zone of islands of the **North Aegean Region** (*Samos, Lesvos and Chios Municipality*), **South Aegean** (*Cyclades and Dodecanese*) and **Crete**.
- Traditional, commercial leisure activities & facilities takes place: shipping, aquaculture, fishing, marine recreational & military activities, cables, pipelines & oil and gas facilities. Aegean Sea is also a hotspot of marine biodiversity.
- Electricity production is based on autonomous power stations, which are powered by fuel and diesel oil owned by the Public Power Corporation (PPC).
- Strong winds, not particularly high wave height > floaters will be even simpler & cheaper, while smaller units could electrify entire islands.

# Preliminary Suitability Assessment for installation of Floating Wind Turbines (Spatial Multi-Criteria Analysis in GIS environment)



# FLOATING AUTONOMOUS ENVIRONMENTAL FRIENDLY AND EFFICIENT DESALINATION UNIT

Integration of desalination unit with windpower:

- Close coupling between generation and consumption.
- Ability of installation far from populated areas
- Minimize optical disturbance and noise
- Ability to move the unit in different areas and install it quickly

# Operational in open sea environment

## Autonomous

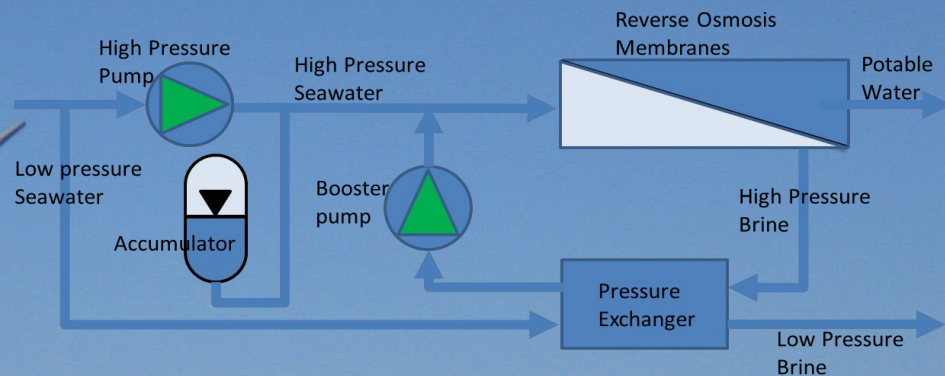
- Renewable Energy
- Unmanned

## Ecological

- RENES
- Deep seawater
- No chemical treatment

## Scalable

## Transferable



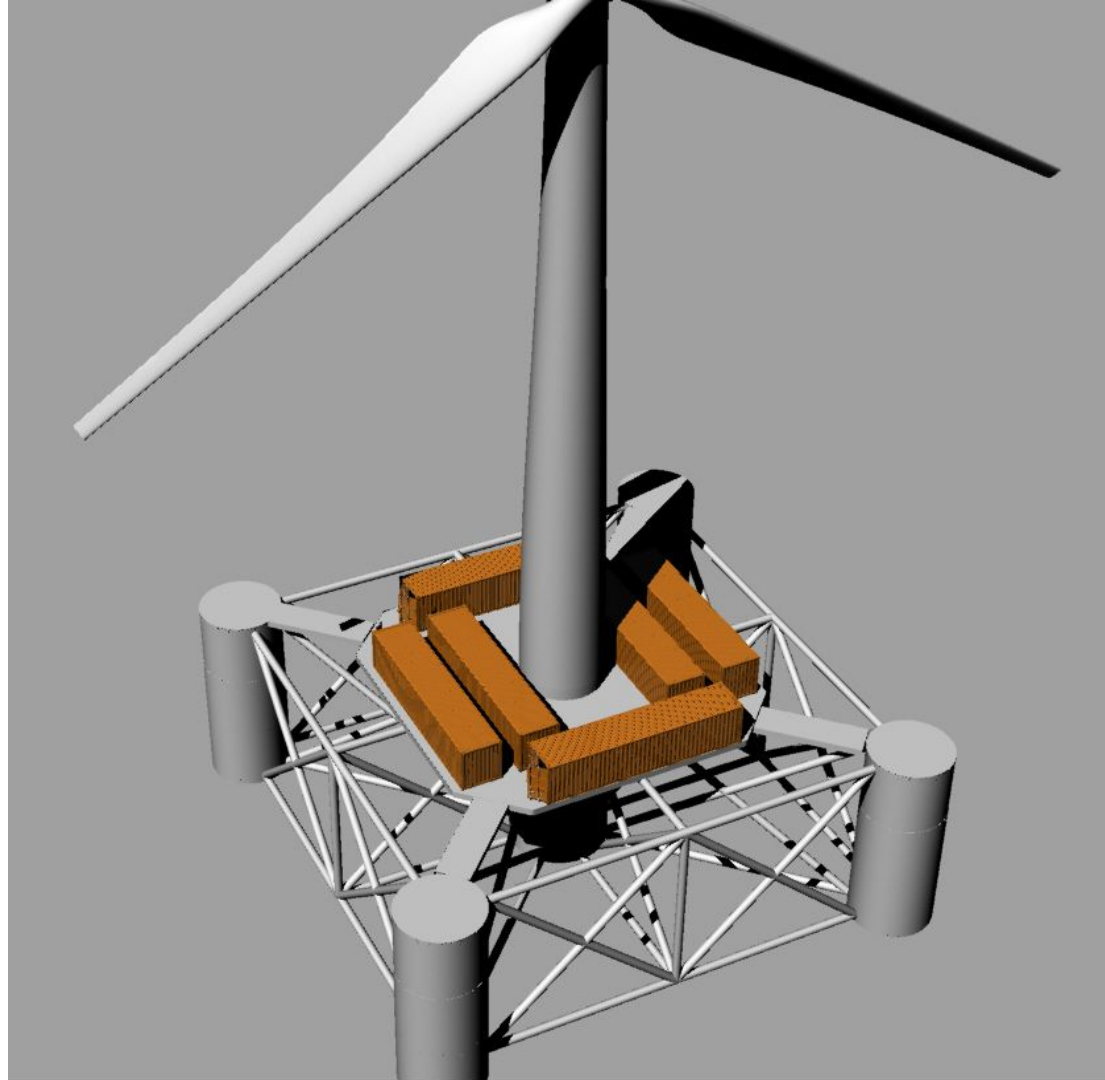
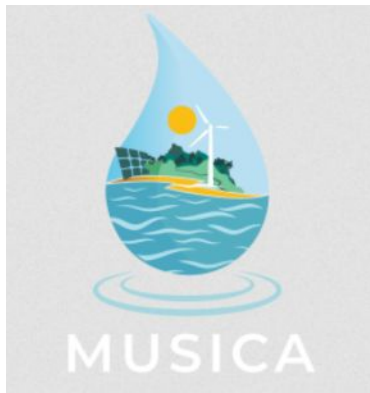
# YDRIADA Floating wind powered desalination



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Stable under extreme weather conditions



# Multiple Use of Space for Island Clean Autonomy Blue Growth Solutions



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant no 862252



# MUP-Site Selection

- **Tools (ArcGIS Software) + Spatial Data:**
- **Exclusion criteria** (Legislative constraints)
- **Evaluation criteria**
  1. Wind & wave potential-WP/WaP
  2. Distance from electricity grid-DFEG
  3. Distance from water supply network-DFWS
  4. Accessibility-ACC
  5. Distance from aquaculture facilities-DFAF
  6. Distance from settlements-DFS
  7. Distance from areas of particular environmental interest-DFPA
  8. Bathymetry-BATH
  9. Sea bottom soil-SBS
  10. Permissions-PER
- **Analytic Hierarchy Process-AHP**
- **Final Suitability Map-Site selection**



# Hierarchical Structure-AHP

Overall goal

MUP Site selection

Evaluation criteria

WP

WaP

DFEG

DFWS

ACC

DFAF

DFS

DFPA

BATH

SBS

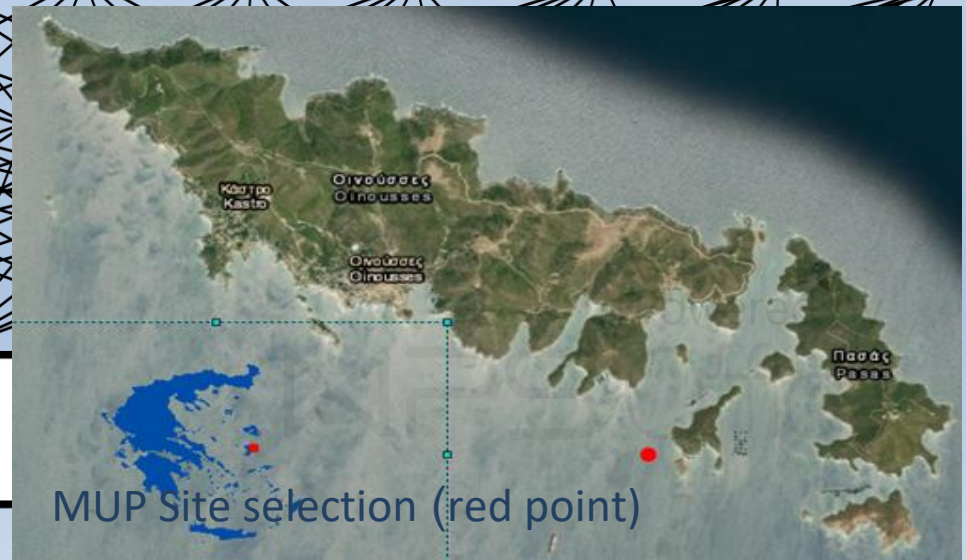
PER

Possible sites that do not fall under any legislative restrictions

Site 1

Site 2

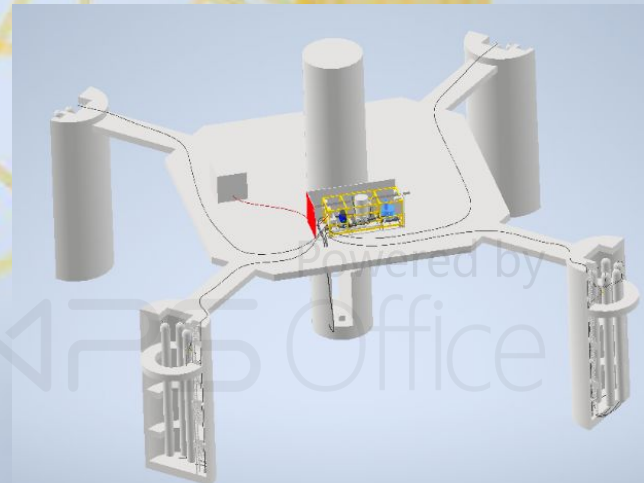
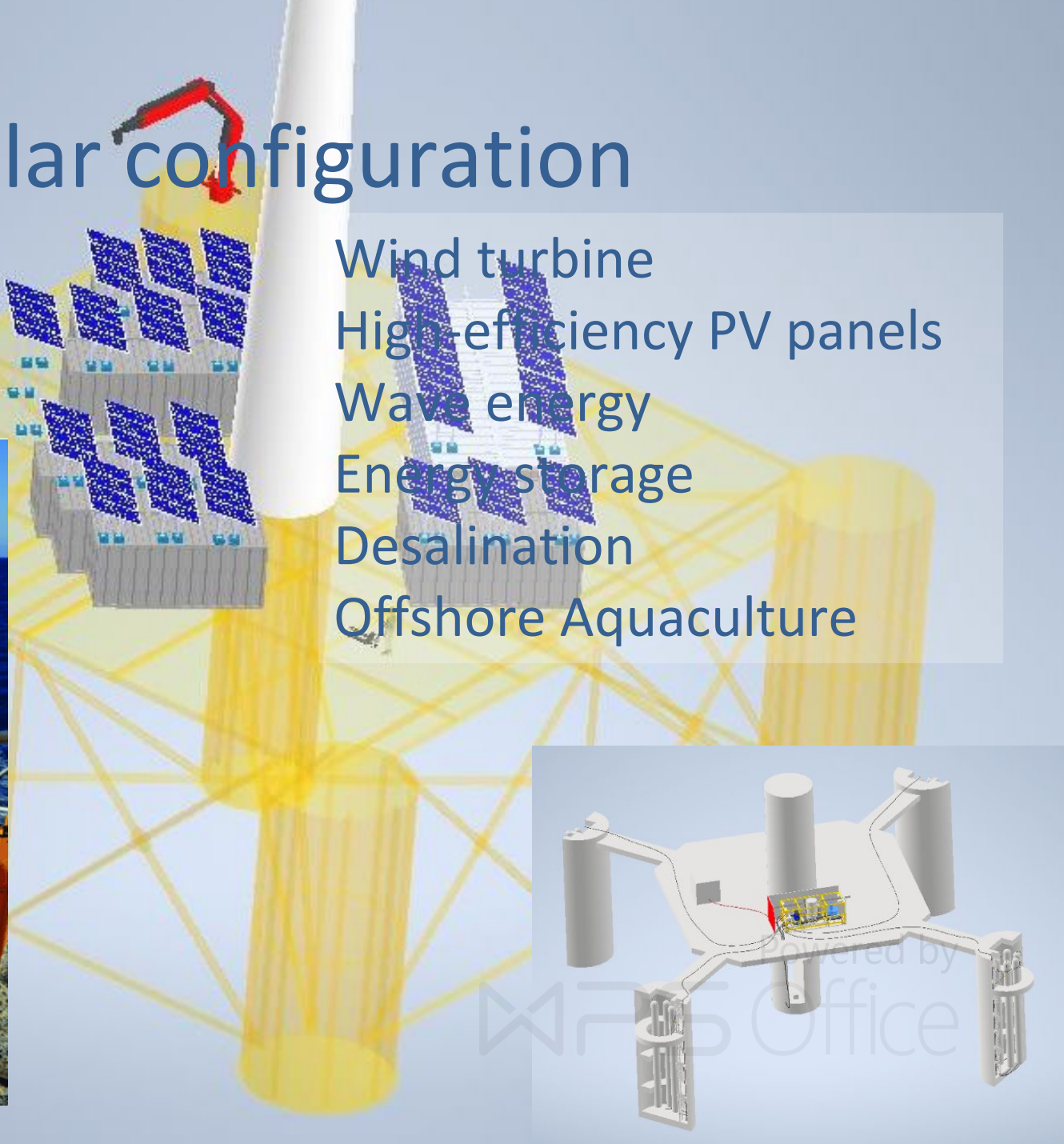
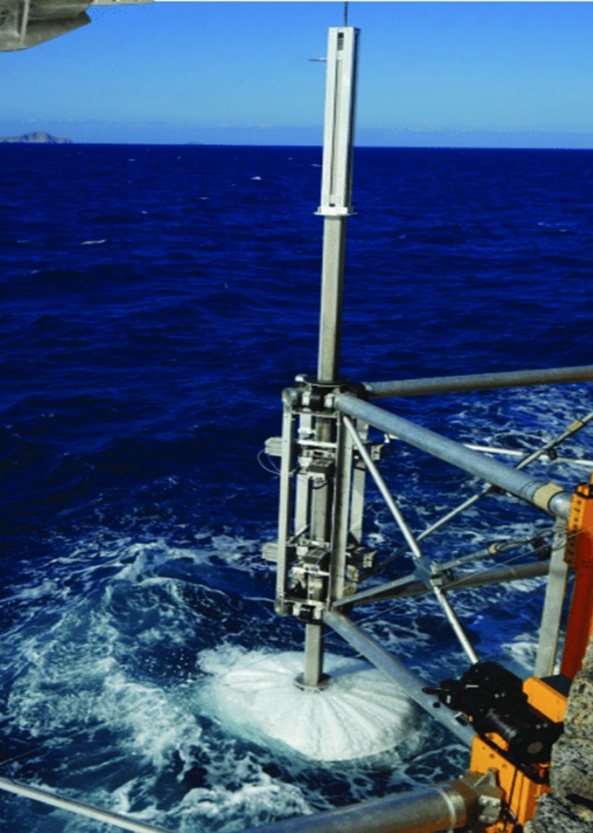
Site 3



MUP Site selection (red point)

# Modular configuration

Wind turbine  
High-efficiency PV panels  
Wave energy  
Energy storage  
Desalination  
Offshore Aquaculture

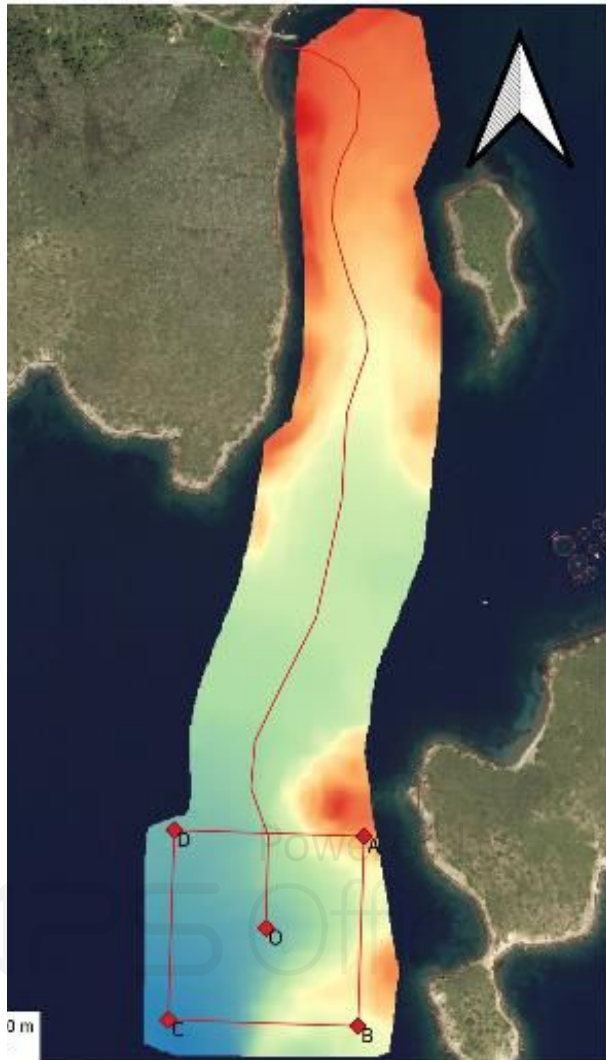


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# Offshore Aquaculture challenges



# ROV survey and preliminary geophysical investigation



# ROV inspection



# Sensors

- Meteorological station

Wind speed-direction, temperature, humidity

- Energy production

Windturbine, PV, Wave energy, Batteries

- Sea water

Temperature, Salinity, Oxygen, hydrophone

- Potable water

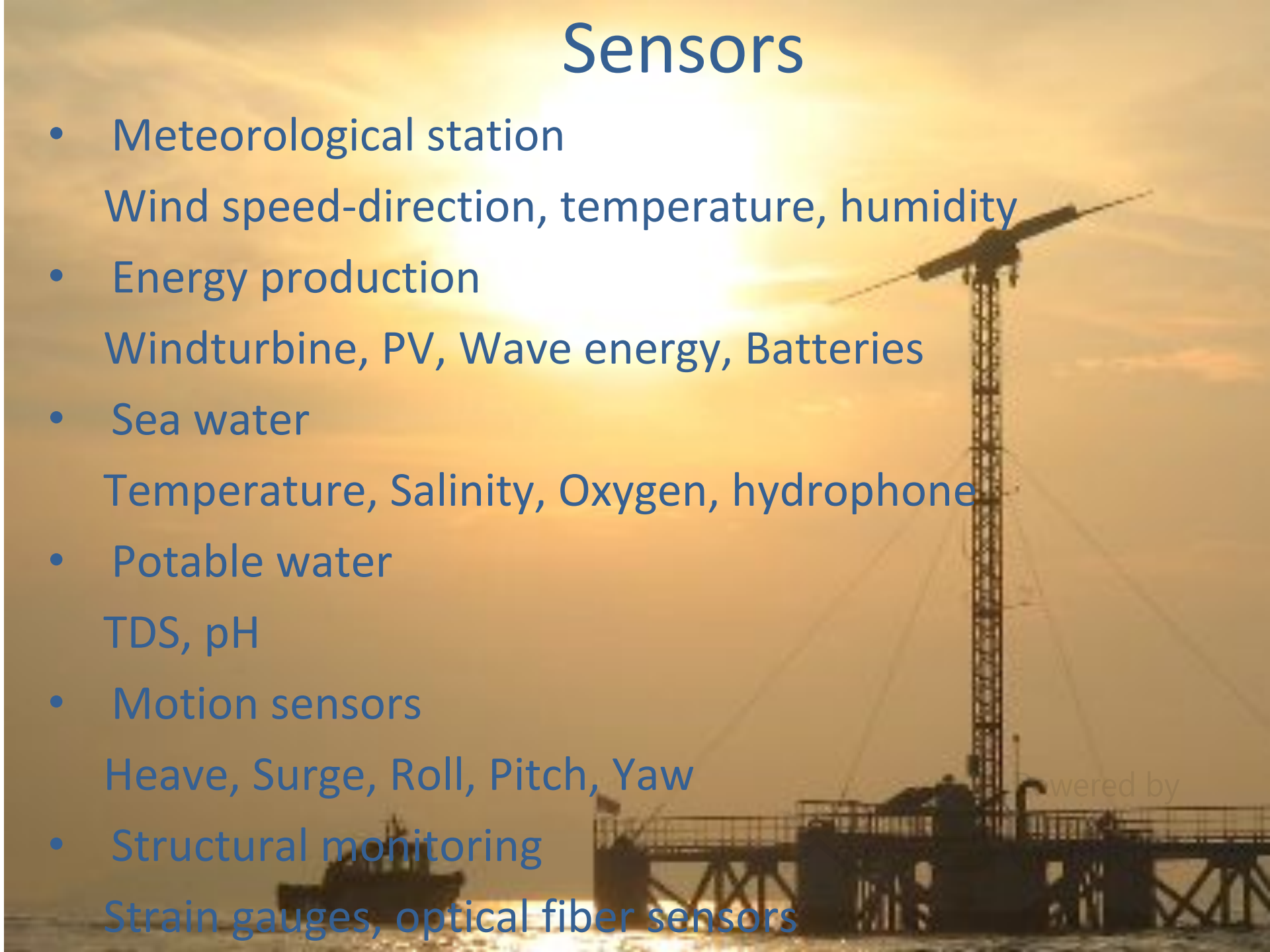
TDS, pH

- Motion sensors

Heave, Surge, Roll, Pitch, Yaw

- Structural monitoring

Strain gauges, optical fiber sensors



# Conclusions

- Multidisciplinary teams
- Stakeholders involvement
- Utilize diverse knowledge
- Environmental friendly solutions



University College Cork



Heriot Watt University



University of the Aegean



CHIOS



L-Università ta' Malta



ICORSA



DAFNI



PLOCAN



INNOSEA



Coral Energy



NeoDyne



SINN Power



INSB



Forky's



AquaBioTech Group

Thank you for your attention