



Interreg
Mediterranean



BLUE GROWTH

Project co-financed by the European
Regional Development Fund

**DEVELOPING
BLUE GROWTH
POTENTIAL**



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The Blue Growth community Summer School – BE WORKING GROUP

Lemnos
Case study

B-B

OWF site

Pilot plant

W Resources

Ports

TECHs

Project Dvl

Environmental
aspects

Financial
aspects

Social aspects

Conclusions

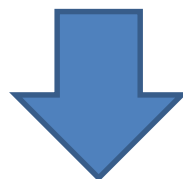
Lemnos: Socio-Economical Framework

- Youth leaving the island (Brain drain)
- Fishing techniques need to upgrade to new regulations, technologies and market
- Tourism: the national and local government are pushing to promote sustainable tourism in the island
- Environmental protection: the local community wants to preserve it, especially Natura 2000 sites.
- Population is open to change



Lemnos: B-B

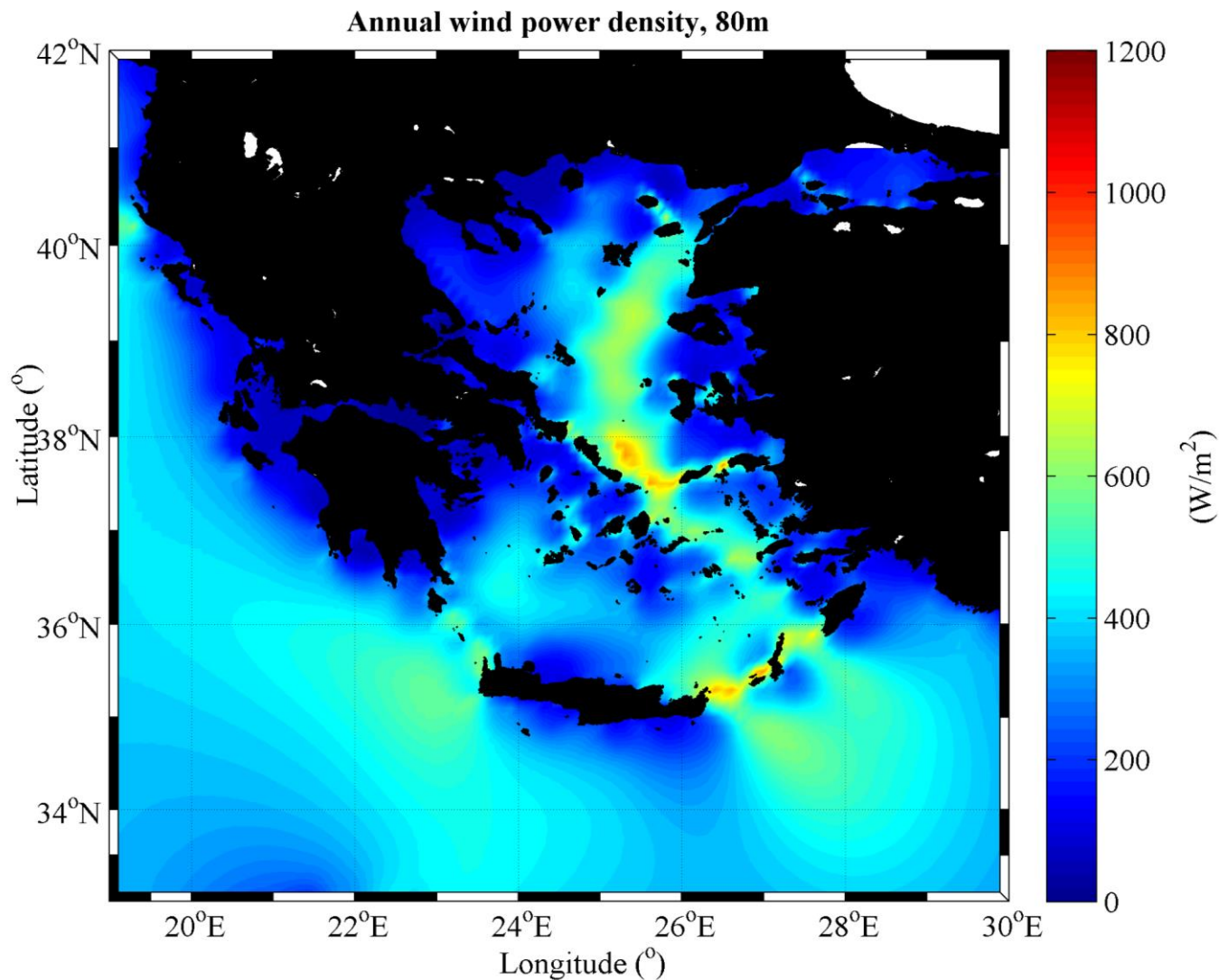
Benefit	Beneficiaries
Clean energy supply - Energy independence & Decarbonization	All
Multi-use platform: Minimize NIMBY attitudes	All
Decrease of the energy cost	Local communities



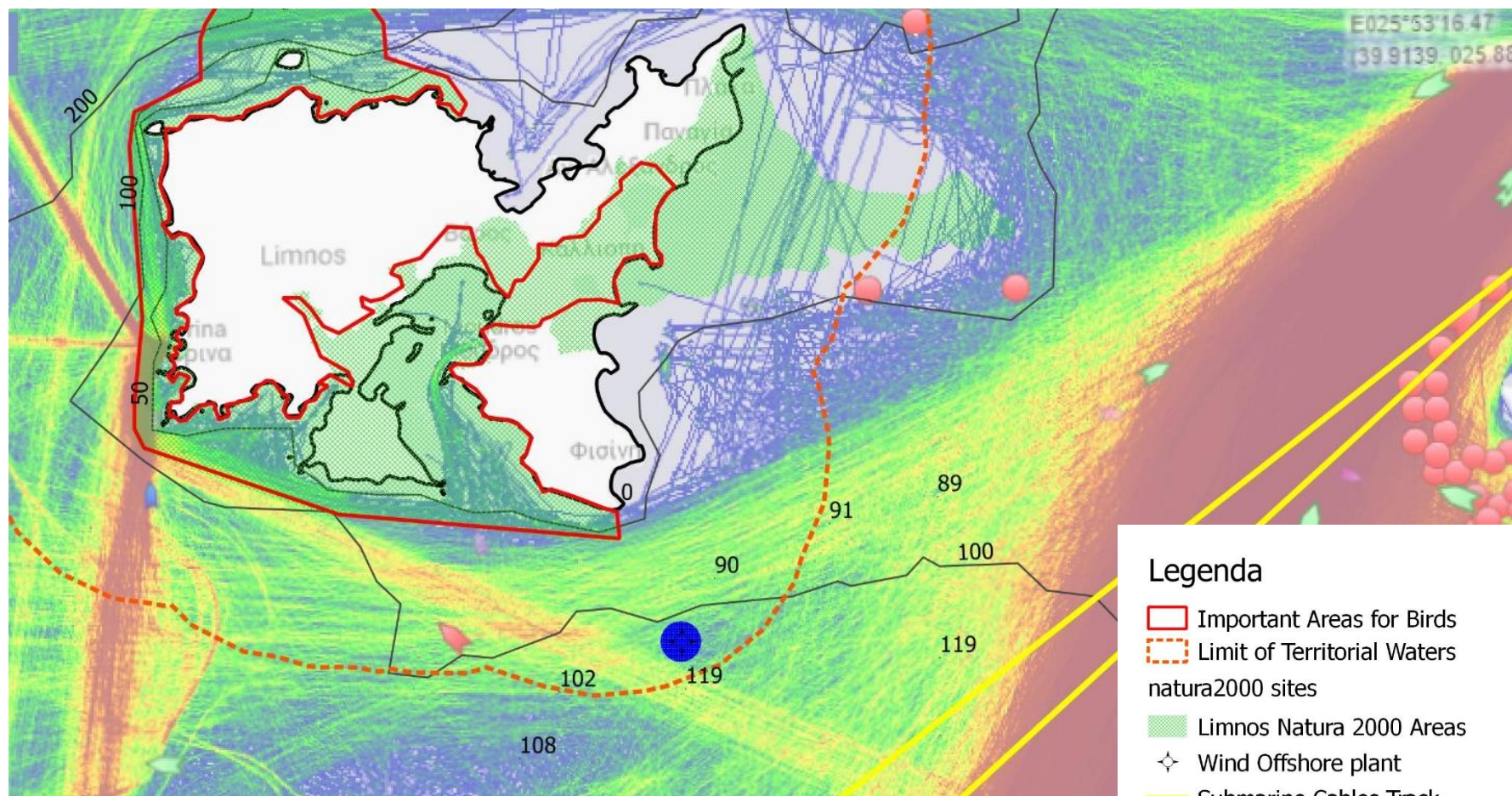
Electric mobility
Tourism
Occupation
Water supply

Charging stations
Educational boat tours, scuba-diving
New and high-qualified jobs
Desalinization plants

Lemnos: Wind Resources



Lemnos: Wind Offshore Plant Location



Legenda

- Important Areas for Birds
- Limit of Territorial Waters
- natura2000 sites
- Limnos Natura 2000 Areas
- ⬤ Wind Offshore plant
- Submarine Cables Track
- Bathymetry

ESPG:4326 WGS 84

X: 25° 23' 53
Y: 39° 42' 45



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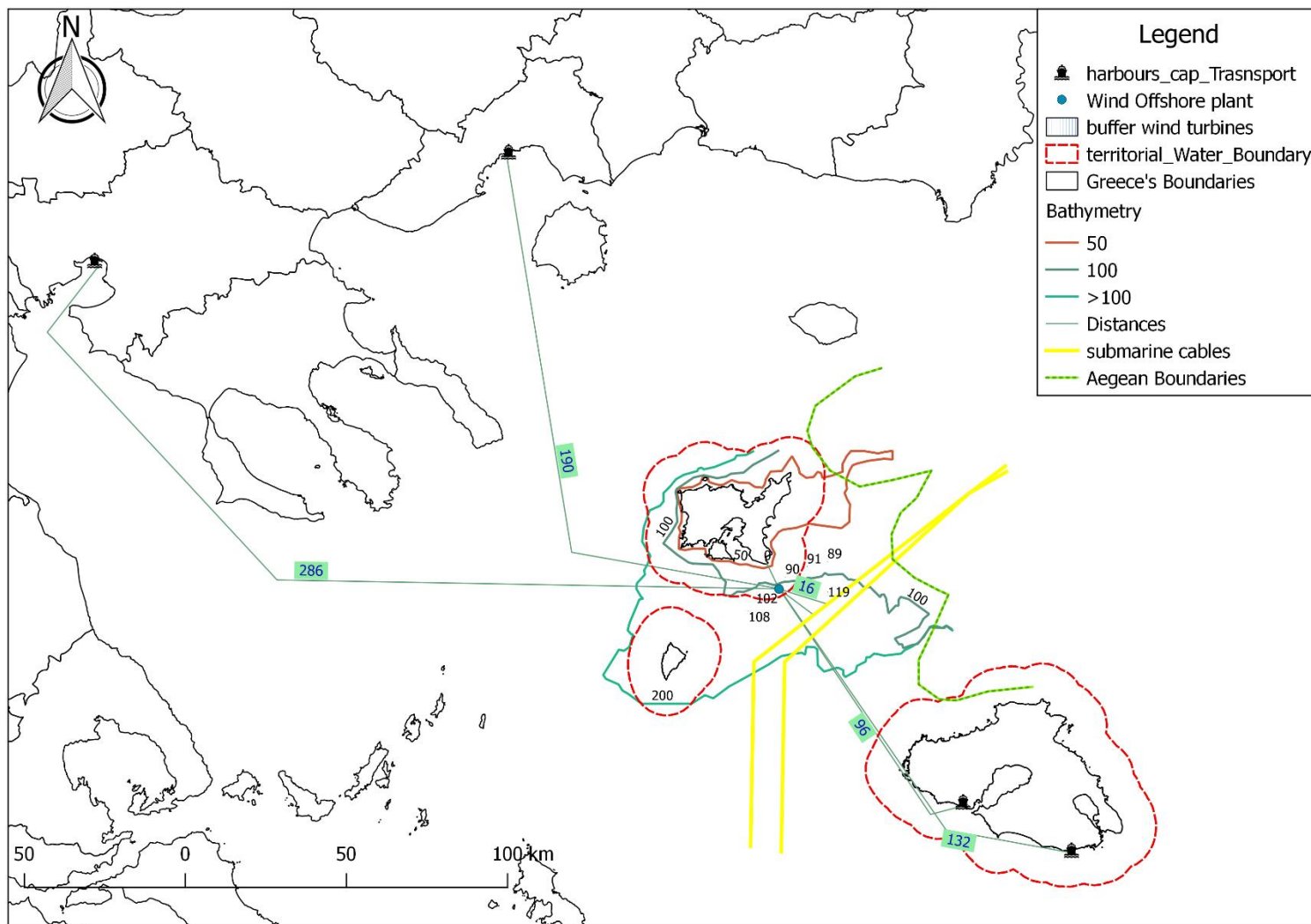


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Lemnos: Closest big ports



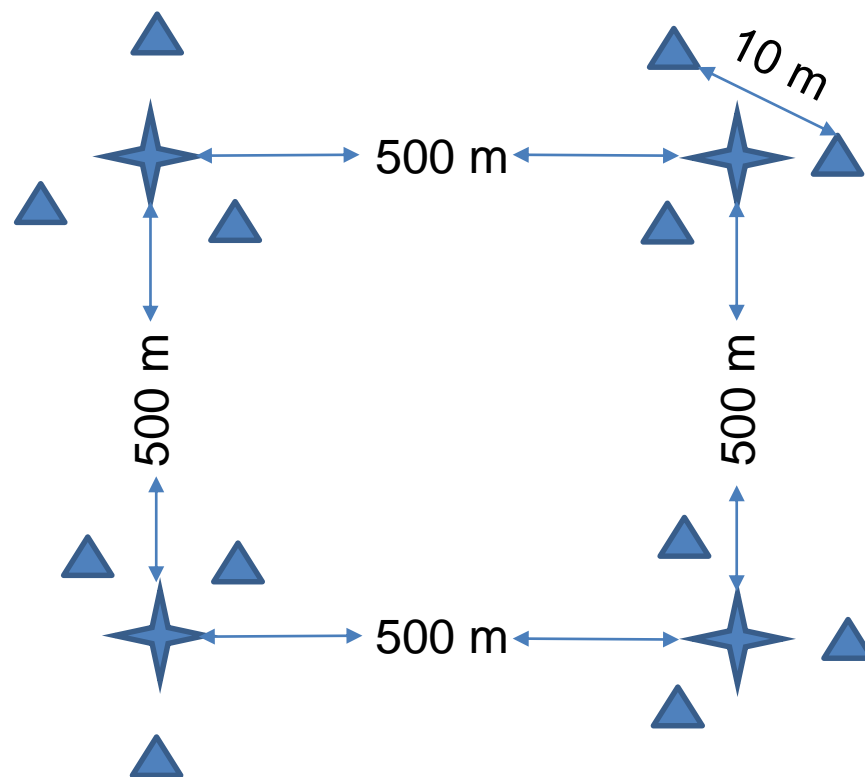
Technology

- Floatgen - Floating Wind Turbine
- Semi-Submersible platform in concrete
- 2 MW capacity
- Potential to supply ca. 5000 inhabitants



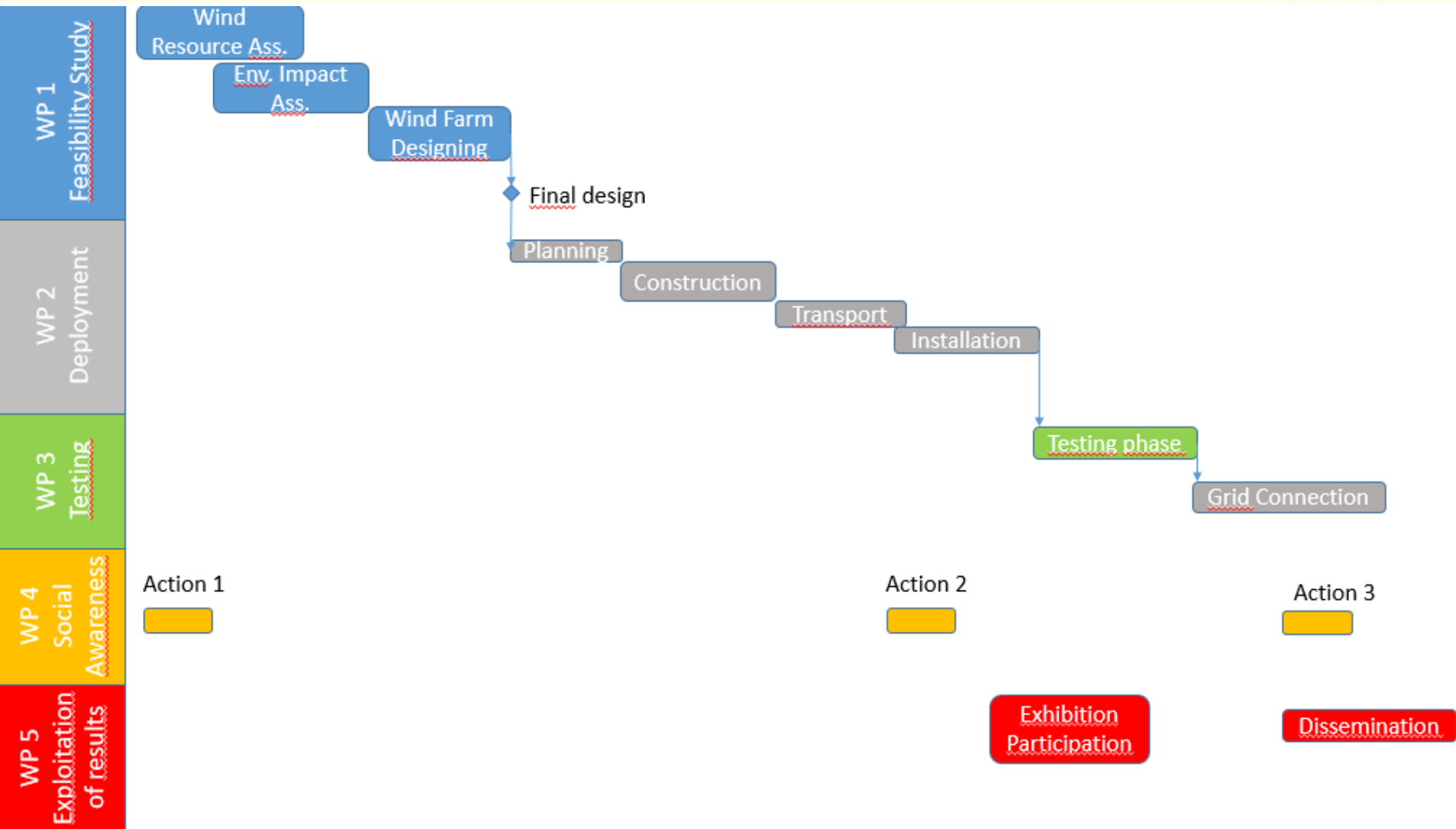
Lemnos: Wind Pilot Plant

- 4 floating wind turbines
- 8 MW power capacity
- Potential for 20.000 inhabitants energy supply
- 80m rotor diameter, 60m hub height, max wave height 16m



Energy storage!

Project Development



Environmental aspects



Dolphins
Mediterranean monk
seals

Navigation, orientation,
communication
affected by underwater
noise



Underwater cables altering
biomass and biodiversity
dependent on the
composition of the benthic
community

Introduction of epibenthic
assemblages – also affects
biochemistry and benthic
composition

EMS effect – no significant
effects noticed



Local nutrient
concentrations, light
and pelagic fishes
abundant offshore

Continuous environmental monitoring!



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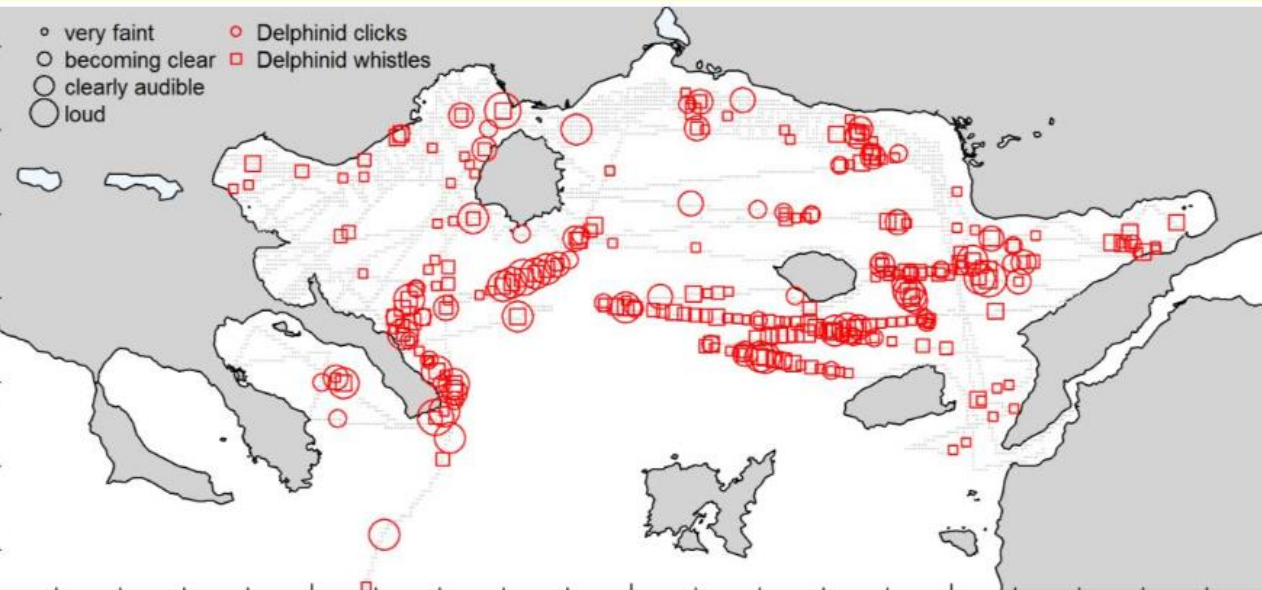


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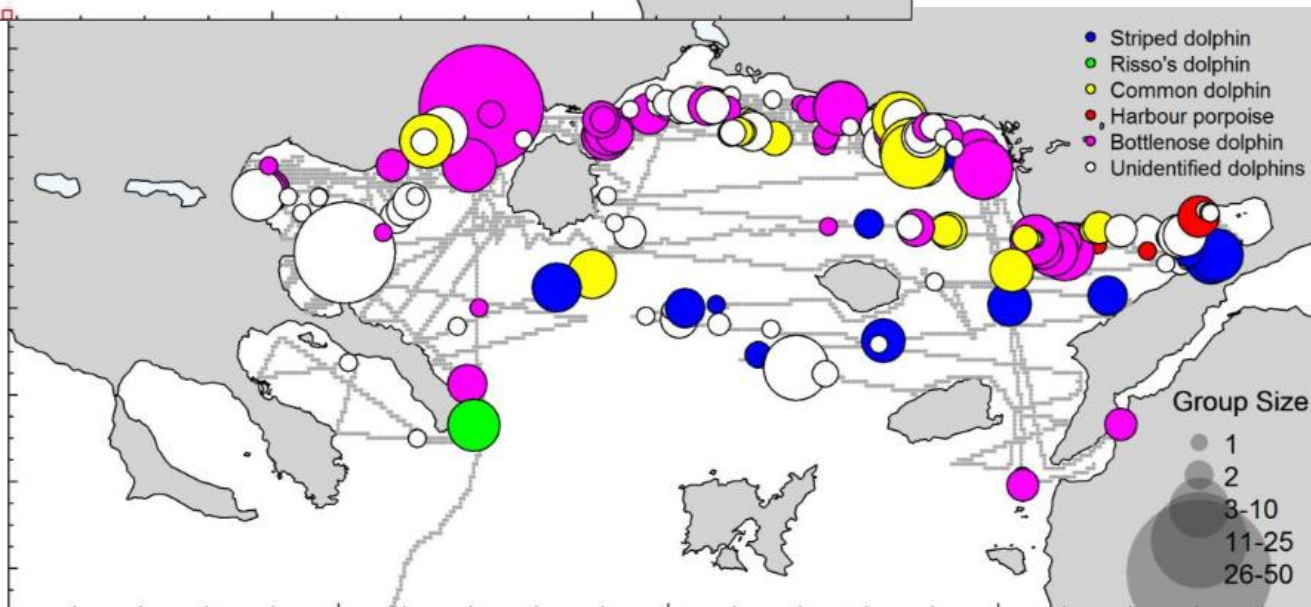
A visual and acoustic survey for mammals

- very faint
- becoming clear
- clearly audible
- loud
- Delphinid clicks
- Delphinid whistles

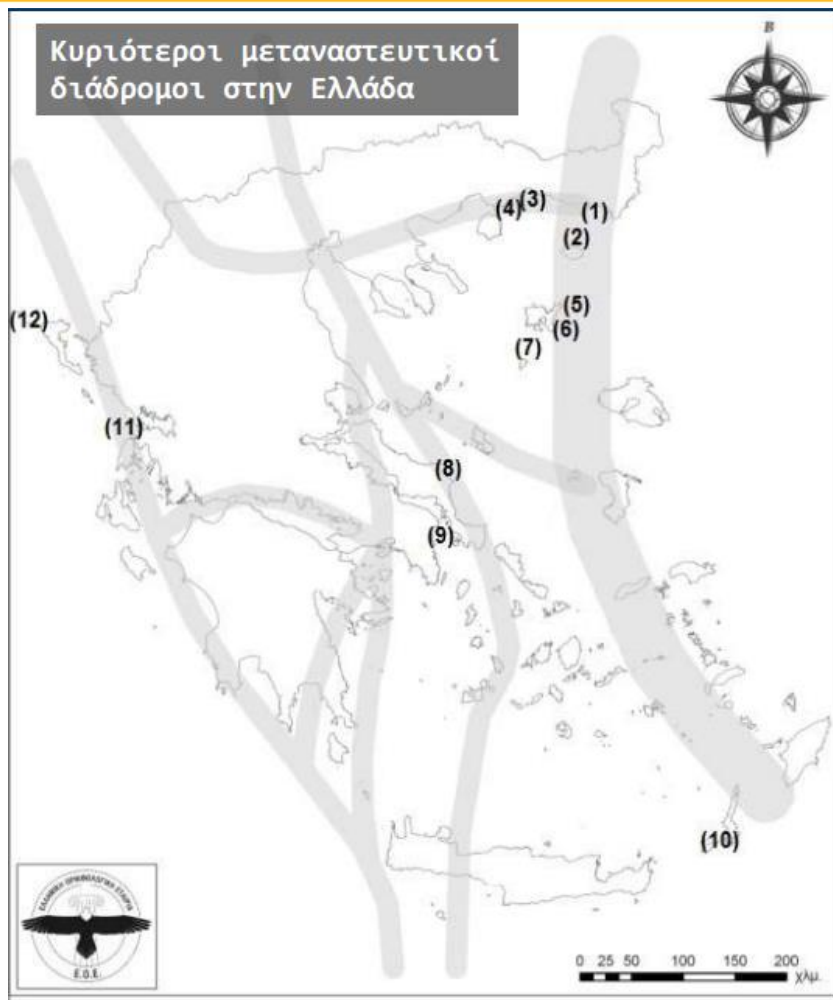
Clicks and whistles
(hydrophones)



Marine mammals
(sightings)



Migration bird routes



Numbers 5 and 6 affect Lemnos.
Potential collisions.

Rotor's swept area represents the greatest risk of collision to flying birds and this clearly overlaps with the 0–50m altitude range within which most seabirds commonly fly.

Tracing radar systems can identify flocks of birds and wind turbines can be shut down on time to avoid collision. Moreover, migrating birds avoid or fly round turbines!

Source: Hellenic Ornithological Society

Social aspects

- **Workshops/meetings** on regular basis starting from “ZERO”

Provide information on:

- Installation/Plant
- 2 W – **Why** and **Where**
- A promising challenge for job opportunities, energy bill savings, Energy Efficiency and independence
- Make citizens BE PART of it
INVOLVE & UNDERSTAND fears/doubts
- **INNOVATIVE**, CHALLENGING, Risky but **PROMISING** pilot with high potentials for transferability

The best solution possible targeted and respectful of local conditions and needs

Stakeholders

Restricted and more targeted meetings/workshops can be arranged depending on – questions – doubts - requirements for:

- Research Institutes & Academia
- Technicians
- Utility companies
- Device constructors/producers
- Installation companies
- Electric network providers
- Coastal and Port authorities
- Public Authorities (national/regional/local Authorities & Agencies etc.)
- Citizens / Unions
- Third parties

DO NOT HIDE ANYTHING: **SHARE DISCUSS INVOLVE & UNDERSTAND PARTICIPATORY APPROACH** GAIN TRUST FACILITATE IMPLEMENTATION



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Financial aspects

Potential barriers for installation

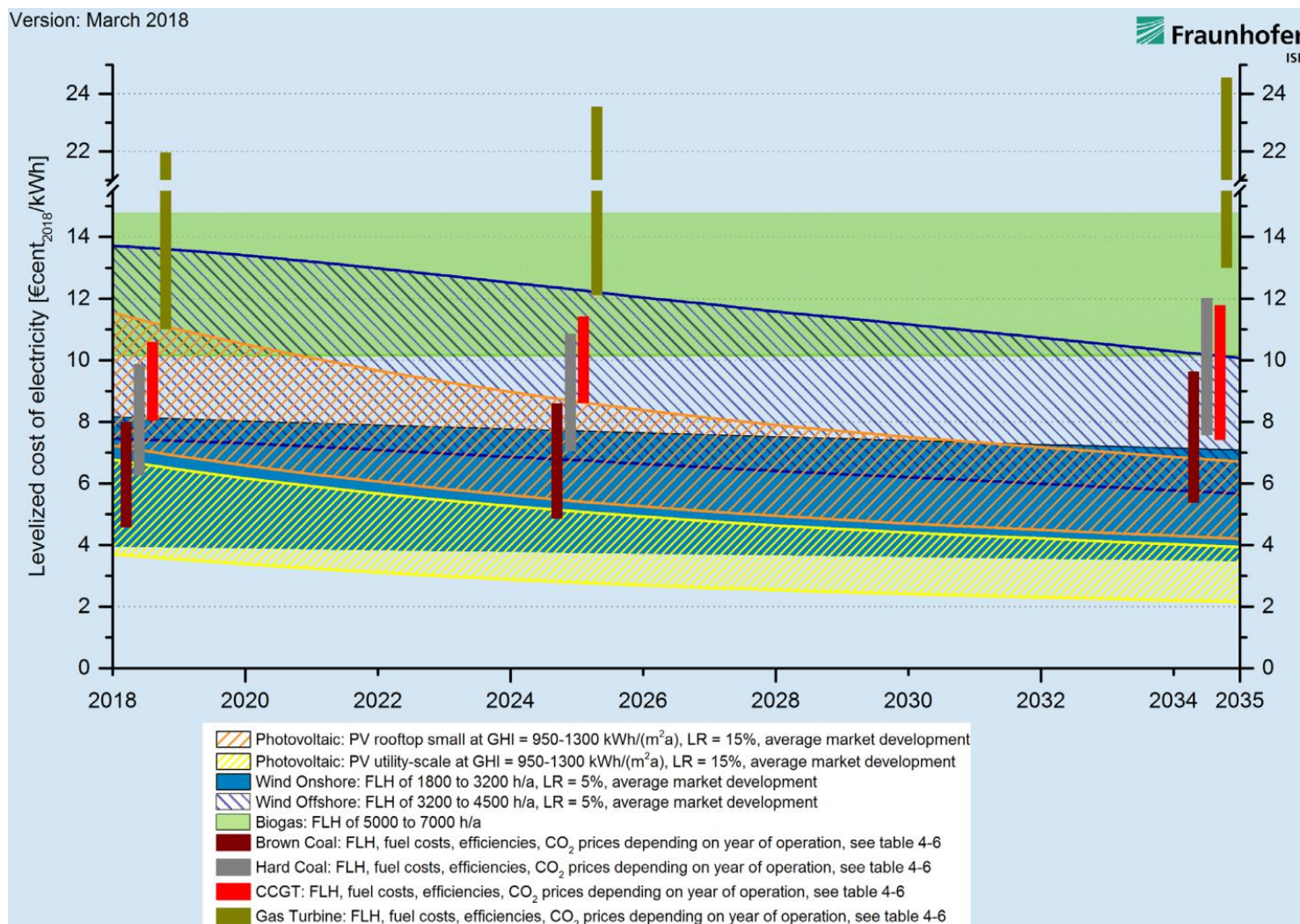
Initial high capital- and operating expenditures are required

BUT

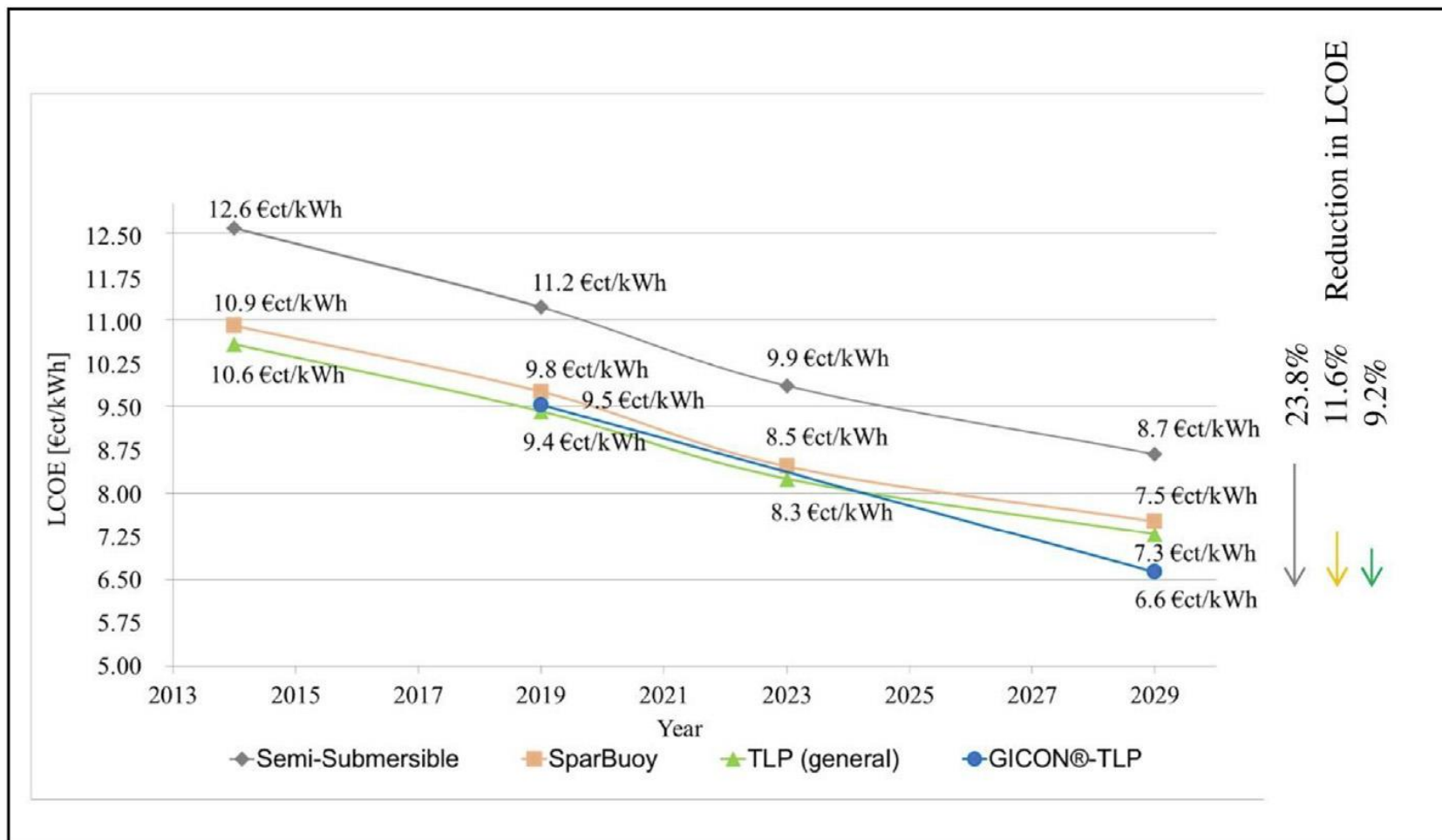


LCOE Comparison (FRAUNHOFER Institute Germany, 2018)

Version: March 2018

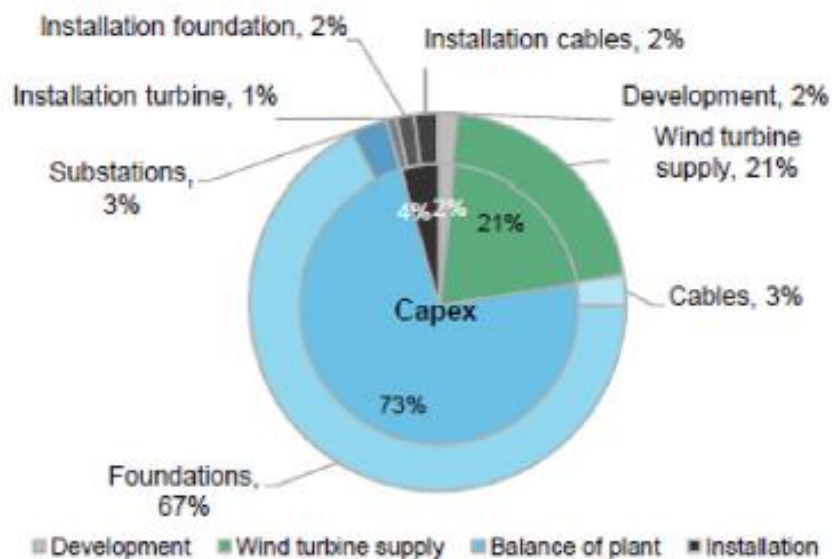


Forecasted LCOE for floating substructures –turbines up to 2MW (Nilsson & Westin, 2014)

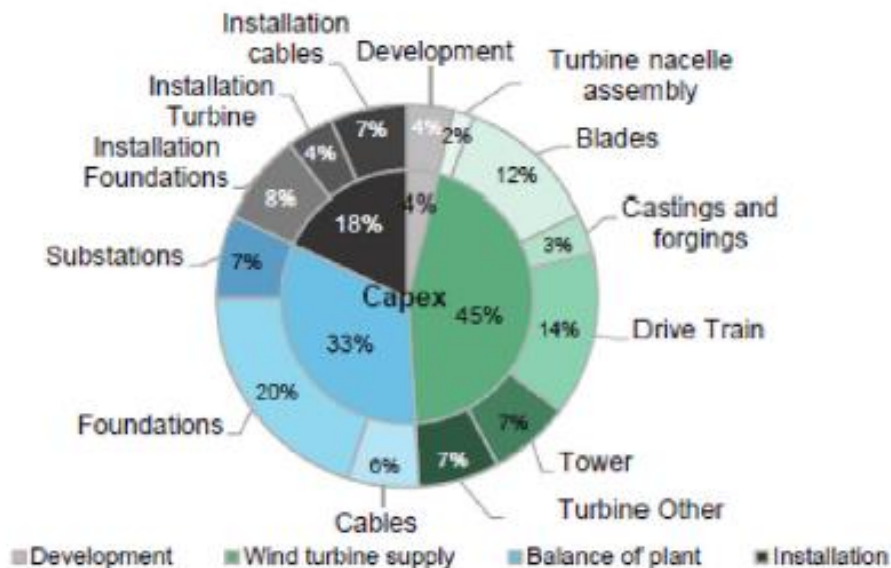


CAPEX breakdown

Floating capex breakdown, 2020 (%)



Conventional capex breakdown, 2015 (%)



Conclusions

- **ESTIMATED TOTAL COSTS:** ~20-30 million €
- **RISKS**

Natural risks could occur due to unpredictable happenings (climate change....etc.....)

Technical risks: unexpected operation/maintenance failures (innovative combination with no previous experience)

Financial risks: as innovative and challenging financial support could require additional efforts to demonstrate its high potentials

Social risks: doubts and fears that can be prevented with full participation and sharing with local citizens and stakeholder

Innovative BUT Challenging
with High - Transferability potentials

Financing opportunities

- European Cohesion Fund
- ERDF (National and Regional Operational Programmes)
- European Investment Bank (different available tools and IFIs....)

Pilot project

Permission procedure is less demanding...

- Risky and challenging but also INNOVATIVE, NEW with high potentials for transferability (Islands E-independency)
- Combined with Aquaculture & Fisheries

Thank you for your attention



BE Team

