

Concept to Reality: Application of biodiversity enhancement structure in an Offshore Wind Farm



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Context

- All immersed structures are bound to be colonized by marine fauna and flora
- Limiting the environmental impact is a priority for the public and have a significant impact on the acceptability¹
- Biodiversity enhancement structures already proved that they can support fisheries²
 - ⇒ Floating Offshore Wind Farms could act as a reservoir of marine species while limiting their impact

Goals

1. Enhance marine biodiversity in fixed and floating OWF
2. Measure the effect of such structures on all surrounding communities: fishes, biofouling, algae, etc...
3. Develop and establish a standardized monitoring method that is easy, reproducible and reliable
4. Reduce the LCOE of floating wind turbine by analyzing natural cleaning phenomenon (predator attraction)

Project development

- Our guidelines:
 - A structure easy to build and to install
 - A structure and a method both repeatable
 - Avoids immersion of other inputs than those of OWF
 - Support any kind of marine life (fixed or mobile, fauna or flora)
- Material: steel/recycled steel
- Form: octagon for better hydrodynamic analysis
- A structure for standardized monitoring: coupon-holding frame
- Able to withstand a fixed or floating OWF lifetime

Analyses

- Species identification algorithm to be updated
- Interaction predator-biofouling
- Reef effect measurement
- Specific measurement on the soft fouling (algae)
- Biofouling analysis on real industrial material:
 - steel
 - concrete
 - mooring chain
 - nylon polymer line

Synergies

- In parallel with deployment of:
 - wind turbines, buoys, sub-station
 - 2 similar structures for comparison in another site
 - another project with a scaled structure (ORLAC-MER)
- Environnant monitoring methods for comparison with ours
- Comparison with planned OWF environmental monitoring



Coupon-holding structure

Offshore scientific measuring station



Optimized habitat

Accredited by:  BRETAGNE ATLANTIQUE

In collaboration with:  

Financially supported by:  

I2FLOW & MOORREEF projects

¹Wüstenhagen *et al.*, 2007 « Social acceptance of renewable energy innovation: an introduction to the concept »

²Vivier *et al.*, 2021 « Marine artificial reefs, a meta-analysis of their design, objectives and effectiveness »