

MODULES

Modelling of marine dunes: local and large-scale evolutions in an OWF context

DURATION: 36 months | **LAUNCH:** 2021 | **Total budget:** €3,339K

CONTEXT

Constantly reshaped by the combined action of marine currents and swell, marine dunes are highly variable sedimentary structures. They are relatively frequent in the North Sea and the English Channel, where future offshore farms are planned. **Their dynamic morphology, which can lead to scour around foundations and buried or exposure of cables, has direct implications for the design, implementation, longevity and safety of offshore renewable energy devices. A correct prediction of dune morphodynamics is therefore essential to limit damage to infrastructures and to design anti-scouring protection. In parallel, it is also necessary to understand the effects that offshore farms can have on these areas of high ecological importance.**

OBJECTIVE

Model marine dune dynamics at different scales to both predict the dunes impact on offshore wind farm components and understand marine dunes resiliency after the construction phase

EXPECTED RESULTS

- Development of a multi-scale approach to assess offshore wind farms - dune morphodynamics interactions: from the grain scale to the dune field
- Development of a thermal model to assess cable heat transfer in marine dunes
- Recommendations for the designing of cables, foundations and scouring protections
- Contribution to the scenarios tested in hydrodynamic models by providing guidance on the model outputs that could contribute to understand ecological resilience of dunes
- Outline of a monitoring program for evaluating ecological resiliency of dune ecosystems

TECHNOLOGIES



STAGES OF THE VALUE CHAIN



Preliminary studies

Conception

O&M

SCIENTIFIC CONTENTS

- Numerical modelling of scouring and sediment transport close to offshore wind farm components
- Numerical modelling of several marine dune fields in an offshore windfarm context
- Thermal studies of a cable buried in a marine dune field
- Physical modelling of marine dunes subjected to complex hydrodynamic forcings
- Pre-study of dune ecological resiliency

PARTNERS



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