

MSc. Thesis Proposal

Title: Offshore Wind Farm impact on the Shipping Logistics

Supervisors

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Introduction

Motivation

The use of offshore wind platforms (fixed or floating) at sea for energy production is increasing, it is estimated that in the coming years the wind farms will jump from about 60 GW to more than 500 GW by 2040, many of them in regions of the intense passage of ships.[1]

Maritime transportation is the most efficient way of transporting cargo, representing about 90% of the world's cargo movement around the globe. For this, the logistics of distribution of goods and fleets must have its schedule closely controlled and any problem can cause several disruptions in the supply chain, as well seen in recent cases such as the Pandemic and the ship stuck in Suez Canal, Ever Given.

To reduce the impact of the wind farm on shipping logistics a study of the impact of the construction, operation and decommissioning of an offshore wind farm on maritime logistics should be conducted in each proposed construction area.

Existing work

In the European Union, as the pioneer in the installation of offshore wind farms, there is already a guide to what would be necessary to be assessed for the installation of a wind farm, but this differs for each area and sector, as well as with local trade and the proximity or not of ports.[2]

Moreover, there are a few studies on the impact of a wind farm on the shipping industry, but most of them are for a specific location and need to be readapted to use in other locations. [3]–[6]

Objectives

To analyze the impact of the construction and operation of a wind farm on maritime transport.

The current scenario is proposed but is neither stressed nor definitive, and may vary according to the proposition of the site to be studied:

- State of the art of similar studies.
- Site definition, with main characteristics, logistics and rules to implement an offshore wind farm.
- Study and analysis of at least one year of maritime traffic in the region affected.
- Simulation of different scenarios to assess impacts on vessels, such as GHG emissions, fuel consumption, and logistical delays, among others.
- ...

Requisites

Applicants must have:

- General knowledge of ship logistics.
- General knowledge of wind farm logistics and lifespan stages.
- Coding experience with python or similar.



Good to have:

- Linux experience.
- Git experience.

Added value to have:

- Knowledge of port logistics.
- Knowledge of ship rules (e.g., MARPOL).

Location

The student must be present at the office at least 4 days per week. This is mandatory to pursue a thesis with blueOASIS.

blueOASIS (www.blueoasis.pt) offices at Oeiras or Ericeira
Edifício D.Pedro, Quinta da Fonte, R. Malhões, 2770-071 Lisboa
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Companies Involved

blueOASIS is a young team with more than 60 years of combined knowledge and experience in Aerospace, Mechanical, Naval and Maritime engineering. The multicultural and multidisciplinary team is committed to making our oceans safer and greener, using state-of-the-art numerical and data science tools. BlueOASIS focuses on renewable energies, ocean cleaning, decarbonization, sustainable offshore structures and green ships optimization.

Technomar is a high-tech naval and ocean engineering company serving the upstream oil & gas, ports, and maritime logistic sectors for almost 20 years. The team offer a broad range of services such as naval architecture, floating unit design, mooring systems, model tests and manoeuvring simulations.

References:

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- [2] European MSP Platform, “Conflict fiche 7: Maritime transport and offshore wind.” Accessed: Nov. 07, 2022. [Online]. Available: <https://maritime-spatial-planning.ec.europa.eu/sector-information/transport-and-offshore-wind>
- [3] A. Rawson and E. Rogers, “Assessing the impacts to vessel traffic from offshore wind farms in the Thames Estuary,” vol. 43, no. 115, pp. 99–107, 2015.
- [4] V. Trueba, Á. Rodríguez-Luis, S. Fernández-Ruano, and R. Guanche, “Impact of vessel logistics on floating wind farm availability,” in *Journal of Physics: Conference Series*, Sep. 2021, vol. 2018, no. 1. doi: 10.1088/1742-6596/2018/1/012041.
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- [6] OSPAR Commission, “Biodiversity Series Problems and Benefits Associated with the Development of Offshore Wind-Farms,” 2004.