Ecosystem impacts from offshore wind farms: Cross-border overview of lessons learnt from England and Belgium

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Introduction

•The EU has set a target that 20% of energy used within the EU should be generated from renewable sources by 2020[1].
•Marine offshore wind farms (OWF) are considered to be the most promising options for increasing energy security [2].
•England and Belgium have set targets of 20% and 13% respectively, to generate electricity supply from renewable Sources [3,4].
•This work aims to showcase synergies and priorities assessed over 2 OWFs at England and Belgium.

Marine Renewable Energy (MRE)

•**MRE** is considered to be on the most promising strategy to reduce carbon footprint worldwide [5].

•Trade-offs associated with OWF during different phases:
*Construction
*Operation
*Decommissioning

•There are biological effects on marine life
•There is a need to minimise impacts on ecological receptors: fish, birds, benthic communities and marine mammals

Study sites

Thanet (TOW)	Thornton Bank (TB)
Located 11.3km offshore from Foreness Point	Located 27 km off the coast
A total of 100 Vestas V9 wind	24 turbines (Phase II and III)
Monopile turbines	Gravity-based &jacket foundations
Capacity = 300MW	Capacity =325 MW

Table 1. Background of the study sites.

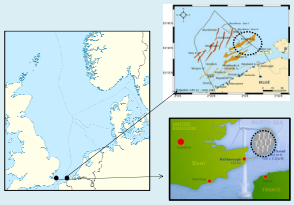


Figure 1. Location of study sites, Thanet and Thornton Bank OWFs.

Key facts

•The Environmental Impact Assessment (EIA) process is broadly similar for both counties.
• A series of steps to gain consent prior to a OWF construction project were addressed.

Common Biological Issues

Site / Receptor	Aims of the survey	Key concerns
Thanet OWF	Monitoring monopile and adjacent sediments	• Assessing faunal colonisation of monopiles and scour effects assessment • Sabellaria spinulosa aggregations Assessment
	Monitoring fish presence and the effects of underwater noise	• Effect of exclusion and displacement of fisheries • Effects of noise during construction (pilling)
	Marine mammals	• Marine mammals monitored but not considered to be an issue in the area
	Seabirds	• Attraction-avoidance • Collision risk
Thornton Bank OWF	Monitoring the surrounding sediments around monopiles	• Organic matter issue on soft sediments • Effect of exclusion and displacement of fisheries
	Monitoring epifauna and fish on artificial hard substrates	• Proliferation of non-indigenous species • Changes in food availability for fish • Attraction-production of fish
	Underwater noise and marine mammals	• Range of disturbance • Repopulation speed
	Seabirds	• Attraction-avoidance • Collision risk

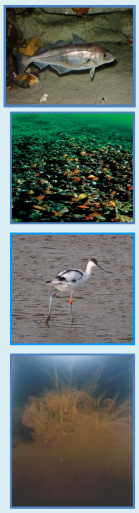
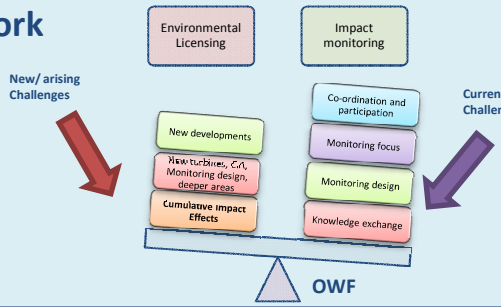


Table 2: Site-specific biological surveys to tackle key issues during monitoring.

Conclusions and future work

•There will be new OWF projects
•New technology issues that the industry, regulators and scientists will have to overcome
•Other methodologies (CIE) will have to be implemented



•There are still challenges associated to OWFs.
•There is still the need to monitor to assess changes in the marine environment
•Communication of findings is key to inform OWF projects

References: [1] Directive 2009/28/EC; [2]Renewable UK(2011) [3] Degraer, S. et al. (2012), [4] Lindeboom, H. J. et al. (2011), [5] Boehlert, GW & Gill, AB(2010).

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