GEOSISMEM

Geophysical surveys for the seabed characterisation of the offshore renewable energy sites

DURATION: 52 months (2018-2022) | **BUDGET:** €775k


© Fokke/AdobeStock

CONTEXT

Competitiveness, and therefore cost reduction, is a major concern for the offshore wind industry. In this context, preliminary geotechnical studies are particularly concerned because they are costly. These are crucial for the design of the foundations and anchors of the wind turbines, as they allow the characterisation of seabed mechanics. **However, this type of study requires campaigns at sea with the deployment of corers to take soil samples which are then analysed in the laboratory. It is therefore necessary to better correlate geophysical and geotechnical data in order to limit the costs of characterising offshore wind farm sites.**

OBJECTIVE

To develop a new methodology for seabed characterisation using a combination of geophysical and geotechnical data to prepare recommendations for the offshore wind sector

MAIN ACHIEVEMENTS

- New methodologies for geophysical data processing
- Multitrace seismic and electromagnetic geophysical measurement campaigns
- Design calculation of a pile from geophysical and geotechnical data
- Recommendations for the integration of geophysical data into site characterisation for project engineering

CONCLUSION

GEOSISMEM carried out a geophysical eabed characterisation of the Calvados offshore wind farm and the Groix & Belle-Île floating wind farm using non-conventional methods. This was compared with the geotechnical characterisation carried out by the wind farm developers prior to the projects. The data sets from both approaches were used to carry out a pile design test. The acquisition of more consistent data would make it possible to consolidate this promising approach.

TECHNOLOGIES

STAGES OF THE VALUE CHAIN

Preliminary studies

ASSOCIATED RESOURCES

- **State of the art** of geophysical techniques applied to the deep exploration of offshore renewable energy sites
- **Recommendations report** on geophysical and geotechnical characterisation of ORE sites
- Paid access **publication** : Flamme *et al.* (2019) **Combining marine electromagnetic and high resolution seismic imaging: application to shallow gassy environment.** SAGEP Proceedings, Vol. 2019, pp. 1-4
- **Judith Flamme's PhD thesis in 2021**: Nouvelle approche de l'étude du sous-sol marin : application conjointe de l'électromagnétisme, de la sismique multitrace et de la géotechnique
- **Geophysical database** acquired on the Calvados offshore wind farm site (electromagnetic and seismic) and the Groix & Belle-Île floating wind farm site (seismic)

PARTNERS

This project benefited from a €175k French State funding, managed by the National Research Agency under the Investment for the Future Programme (ANR-10-IEED-0006-27). It also had the financial support of the Région Bretagne.

© France Energies Marines, 2022