

LISORE

Innovative and cost-effective offshore substations for ORE by 2025

DURATION: 17 months (2019-2020) | BUDGET : €476K

CONTEXT

Usually, offshore wind farms are connected to the land grid via offshore substations using regular bottom fixed structures. This technology would connect 62% of France's potential. The remaining 38% represent a technical challenge. Floating offshore wind farms are installed in deeper waters that are too costly for bottom fixed substations. **A floating solution could be more relevant, in parallel with the development of dynamic cables supporting higher voltage levels than existing solutions. The latter are necessary for connection to turbines and to the network. The subsea substation also represents a plausible industrial alternative that has not yet been considered for high voltage connection.**



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TECHNOLOGIES



STAGES OF THE VALUE CHAIN



Preliminary studies



Design



O&M

OBJECTIVE

To identify technological bottlenecks and potential solutions which will enable the reduction of the total cost of marine substations by 2025 for commercial floating wind farm projects.

MAIN ACHIEVEMENTS

- Technical feasibility study for floating or subsea substations adapted to offshore renewable energies
- Feasibility study of the system and the associated maintenance plan
- Economic evaluation of their global ownership cost
- Identification of technological bottlenecks relating to the materials and processes required for innovative substations with a TRL below 5

CONCLUSION

LISORE has investigated innovative solutions for electrical substation of offshore wind farms, anticipating the future of offshore renewable energy in deep waters, far from shore. The conducted work was set as a reliable methodology to study the reliability of the substation as a system, unifying electrical and naval structural disciplines. Pre-sizing of different concepts has been performed, and the corresponding total cost of ownership was calculated, including installation, maintenance and downtime costs. MOSISS which was launched following LISORE focuses on the modelling of the monitoring and maintenance strategies in reliability calculations, in order to optimize the maintenance of floating offshore substations.

AVAILABLE RESOURCES

- **Conceptual designs** of electro-technical architectures and equipment for both submerged and floating substations
- **Pre-sizing of floating substation** : topside, floater and mooring system
- **Methodology** for unified electrical and structural time-variant reliability computation
- **Numerical tool** for calculation of total cost of ownership of floating substations, including installation, maintenance and downtime costs
- **Database of failure rates estimation** of the primary components of the substation
- **List of technological barriers and associated bottlenecks** regarding critical components of floating and subsea substation

PARTNERS



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