

## **Brief description of R&D activities of FEM**

FRANCE ENERGIES MARINES defines and operates an ambitious and multidisciplinary R&D programme that looks at the different MRE sources and barriers with a transverse approach. This strategy, which is quite unique to FRANCE ENERGIES MARINES, intensifies the synergies between the various actors and sectors, optimising the R&D investments and accelerating the improvement of the cost and technical performances of MRE technologies. The R&D themes developed concurrently with the demonstrator assessment activity include:

1. technological innovations oriented towards the development of reliable, high-performance and competitively priced MRE technologies (description of the environment and resource assessment, energy efficiency of recuperators, development of simulation tools, foundations and moorings, reliability of materials and structures, operations at sea, system life cycles, connection to and integration in the grid, storing of energy and by-products, industrialisation of construction processes etc.; and
2. extensive knowledge and well-supported data about non-technological aspects (environmental impact, acceptability with respect to other uses, changes in regulations, economic production models for marine renewables, etc.).

The list of some of our current R&D projects are listed below:

1. Aero-Hydro Elastic response of offshore wind turbines (fixed & floating) Partners: IFP-EN, ECN, AREVA, DCNS, EDF, TECHNIP
2. Expert system for estimation of power produced by wave turbines Partners: ECN, EDF, STX, DCNS
3. Forecast models for wave and tidal current interactions Partners: EDF, DCNS, ALSTOM, STX, IFREMER
4. UXO (Unexploded Explosive Ordnance) detection Partners: Geocean, EDF, IXBlue, ENSTA Bretagne
5. Methodology for Impacts studies of tidal turbines (GHYDRO) Partners: IFREMER, DCNS, EDF  
Biogeochemical impact of deep water outlets in OTEC Partners: DCNS, IFREMER, UBO, CNRS, GEOCEAN
6. Subsea observatories for MRE Partners: IFREMER, ENSTA Bretagne
7. Hydrodynamic benchmark for the study of non-linear wave/structure interactions of large wind turbine foundations (BHFM) Partners: INNOSEA, ECN, AREVA, EDF, STX
8. Characterisation of the biofouling on EMR sites (protocols and instrumentation) and development of prevention solutions Partners: ECN, EDF, DCNS, Ifremer, Corrodys
9. Modelling of MREs integration in the context of multiple existing maritime activities (EMUE) Partners: UBO
10. Evaluation and monitoring of tidal turbine impacts on Benthic communities – Acoustic index of benthic communities biodiversity on hard bottom seabeds. (Benthoscope) Partners: UBO
11. EMACOP (Coastal, Ports and Marine energies) Partners: CEREMA, ECN, IFREMER...