

EERA Ocean Energy Joint Programme

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Number participants and associates:	10 from 8 European Countries, 38 person years committed

Why a Joint Programme on Ocean Energy?

The EERA Ocean Energy JP is based around six key Research Themes. These themes have been developed based on existing research which identifies the critical areas of research required for the successful growth of the industry. Within each Research Theme a number of sub-themes have been identified as key long term research objectives. The gap between what has been identified as a key long term objective and what the EERA Ocean Energy JP is actually able to deliver will help identify issues that need future funding and coordinated research efforts.

Research Theme 1: Resource - This research activity will:

- Develop a better understanding of the wave and tidal resources with regard to annual resource, seasonality, annual variability and weather windows in order to better determine locations for future device arrays.
- Extend the knowledge of forecasting waves both in the short and in the long term
- Deepen into the understanding of extreme waves and its affection to the survivability of devices
- Advance the measurement techniques in order to allow accurate buoy-numerical comparisons and extend the array-waves interaction

Research Theme 2: Technology - This research activity will:

- Investigate array effects using simplified parametric models, or through fast approximate solutions, aiming to reduce computational time while preserving accuracy into pre-established limits.
- Explore breakthrough solutions in PTO concepts could lead to step change improvements in cost, performance and reliability. This will take into consideration the control variable and robustness in implementing control strategies at device level and at array level.
- Explore global 'resource-to-wire' models for the performance assessment of grid connected ocean energy converters.
- Investigate different O&M strategies applied to the ocean energy sector looking at essential, predictive and corrective maintenance strategies.
- Examine interactions of moorings and foundations with devices and arrays looking at nonlinear effects and soil interactions.

Research Theme 3: Deployment and Operations - This research activity will:

- Assess the reliability of ocean energy components utilising results from sea trial data and adapting supplier characteristics. Potential gaps on data availability should be identified and tried to be filled by targeted funding of demonstration projects. This will contribute to the development of an integrated reliability model for wave and tidal ocean energy array devices.
- Examine the issues surrounding farm array planning with a focus on four key aspects: performance, operations, environmental constraints and electrical requirements.
- Study the potential for shared infrastructure across both the ocean energy sector itself as well as with other sectors such as offshore wind and oil and gas.

Research Theme 4: Economics and Costs - This research activity will:

- Work towards developing a deeper understanding of the key cost drivers of the ocean energy sector by gathering information on previous projects and collecting the knowledge from other existing renewable energy sectors.
- Quantify the cost reduction potential of ocean energy and prioritise research in the following key areas to unlock that potential and achieve full cost reduction: new designs, materials, components, installation and O&M methods and equipment.
- Seek adequate business models and work towards adopting policy support and finance mechanisms to the particular conditions of ocean energy first arrays, in order to accelerate de-risking of projects to acceptable levels.

Research Theme 5: Environmental and Socio-Economic Impacts - This research activity will:

- Share and compare methodologies and databases to conduct environment studies on physical and biological impact.
- Focus on cumulative impacts not only due to the shift from single device to array, but also to concurrent usages of the coastline or to the effects of the global change.
- Investigate the better appropriation and adaptation in the local practices of European Framework directives and recommendations that should facilitate the social acceptance of MRE deployment.

Research Theme 6: Research Infrastructure, Education and Training - This research activity will:

- Coordinate and work to enable the development and management of pan European pan technology training courses as part of the development of an Ocean Energy Academy to ensure a continuous supply of skilled personnel to the EU ocean energy sector.
- Catalogue the physical test tank facilities in Europe.
- Investigate the scaling issues of combined wind and waves in test tanks.

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