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# SPECIAL REPORT

## ORECCA – Offshore Renewable Energy Conversion Platforms Coordination Action

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### Project objectives

ORECCA is a Coordination and Support Activity type project which started in March 2010 funded under the Seventh Framework Programme (FP7) by the European Commission Directorate-General (EC DG) Research. The project stimulates collaboration in research activities leading towards innovative, cost efficient and environmentally friendly offshore renewable energy (ORE) conversion platforms for wind, wave and other ocean energy resources, including their combined use. This is being achieved through the development of a first European road map for the entire marine renewable energy sector. The project therefore focused on establishing the state of research, technological development and demonstration activities on offshore renewable energy conversion platforms and on the definition of strategic priorities, including socio economics aspects, for the development of offshore renewable energy conversion technologies and markets. Another objective of the project was to overcome the knowledge fragmentation existing in Europe and stimulate the key experts to provide useful inputs to industries, research organizations and policy makers on the necessary next steps to foster the development of the ocean energy sector in a sustainable and environmentally friendly way. This is achieved through the creation of a framework for knowledge sharing ([www.ORECCA.eu](http://www.ORECCA.eu)).

### Resources

The three geographical target areas are the North & Baltic Sea, Atlantic and Mediterranean & Black Sea. Potential building plots have been identified based on the amount and type of renewable energy resource available and on the sea characteristics together with consideration of the offshore and onshore infrastructure (Figure 1).

All in all about 70% of all offshore renewable energy resources can be found in water depths of more than 50 m (Figure 2), the “hot spots” for energy harnessing being identified as the western facing Atlantic coastline (UK, Ireland, Spain and Portugal) and the northern North Sea (Norway, UK).

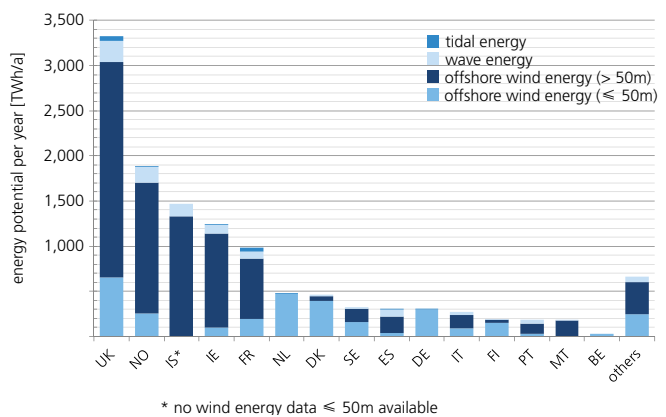


Figure 1: Potential of offshore renewable energy resources of selected European countries

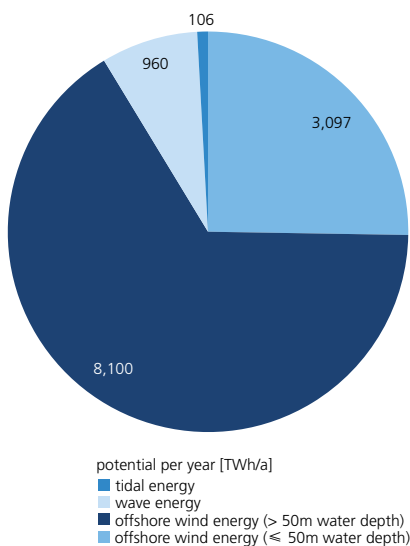


Figure 2: Share of offshore renewable energy resources in European waters

### Installation schedule

Offshore wind energy and ocean energy in North-, Baltic- and Mediterranean Sea and the European Atlantic regions together could technically provide all of Europe’s future electricity demand. Around 3.8 GW of offshore wind turbines are already installed throughout Europe (end 2011); the water depth and distance to shore of offshore wind farms locations rose from under 20 m and 20 km to 40 m and 40 km (Figure 3). These numbers will increase further in the coming years, considering the huge distances of the projects in the German EEZ and the

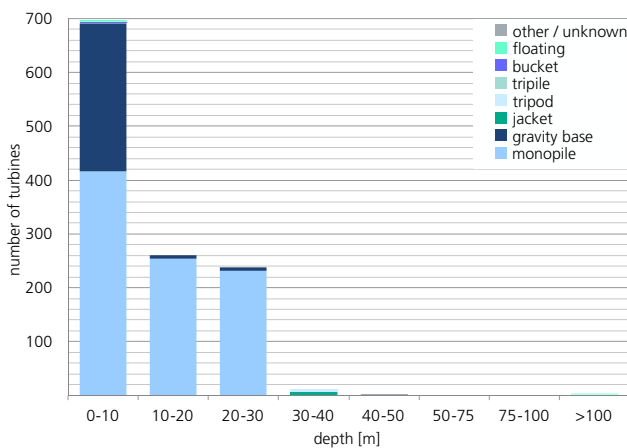


Figure 3: Foundation types of wind turbines in fully functional offshore wind farms in certain water depths [IWES, 4COffshore 2012]

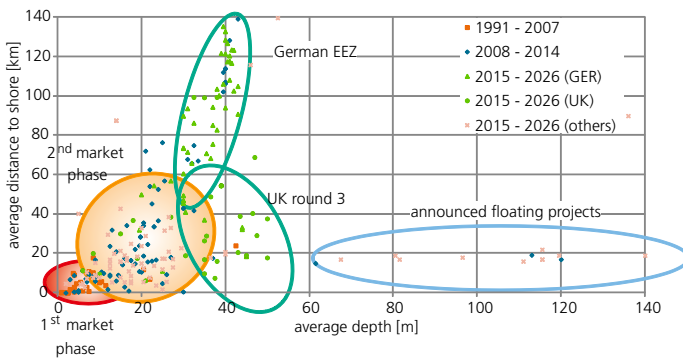


Figure 4: Development of the offshore wind market in terms of water depth and distance to shore up to 2026 [IWES, 4COffshore 2012]

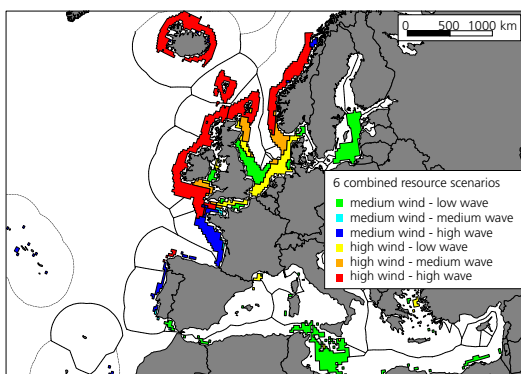


Figure 5: Identified areas of combined wind- and wave resources in Europe [RSE]

water depths of the announced floating wind projects in the North- and Mediterranean Sea (Figure 4).

Investigations during the project lead to the observation that the utilization of ocean energy follows about ten years behind that of offshore wind energy regarding immaturity of technology and realized projects. In addition, the current installation pipeline of offshore wind capacity exceeds current projections by 100% in 2020 (Figure 6), while the installation pipeline of ocean energies currently falls below the 2020 targets by 50% (Figure 7).

**Combined resources**

Considering these numbers, facts and projections the project proposes the colocation of wave- and wind projects in order to benefit from a shared infrastructure (electrical grid, port facilities, installation- and service vessels) as the utilization of combined conversion platforms is immature. A number of adequate areas have been identified and classified with respect to the intensity of present wave- and wind resources (Figure 5).

This map amongst many others (bathymetry, wind speeds, wave energy, wind-, wave- and tidal projects locations...) can be accessed via the webGIS application, integrated into the ORECCA website.

**Roadmap**

Distilling the results from nine extensive technical reports covering the aspects of investments & grants, environment, resources, site selection, design tools & standards, state of the art platform technologies, synergies, offshore grids and installation infrastructure into one roadmap, the ORECCA project proposes the following steps and measures to boost the development of ORE conversion technologies and markets:

- While offering huge resources ORE are currently not competitive without market incentives. Funding and public support is generally well established and appropriate. But in only 4 out of 12 countries investigated the production based incentives (PBI) are significantly higher for wave and tidal – than for

offshore wind energy. In order to accelerate the use of the untapped ocean energy resources it is proposed to enhance and extend capital support, incentives and funding for ORE.

- Regarding the technology it is required to focus on cross-technological standardization of components and procedures, enhance collaboration as well as knowledge transfer from neighbouring industry sectors and gather more performance data and operating experience in the field.
- The requirements towards installation infrastructure such as ports and vessels have to be further investigated with respect to the needs of the offshore wind- and ocean energy industry, in particular when considering increased water depths and distances to the coast of future projects at the resource hot spots identified. The development should be directed towards the combined respectively shared use of infrastructure. The electrical offshore grid should be extended to a pan-European scale, not neglecting the reinforcement of national grid capacities, especially in Norway, Ireland and the UK.
- On the environmental issues it is proposed to extend research on cumulative effects, EMF effects of subsea cables, flow alteration, sedimentation and habitat change and mitigating actions for piling.
- Furthermore it is proposed to harmonise legislation and regulation on a transnational level, leading to the establishment of streamlined one-stop-shop marine consenting systems, maritime spatial plans and strategic environmental assessment in all relevant countries. Legislation and regulation should evolve together with the growth and development of the offshore energy industry and compliance should be ensured by clearly defining and properly communicating these rules and laws.

The full roadmap and the executive summary together with all reports can be accessed via the ORECCA website. Visit [www.ORECCA.eu](http://www.ORECCA.eu) for further information.

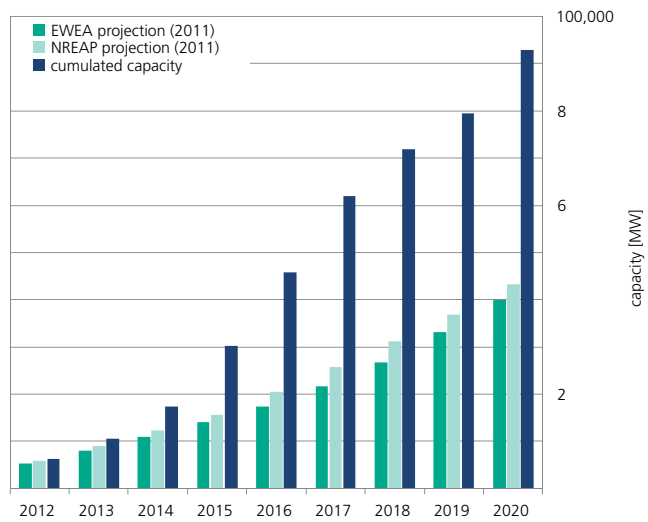


Figure 6: Offshore wind installation projections and schedule of European countries [IWES, 4COffshore, 2012]

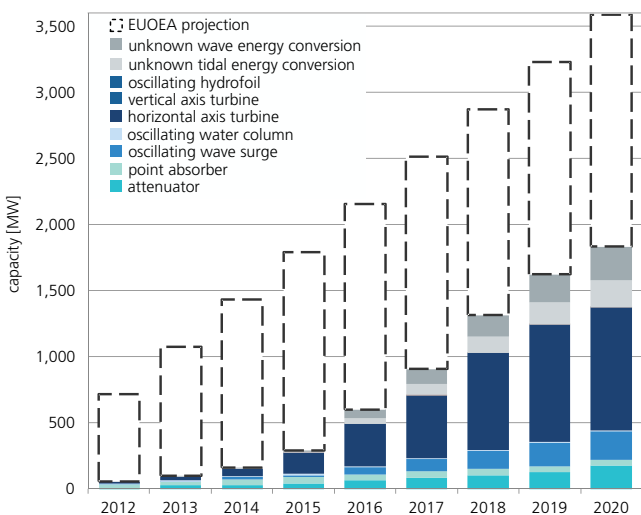


Figure 7: Installation projection and schedule of different wave and tidal conversion technologies in Europe [IWES, 2012]

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- <http://www.4coffshore.com/windfarms>
- <http://www.orecca.eu/>

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