PANEUROPEAN R&D ON VERY LARGE OFFSHORE WIND TURBINES: THE HIPRWIND PROJECT

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HiPRwind (read "hyperwind") is an EU project introducing a new cross-sectoral approach to the development of very large offshore wind turbines. Focused on floating systems, this 5-year pan-European R&D effort will develop and test new solutions for enabling offshore wind technologies at an industrial scale. The project is designed with an "open architecture, shared access" approach in that the consortium of 19 partners will work together, in a collaborative way, to develop enabling structural and component technology solutions for very large wind power installations in medium to deep waters. Results of general interest will be shared within the broader R&D community working on future wind energy solutions.

A central outcome of HiPRwind is to deliver a fully functional floating wind turbine installation at approximately 1:10th scale of future commercial systems, deployed at real sea conditions. This research & testing facility, a world's first, will be used to research new solutions and generate field data. The project will address critical issues of offshore wind technology such as the need for extreme reliability, remote maintenance and grid integration with particular emphasis on floating wind turbines, where economic and technical weight and size limitations of wind turbines and support structures can be overcome.

As can be seen in Figure 1 and Figure 2, prepared by Acciona and 1-TECH in the context of the project MARINA Platform, the offshore wind resource available in shallow waters is very limited and it is needed to find solutions for deepwater areas.

Innovative engineering methods will be applied to selected key development challenges such as rotor blade designs, structural health monitoring systems, reliable power electronics and control systems. Built-in active control features will reduce the dynamic loads on the floater in order to save weight and cost compared to existing designs. HiPRWind will develop and test novel, cost effective approaches to floating offshore wind turbines at a lower 1-MW scale.

In this way, the project will overcome the gap in technology development between small scale tank testing and full scale offshore deployment. Thereby, HiPRwind will significantly reduce the risks and costs of commercialising deep water wind technology. The HiPRwind project will make use of existing test locations which offer a favourable permitting situation and infrastructure such as grid connection and monitoring facilities already in place.

The main aspects that the project will deal with are:

- Design of the floating support structure and its moorings system.
-Construction of the full demonstrator unit, its assembly at port facilities and installation at the offshore test site.
- Critical aspects of the floating wind turbine, such as the structure and its system dynamics, the controller, condition and structural health monitoring systems, and the rotor based on innovative blade designs and features.
- High reliability power electronics will be designed, assembled and tested in the lab at a multi-MW scale.

The project also has dedicated work for dissemination and Intellectual Property Rights exploitation, addressing also non-specialist and non-technical target groups, as well as project management drawing on both research and industry consortium members.

The full impact of the HiPRwind project will be ensured by the strong and close collaboration of participating best-in-class industrial and R&D players in the maritime and wind energy sector with a strong background on successful industrial development in harsh environments.

HiPRWind is a collaboration between nineteen partners from all around Europe. This research project has received funding from the European Union's Seventh Framework Programme [FP7/2007-2013] under Grant Agreement Number 256812.

Figure 1: Simplified European Bathymetry

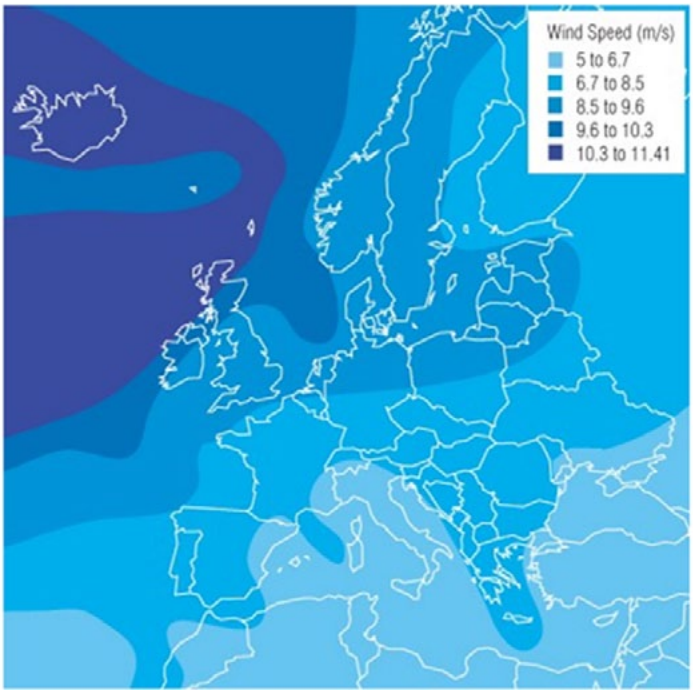

Figure 2: Wind speed areas in the same area.