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Principle Power says the stability of its foundation means that it can be sited in deep water, out of view from the shore Photograph: Principle Power

WindFloat foundation set to be tested off Portugal

Principle Power expects to deploy a full-scale prototype of its floating support foundation for wind turbines off the north coast of Portugal in mid-2011, the company tells *Recharge*.

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The test will cost an estimated €18-19m (\$22-23.3m), Seattle-based Principle Power says.

The company's triangular **WindFloat** design incorporates features that dampen wave- and turbine-induced motion, enabling turbines to be sited in offshore locations where water depth is greater than 50 metres and wind resources are superior, according to Principle Power.

A memorandum of agreement signed in February 2009 with Portugal's EDP calls for the companies to co-develop a three-phase project. Phase one is to fabricate and install a single WindFloat for technology

demonstration, says Craig Andrus, Principle Power's senior vice-president in Europe.

After successful completion and assessment of the demonstration unit, phases two and three will consist of pre-commercial and commercial deployments.

The platform foundation will be built in Portugal. **EDP**, through its technology division, EDP Inovação, is supporting the project as its main investor. Principle Power and several other participants will also provide equity.

Andrus says Portugal was chosen as a test site because it has significant offshore wind resource, but few locations that would be suitable for traditional shallow-water fixed foundations. In addition, there is significant industrial and government support for the project.

The WindFloat design is a semi-submersible fitted with water-entrapment or heave plates at the base of each of three columns. The plates help reduce the structure's movements in waves and improve the system's motion performance.

The turbine and tower are set asymmetrically on one of the columns, which are 35 metres apart.



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Principle Power chief technology officer Dominique Roddier told the recent American Wind Energy Association annual meeting that the turbine will remain almost exactly vertical because of a closed-loop water ballast system.

It moves water between columns in response to changes in wind direction and velocity, which mitigates thrust forces.

The company claims that because its design is stable, existing commercial turbine technology can be used. The design and size of the WindFloat foundation also allow for onshore assembly, eliminating the need for expensive specialised vessels, such as jack-up barges.

Its shallow draft allows it to be sited out of view from shore, regardless of depth.

WindFloat will be moored to the ocean floor using conventional components, such as chain and polyester lines, to minimise costs.

Richard A Kessler, Fort Worth

Published: Thursday, July 1 2010

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