



## **IEAGHG Information Paper; 2013-IP10: New Developments in Offshore Wind**

An article in DNV's Global Contact Magazine, No.1 2013 provides an interested insight into the way wind power offshore may develop in the future. The basis of the article is that offshore wind has enormous potential but only a fraction of the world's oceans are shallow enough to build fixed bottom turbines. However the solution to this problem could be floating wind turbines.

Apparently the first full scale floating installations are already operational in Europe. Statoil has developed a technology called Hywind which is based on a spar buoy. This is a steel metal cylinder ballasted with sand and water to float like a bottle. The buoy is anchored by mooring lines.



**The world's first large-scale floating wind turbine is located approximately 12 km south east of Karmøy in Norway at a water depth of about 220 meters.**

More details can be found at:

[http://www.siemens.com/press/en/pressrelease/?press=/en/pressrelease/2009/renewable\\_energy/ere200906064.htm](http://www.siemens.com/press/en/pressrelease/?press=/en/pressrelease/2009/renewable_energy/ere200906064.htm)

An alternative technology is the Windfloat design. The first offshore floating wind turbine of this kind is now under construction off the coast of Aguçadoura in the north of Portugal. Installation and construction costs are estimated to amount to 4.1 million Euros per MW installed.

The technology is patented by American company Power Principle using the name "WindFloat". It consists of a triangular floating base. The base is allowed to float through the use of three pillars, one of which houses the tower structure for the wind turbine. The structure is anchored to the seabed through the use of cables and can be installed anywhere between depths of 50 meters to several hundred meters.

The design and size of the WindFloat enables the overall structure to be assembled onshore and towed to its final location. All fabrication and qualification is completed at quayside in a controlled environment. According to Principle Power, cost savings are significant when compared with direct/fixed offshore wind turbine support structures.



For more details see: <http://irishenergynews.com/home/index.php/2011/01/09/first-offshore-floating-turbine-in-portugal/>

The benefits of these floating wind turbines according to DNV are:

- The possibility to standardise and mass produce
- The problem of challenging soil conditions for the base is eliminated
- Fabrication costs will be reduced because manufacturers won't have to adapt each turbine for local conditions
- Turbines can be assembled in sheltered water, thereby reducing the impact of weather related risks,
- Floating turbines are not limited to existing acreage issues and the turbine can be installed in the best wind conditions.

DNV expects a significant take up of the technology offshore USA and Japan.

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