

A photograph of an offshore wind farm at sunset. The sky is a mix of orange, yellow, and blue, with scattered clouds. The sun is low on the horizon, creating a shimmering reflection on the water. In the background, a range of low mountains is visible. In the foreground, a line of wind turbines stretches across the horizon, their silhouettes dark against the bright sky.

OFFSHORE *WIND*

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Supporting role

Principle Power promote the benefits of an innovative prototype for a floating wind turbine

Principle Power targets the rapidly maturing offshore wind sector by eliminating current deepwater limitations with an innovative solution. WindFloat is a floating support structure for large offshore wind turbines with a simple, elegant and patented design.

The innovative features of the WindFloat dampen wave and turbine induced motion, enabling

wind turbines to be sited in previously inaccessible locations where water depth exceeds 50m and wind resources are superior. Further, economic efficiency is maximised by reducing the need for offshore operations during final assembly and commissioning.

There are three main advantages to the WindFloat: first, its static and dynamic stability provides for low pitch and yaw performance, ena-

bling the use of existing commercial wind turbine technology; second, its design and size allow for quay-side assembly; third, its shallow draft allows for depth-independent siting and wet tow to sites not visible from shore.

The WindFloat is fitted with patented horizontal water entrapment (heave) plates at the base of each column. The plates significantly improve the motion performance of



the system due to additional damping and entrained water effects. This stability performance allows for the use of existing commercial wind turbine technology.

Optimal

WindFloat's superior stability is further augmented by a closed-loop active ballast system. This additional ballast system mitigates mean wind-induced thrust forces, restoring the system to optimal efficiency following changes in wind velocity and direction.

Traditional offshore deployment using monopiles or other conventional foundations requires a large

lay down area for staging of equipment to be assembled offshore. Specialised installation vessels, carrying a typical day rate of approximately 250,000 USD/day are employed to transport equipment to

the installation site and perform the installation. All assembly, qualification and testing of the systems are conducted at the installation site in an uncontrollable and non-readily accessible marine environment. Operations can only be conducted when sea states of less than 2m significant wave height permit. Further, each installation must occur in a serial fashion (one at a time) due to the limited number of installation vessels available and the cost of charter. Historical data from European sites has shown this dependency to be very costly and thus far unavoidable in offshore wind development.

In contrast, the WindFloat permits all fabrication, final assembly and qualification to occur quayside in a controlled environment. Multiple systems can be assembled simultaneously and deployed in a batched fashion (many at a time). The system can be wet towed to site, requiring only hook-up of pre-laid moorings and power cables when offshore. Standard anchor handling tug and conventional tug vessels are employed which carry a typical day rate of approximately 25,000 USD/day, a ten-fold reduction over traditional methods. Overall offshore operations are

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