



**U.S. Department of Energy**  
**Energy Efficiency and Renewable Energy**

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**Wind Energy Program Technology Portfolio**

**Wind Speed Technology Phase II: Semisubmersible Platform and Anchor Foundation Systems for Wind Turbine Support**

**Concept Marine Associates, Inc.**

**Project Description:** As available onshore wind energy development sites in Europe have become less accessible, the offshore market has burgeoned. The waters there are relatively shallow, so simple monopile foundations are used. Recent studies show a significant offshore wind resource near major urban areas in the mid-Atlantic and Northeast regions of the United States. Many are in waters deeper than 50 meters, where monopile foundations would be prohibitively expensive and alternative anchoring methods must be developed. The oil and gas industries have developed a wide range of offshore technologies; however, they must be simplified and mass produced if they are to become cost effective in offshore wind energy development.

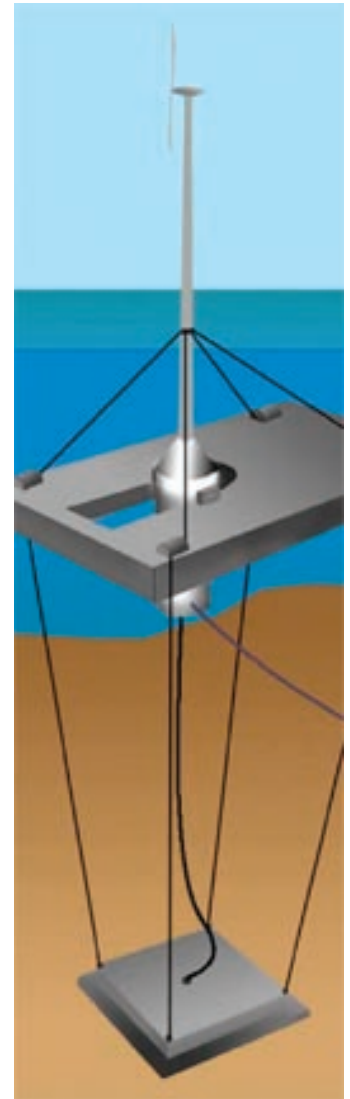
This study evaluates and optimizes a semisubmersible platform and anchor foundation system that can support a 5-MW wind turbine. The foundation consists of a positively buoyant concrete platform that is to be moored in deep water and held below the surface to avoid most of the wave energy. The platform supports a tower that extends through the wave energy zone and is high enough to provide clearance for a wind turbine and blades. Two primary mooring techniques—tension legs connected to a large concrete dead-weight/suction anchor and conventional catenary anchors—are included in the study.

Results of the work will include a report of computer modeling and simulations, cost of energy calculations, and recommendations for platform size, configuration, materials, and anchoring techniques.

**Project Type:** Conceptual Design Study  
**Total Project Budget:** \$198,108  
**Industry Cost Share:** \$0  
**DOE Cost Share:** \$198,108  
**Planned Project Duration:** September 2004–April 2005

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**Current Status:** Project Complete



**Concept illustration of a semisubmersible platform and anchor foundation system for offshore wind turbines.**

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