

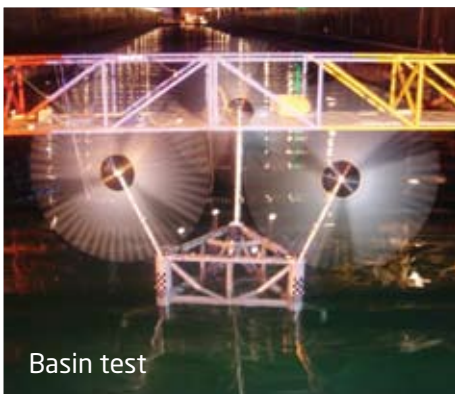
WindSea

Next-generation floating wind farm



Characteristics

- Semi submersible platform with 3 columns.
- Three turbines; two upwind, one downwind.
- The floater is self orientating towards wind.
- Mooring lines connect to a disconnectable turret.
- Cable for power transmission is guided through the turret to the seabed.



Basin test

Advantages

Construction:

- Flexible layout - scalable.
- Easy fabrication - all construction is performed at yard, including installation of the turbines.
- Easy installation - the floater is tugged to offshore destination, connected to the mooring lines and ready for operation.

Energy Production/Operation:

- Cost effective solution - three turbines on one platform.
- Self orientating towards the wind - wind and wave response is independent of each other.

Maintenance:

- Easy access for inspection and maintenance as well space to perform such tasks.
- May easily be disconnected from the turret and tugged to a yard for modifications or more extensive maintenance.

Dimensions

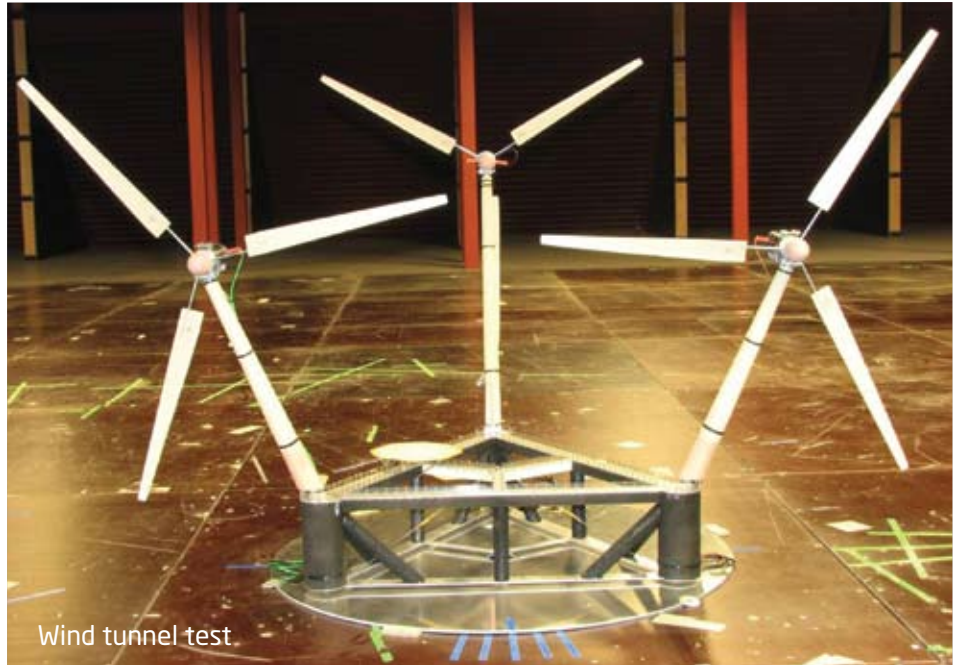
- | | |
|---|-----------------------------|
| • Height upwind turbines above sea level: | 71 m |
| • Height downwind turbines above sea level: | 90 m |
| • Distance between upwind turbines: | 103 m |
| • Turbine power: 3,6MW - rotor dia: | 104 m |
| • Vessel draft: | 23m (operation) 7m(at yard) |

History

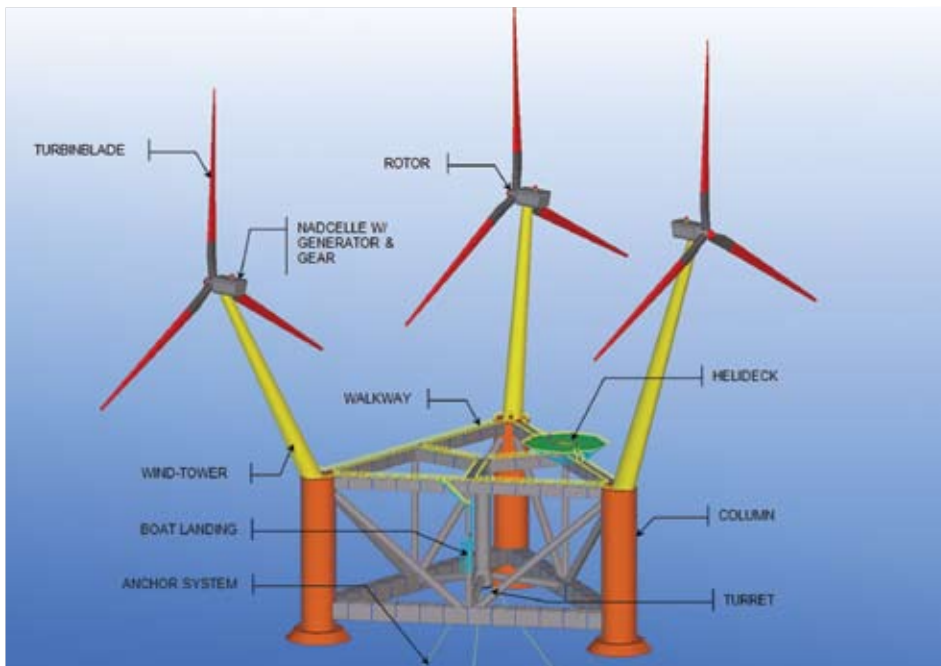
- 2006 - 2008: Concept development.
- 2008 - 2009: Validation of concept: Further development of the concept and preparation for scale testing at FORCE Technology's facilities at Lyngby in Denmark.

Tests performed in basin; The marine performance of the vessel. Power production at different sea conditions as well as the ability to self orientating towards the wind.

Tests performed in wind tunnel; Power production, including the effect of wake and turbulence.



Wind tunnel test



Results

- The main principal of the WindSea floater has been proved correct.
- The total energy production for a given configuration has been calculated.
- The power production of the system has been calculated and verified in test to be 93% of the theoretical maximum, based on three stand alone turbines.
- Wake effect: The results from the test and WindSea's calculations are in accordance with third party calculations (RISØ).

Who we are

WindSea as is established to develop, test and commercialize the WindSea floating windmill system.

WindSea is owned by FORCE Technology and NLI, both leading players in their respective fields.

Future development

- The development phase will start in Q1 2010 and includes further studies of the test results, concept development, optimization as well as testing.
- The prototype phase includes detail engineering, fabrication, procurement, commissioning and installation of a prototype.
- After the installation of the prototype, there will be a test phase leading up to commercialization of the WindSea system.