

HYWIND SCOTLAND

The world's first commercial
floating wind farm

THE HYWIND CONCEPT

- With fixed bottom wind turbines, offshore wind is optimal for 20-50 metres water depth
- Floating wind structures like Hywind open up the possibility for capturing wind energy in deep water environments, and represents a great potential worldwide along coastlines with water depths of several hundred metres
- Hywind consists of five wind turbines placed on top of a ballasted cylinder (spar-substructure)
- The floating turbine technology was first conceptualized in 2001, a scale-model was used to model-test the concept in 2005 in Trondheim, Norway and Hywind Demo - the world's first floating full-scale wind turbine - was installed by Statoil in 2009 in the North Sea.
- The concept is based on Statoil's more than 40 years of oil and gas offshore experience as well as Masdar's decade of experience in the renewable energy sector.
- It combines known technologies in a completely new setting and opens up the possibility for capturing wind energy in deep-water environments.

FACTS

- Hywind Scotland is owned by Statoil (75%) and Masdar (25%)
- Hywind is the world's first commercial floating wind farm
- Located at Buchan Deep, 25 km off Peterhead, Scotland.
- Production startup is planned for Q4 2017
- 5 turbines, 6 mw each -> Installed capacity 30 MW
- The wind farm will provide renewable energy to over 20 000 UK households.
- Offshore Export cable length: Approx. 30 km
- Onshore cable length: Approx. 2 km
- Turbine height: 253 meters in total. 78 meters below sea surface, 175 from sea surface to wingtip. Rotor diameter: 154 meters. Total weight near 12 000 tonnes.
- The end goal is large scale floating offshore wind farms of 500-1000 MW

CONTRACTORS AND FACTS

BLADES:

Length: 75 meters, weight: 25 tonnes. The turbines have almost the same wingspan as an Airbus 380 (79,75 meter)

NACELLES:

Large enough to fit two typical London double decker busses.

TOWERS:

83 meters, weighing close to 670 tonnes.

Diameter 7.5 metres at the widest.

Constructed in 4 segments, and assembled at Stord. Contains: platforms, elevator, cable gates and ventilation. Some electrical equipment at the bottom section.

SUBSTRUCTURES:

The substructures are 91 meters long and 14,5 meters in diameter at the widest. Steel weight is 2 300 tonnes. When they are upended and ballasted to be stable they weigh more than 10 000 tonnes.

CHAINS:

The five floating wind turbines for Hywind Scotland will be anchored to the seabed by three mooring chains each, connected to a suction anchor. The chains on each line are on average close to 900 metres in length, and have a diameter of 50cm, weighing some 400 metric tonnes. Each Turbine is anchored by a 2,400 meter chain, weighing 1,200 tonnes. Chains are transported to Montrose, Scotland and Stord, Norway prior to offshore installation.

SUCTION ANCHORS:

Construction: Global Energy Group (Isleburn Ltd) Inverness/ Scotland. The 15 suction anchors (three for each turbine) are 16 meters tall, 5 meters in diameter and weighing approximately 300 tonnes each.