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.

Masdar
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Statoil