FOUNDATION
OFFSHORE
WIND ENERGY

alpha ventus – Operation Offshore

FOUNDATION OFFSHORE WIND ENERGY

Outline

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FOUNDATION OFFSHORE WIND ENERGY

German Offshore Wind Energy Foundation

- Founded in 2005 as an independent, non-profit organisation to promote the utilization and research of offshore wind in Germany

- Acquisition of **ownership rights (permit) of alpha ventus** – moderated/accompanied process of Germany's first offshore wind farm

- Platform for **offshore wind/maritime industry**, including **trade associations, policy-makers and R&D**

- Involved in various **projects** (EU-wide and national), e.g.:
  - **PROMOTioN**
  - **Baltic InteGrid**
  - **UKOW**
  - **MaWi-OWI**
  - **INSCHOOL**
  - **BestOff**

PROMOTioN
PROGRESS ON MESHED HVDC OFFSHORE TRANSMISSION NETWORKS

Baltic InteGrid

BESTOFF

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alpha ventus Timeline

2005	• 4th National Maritime Conference kick-starts the offshore era in Germany
2005	• German Offshore Wind Energy Foundation founded and acquired the project rights
2006	• Site leased to Deutsche Offshore-Testfeld und Infrastruktur GmbH & Co. KG (DOTI)
2006	• Announcement that €50 million funds are made available for research at *alpha ventus* (RAVE)
2007/2008	• Construction begins on land and at sea
2010	• Commissioning of *alpha ventus*
2014	• Alpha ventus milestone: 1 TWh of energy generated

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Political background

- 2003: FINO 1 research platform (BMU takes on the accompanying ecological research for offshore wind power)
- In 2005, Germany had no offshore wind generation
- **January 2005: 4th National Maritime Conference paved the way for offshore wind energy in German waters**
- **April 2006: Energy Summit with German Chancellor Dr. Angela Merkel – Energy suppliers EO.N, EWE and Vattenfall agree to set up and run a German offshore test field**
- RAVE (research at alpha ventus)

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Involved actors

- German Offshore Wind Energy Foundation (ownership, permit rights of alpha ventus)
- Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)
- German costal States (Niedersachsen, Schleswig-Holstein, Mecklenburg-Vorpommern, Hamburg, Bremen)
- DOTI GmbH & Co. KG (E.ON, Vattenfall, EWE)

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Offshore R&D

RAVE = Research at alpha ventus

- A research initiative of the German Ministry for the Environment
- Accompanying research at the alpha ventus test site
- Funding €50 million

Key objectives:

- Demonstration of 5 MW offshore turbine technology
- Improvement of turbine technology
- Investigation of research questions of offshore wind power utilisation
- Enhancement of the research potential in Germany
- Accompanying environmental studies, e.g. noise mitigation

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Construction details

- August 2007: construction start on the cable route
- Summer/Autumn 2008: laying of sea cable; preparation for grid connection
- September 2008: construction of offshore substation platform
- Spring/Summer/Autumn 2009: sea cable connection; substation commissioning; wind turbine construction
- November 2009: completion of wind farm construction; calibration and test operations
- April 2010: official commissioning of *alpha ventus*

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Test field characteristics

Wind turbine types:

1. 6 × Repower Systems (now Senvion) 5M
2. 6 × AREVA Multibird M5000

Nominal output: 60 MW

Foundations: 6 × Jackets, 6 × Tripods

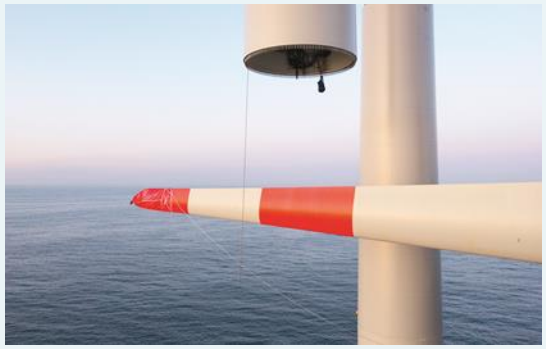
Distance to shore: 60 km (located in German Exclusive Economic Zone – EEZ)

Water depth: roughly 30 m

Prevailing wind direction: 210-240° (southwest)

Average wind speed at hub height: 10 m/s (wind speed category 5)

Main wave direction: 330° (northwest)



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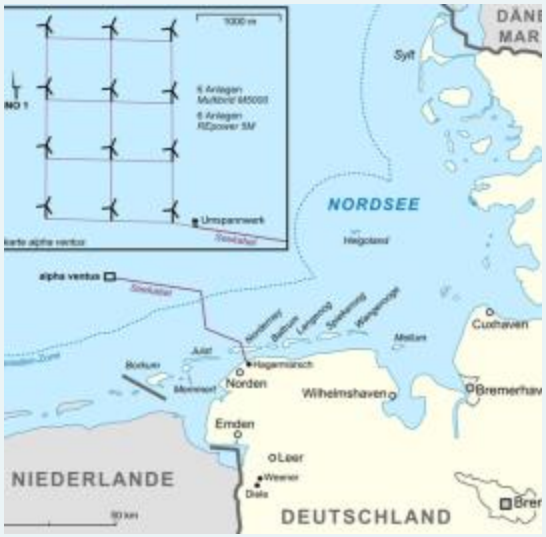
Test field characteristics

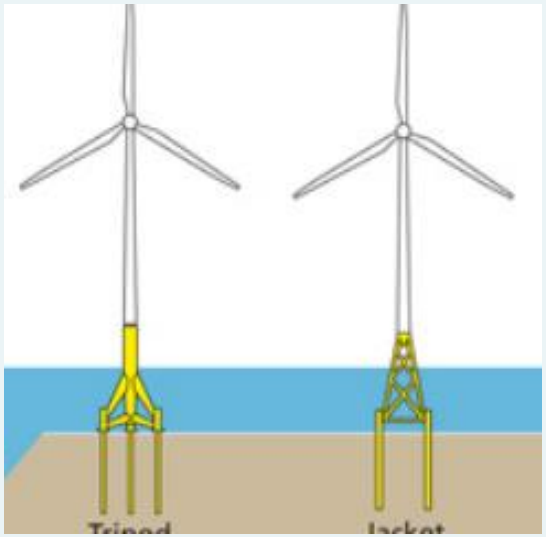
Turbine allocation: four rows of three turbines each

Surface covered: 4 km² (equivalent of about 500 soccer fields)

Turbine size (from water line to blade tip):

- AREVA: 148 m
- REpower: 155 m





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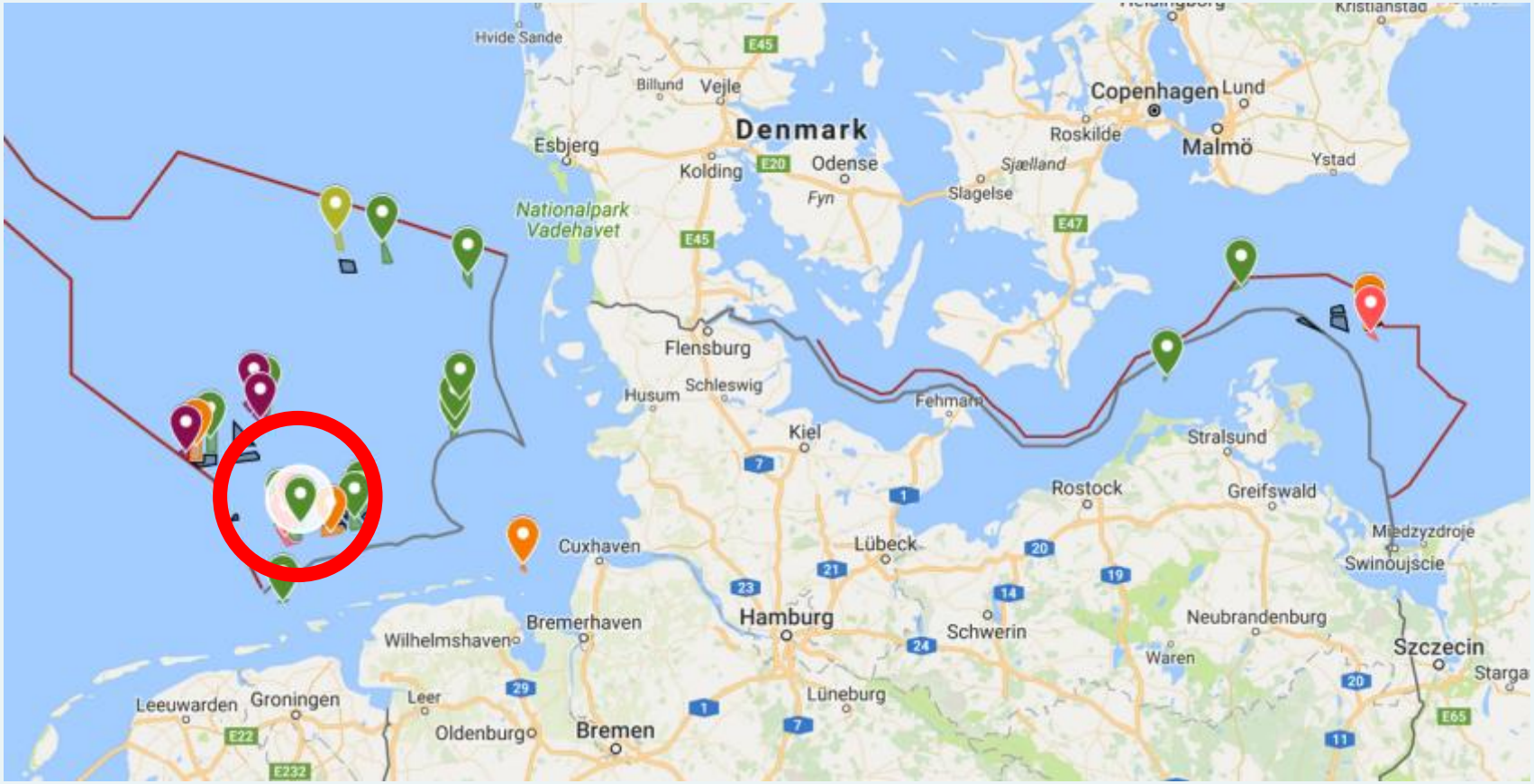
Location of *alpha ventus* in the North Sea



Source: Status Quo Offshore Wind Energy in Germany: http://www.offshore-stiftung.de/en/status-quo-offshore-windenergy

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Exceeded expectations

- Original forecasts for alpha ventus – 3,900 full load hours – were exceeded in the farms first year of complete operation, reaching **4,450 full load hours**
  → **14.1% increase**

- Within less than 4 years of operation, alpha ventus reaches 1 TWh energy generation in February 2014

Thank you for your attention!

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