Beyond RAVE: Research and demonstration at offshore test fields

Dr. Bernhard Lange
Fraunhofer-Institute for Wind Energy and Energy System Technology IWES, Kassel
Why RD&D at offshore sites?

• RD&D needs data and experience from real offshore applications
  – Research needs data from real turbines in real conditions
  – Development needs the possibility to measure at new solutions
  – Demonstration for the market, which requires proven technology

• RD&D offshore is a necessity
What is RAVE today?

- A research lab in the middle of the North Sea
- A huge unique set of measurement data
- A research community dedicated to offshore wind power
- A large number of research results
- A knowledge base in a broad range of topics in offshore wind power
Beyond RAVE

- RAVE
- New test fields
- Technology monitoring
RAVE

RAVE will continue, but the focus will shift in two ways:

• from design and erection to operation and maintenance
• from demonstration to research
Test field research beyond RAVE

Why?

• Possibility to continuously demonstrate the latest technology
• Possibility to ensure a continuous technological development
• Possibility to test new, innovative concepts
• Possibility to gather research data from different technologies, different site conditions
Idea: Distributed Test Field

Instead of a second dedicated test field, offshore RD&D should be an integrated part of commercial offshore wind farms.

Distributed over several sites and over time.

Each part of the 'distributed test field' should be:
- Dedicated to specific RD&D goals
- Associated to a commercial wind farm
- Conducted by industry, research and wind farm owner together

Coordination within and between the test fields is essential.
Example under planning: Albatros 1

Planned offshore test field Albatros 1

- Part of the wind farm Albatros
- 110 sm to port, 40m water depth
- Demonstrate and test 10 gravity foundations
- Research in environmental, technical and logistics topics
- Industry, wind farm owner and researchers work together
Technology Monitoring

A clear understanding of the status and issues of the technology is needed for each wind farm and on a general level.

Collection of information and data across the industry

- To optimize maintenance and availability of specific wind farms
  ➔ Systematical collection and evaluation of operational experiences
- To answer fundamental questions on development of wind power offshore
  ➔ General monitoring

So far six wind farm operators confirmed participation.
Summary

RD&D at offshore wind farms is very expensive, but necessary

- To demonstrate new technology
- To speed up the development and reduce risks
- To enable research relevant for the industry

Future RD&D offshore

- Continuation of RAVE
- RD&D offshore in a distributed test field
- Technology monitoring across the industry
Vision

International collaboration
• Test field research distributed over Europe with RD&D opportunities for industry and researchers
• European research community as knowledge base and partner for a European industry

Research and industry
• Close collaboration between industry and research community
• Innovative research with collaboration across companies
Thank you for your attention!

More information: WWW.RAVE-OFFSHORE.DE