European Research Models for Advancing the Offshore Wind Industry

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Short profile of Fraunhofer IWES North-West

Managing Director	Prof. Dr.-Ing. Andreas Reuter
Research spectrum	Wind energy from material development to grid connection
Operational budget 2015	€ 15 million
Staff	150 employees
Located in	Bremerhaven, Oldenburg, Bremen, Hanover
Investments to date in the establishment of infrastructure	€ 60 million

Research Alliance Wind Energy

Strategic Alliance with ForWind and the German Aerospace Center (DLR)

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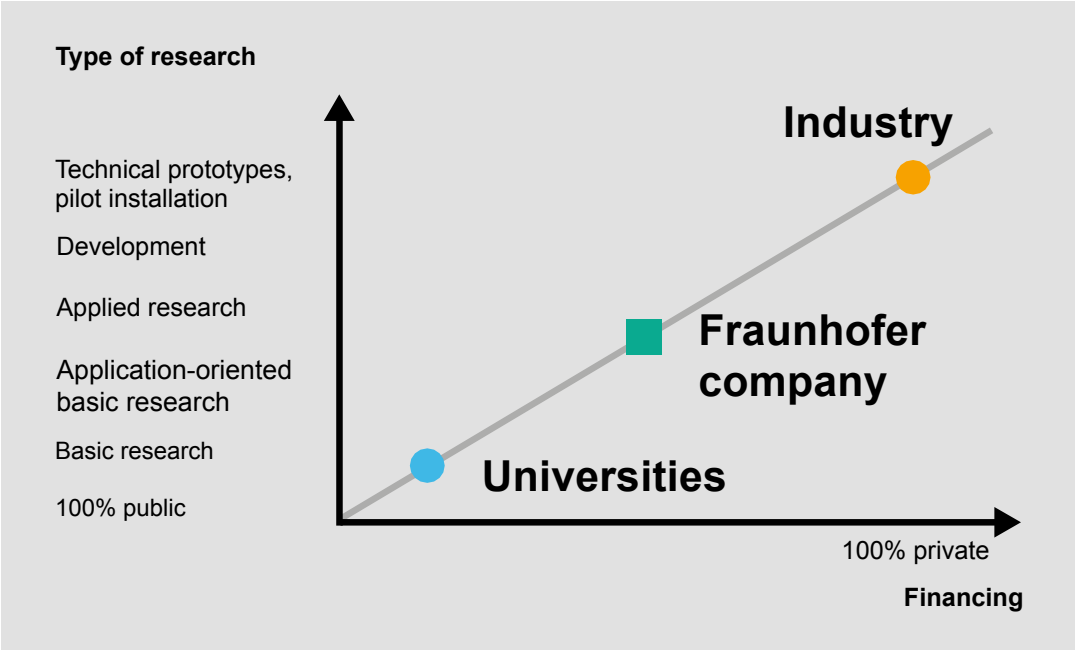
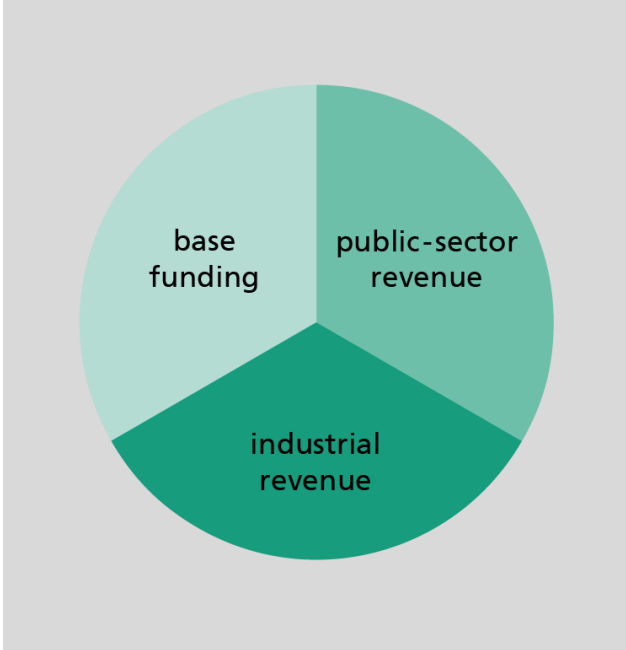
Fraunhofer's business model: Focus on industry as a factor for success

- **67 Fraunhofer institutes** in Germany
- More than **24,000 employees**, mainly with an academic background in natural or engineering sciences
- **€ 2.1 billion** annual research budget





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Outline

National funding offshore wind: Germany

- Example: FINO1, 2 & 3
- Example: RAVE

European funding

- Example: DOWNVInD
- Example: EERA-DTOC
- Example: DEMOGRAVI3

Conclusion

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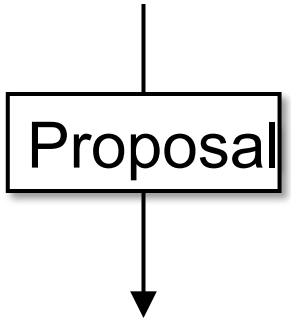
National funding offshore wind: Germany

Basic research

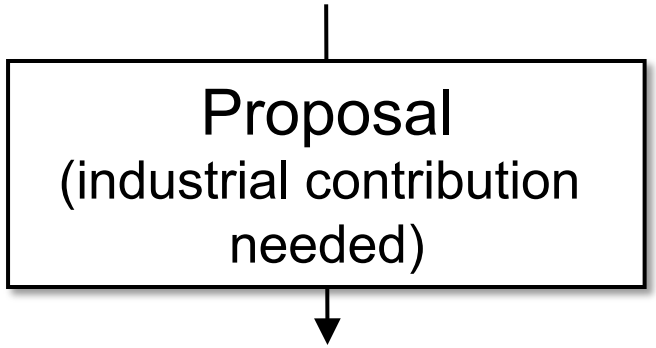
(e.g. academia)



Federal Ministry of Education and Research (BMBF)

Applied research

(e.g. research institutes)



Federal Ministry for Economic Affairs and Energy (BMWi)

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Example FINO1, 2 & 3

Offshore platforms in North Sea (1 & 3) and Baltic Sea (2), planned in 2002

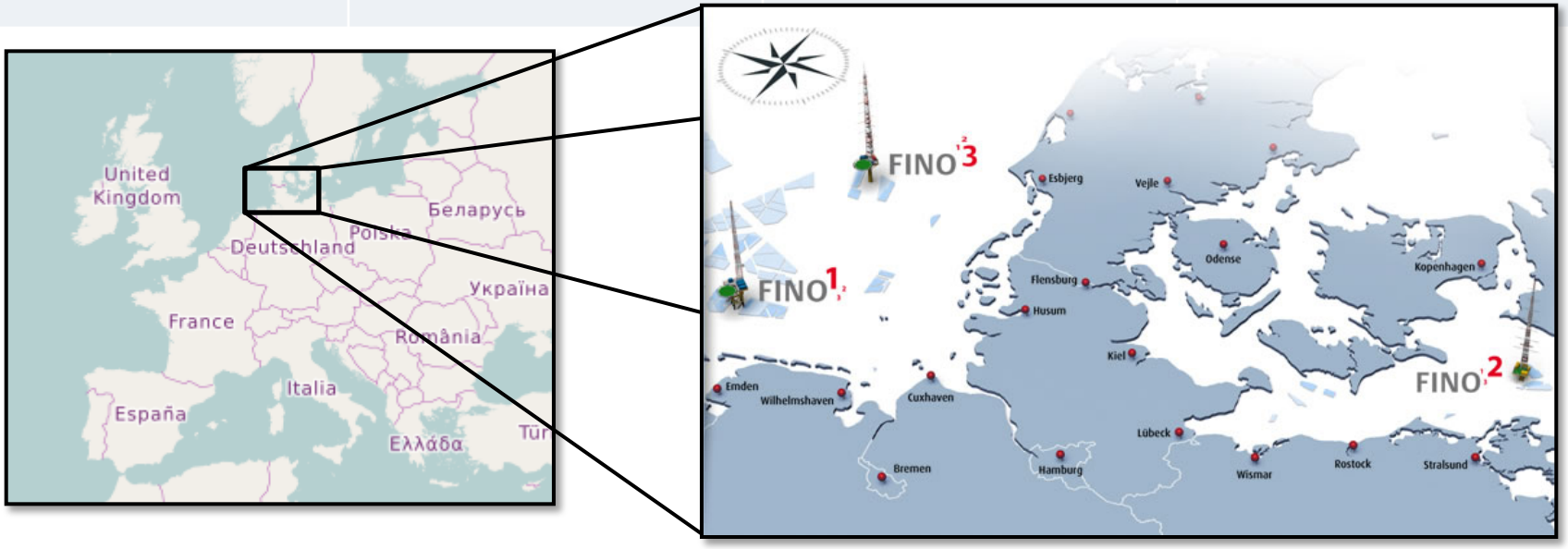
Goals:

Installation in proximity to future offshore wind farms

- Met-ocean and subsoil conditions (BMWi)
- Detection of vessel traffic (BMVBW)
- Survey of birds, mammals and benthos (BMU)

Example FINO1, 2 & 3

	FINO1	FINO2	FINO3
Location	North Sea	Baltic Sea	North Sea
Starting	2003	2007	2009



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RAVE – Research at Alpha Ventus

2005 - Planning of offshore test site

2007 - Research initiative Research at alpha ventus, **RAVE**

2009 - Realization of offshore test site **alpha ventus**

Funded projects in the areas

- O&M, coordination, measurements
- Foundations
- Wind turbine and monitoring
- Grid integration
- Ecology, acceptance, HSE

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RAVE – Research at Alpha Ventus

Examples

- Optimization of wind turbines and blades
- LIDAR measurements and devices
- Load calculations and verification
- Noise during installation and operation
- Wind farm sonar transponder – submarines
- Scour protection

European funding

Framework programmes:

- Framework Programme 6 2002-2006, 15.0 bn€
- Framework Programme 7 2007-2013, 17.5 bn€
- Horizon 2020 2014-2020, 50.5 bn€

Funding schemes (changes with framework):

- Collaborated projects CP approx. 5 – 20 M€
- Coordination and Support Actions approx. – 5 M€
- Research for SME

European funding

Effects of funding:

- Reaching European targets (decrease costs of energy, decrease GHG, strengthen EU economy…)

- Improve cooperation between academia and industry
- Dissemination of knowledge
- Realization of demonstration projects
- Education of researchers and engineers (PhDs)

European funding

Procedure of funding:

(Research pathway / strategy)

1. **Tender**
2. **Establish consortia**
    1. industry + academia
    2. from different European countries
3. **Send in proposal**

Example: DOWNVInD

Distant Offshore Windfarms No Visual Intrustion In Deepwater

- Demonstrator and research
- Installation of two RePower 5M
  In 2007
- 25km from shore

- 18 consortia members
- €6m EU funding
- €8.8m local funding

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Example: EERA-DTOC

EERA Design Tools for Offshore Wind Farm Cluster

- Integrated and validated design tool
- Wake, yield, electrical models
- Verification of models

- 22 consortia members
- €2.9m European funding

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Example: DEMOGRAVI3

Demonstration of a full scale hybrid concrete steel, self-buoyant bottom standing gravity based foundation

- Planned to be installed in 2017
- Portugal

- 10 consortia members
- €19m European funding

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Conclusion

National and European research play an important role for the development of offshore wind

National / German projects are

- Focused on basic research
- Research topics are clustered (FINO / RAVE)
- Obtained data is still today unique

European funded projects

- Bring together knowledge, networking, dissemination
- Realization of complex demonstration projects

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Thank You For Your Attention

Any questions?

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