Pushing Offshore Wind Energy Regions (POWER)

Offshore Wind

The Germany / UK Connection

P·O·W·E·R
Pushing Offshore Wind Energy Regions

OPEN DAYS
European Week of Regions and Cities
Brussels 9 – 12 October 2006

5th October 2006 – Astral Centre, Lowestoft College

Sponsored by:

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www.offshore-power.net

Wind Energy Agency Bremerhaven/Bremen

The WAB Industry Network in Northwest-Germany

Offshore Wind in Germany: Status and Perspectives



Jan Rispens

Wind Energy Agency Bremerhaven/Bremen

- Association with 140 members from industry, services and science from Bremen and surrounding coastal region
- Companies from a broad industry spectrum
- Partly funded by the Federal State of Bremen
- Branch office in Bremerhaven

Members of the WAB

Maritime industry

Suppliers of:

- turbines
- towers/foundations
- rotor blades
- project developers
- specialized services
- maritime & offshore services

Logistics

Wind sector

Science & education

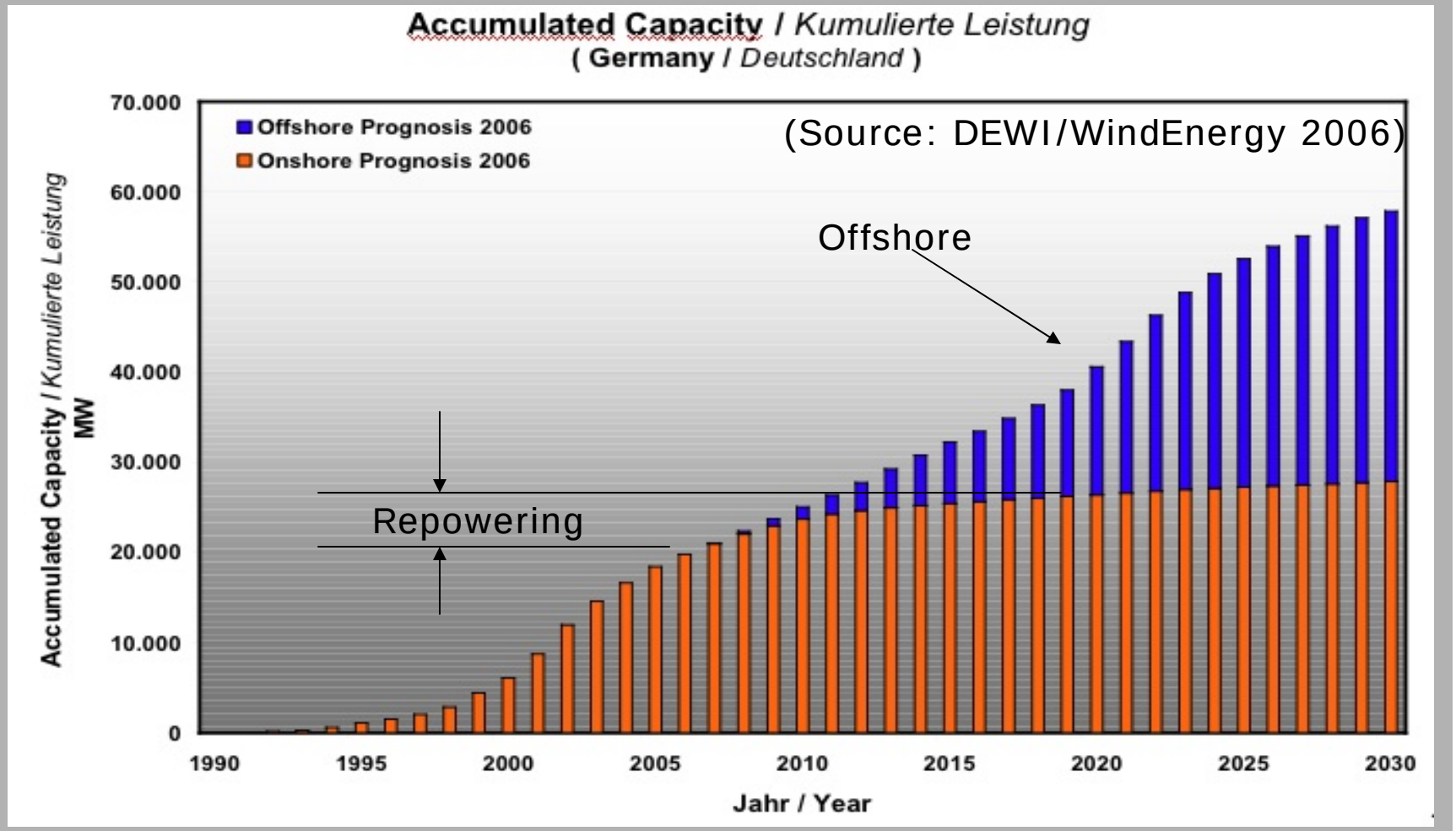
Turnover: approx. 500 Million €
Employees: approx. 1,000

Energy sector, supply, components

Activities of WAB

- Support regional innovative structures for wind energy
- Strengthen wind energy network in Northwest-German coastal region
- Initiate and facilitate research, development and demonstration project for on- and offshore wind energy
- Facilitate cooperation between wind and maritime industry - Offshore
- Initiate and coordinate qualification and education projects
- Identification of necessary structures and ressources for offshore wind

Prognosis Wind Power in Germany



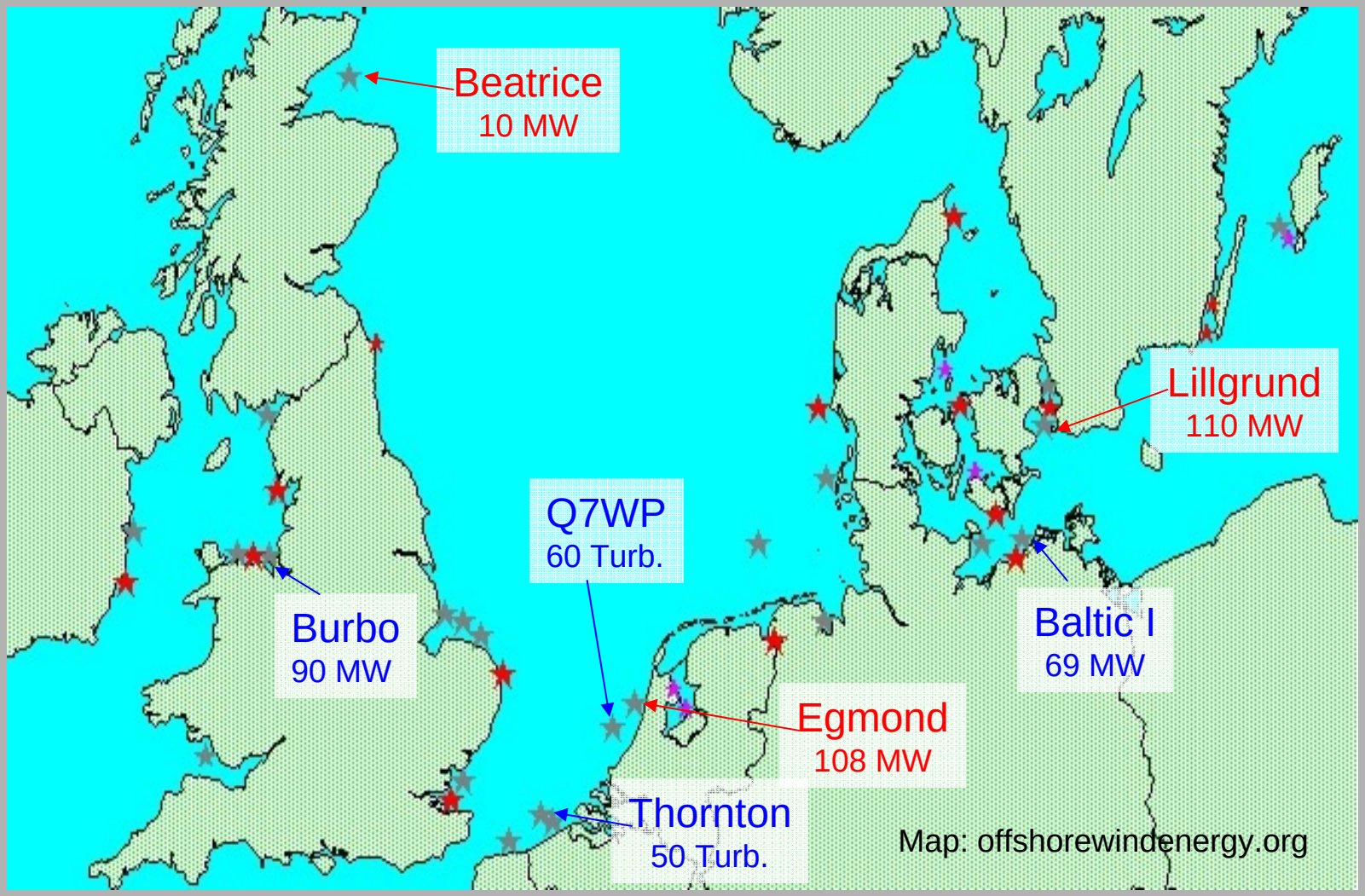
Offshore and repowering: focus in coastal areas

Offshore project status international

Country	Number Windfarms	Installed Power (MW)
Denmark	8	416
UK	6	329
Sweden	3	23
Ireland	1	25
Germany	2	7
Others	3	20
Total	**23**	**820**

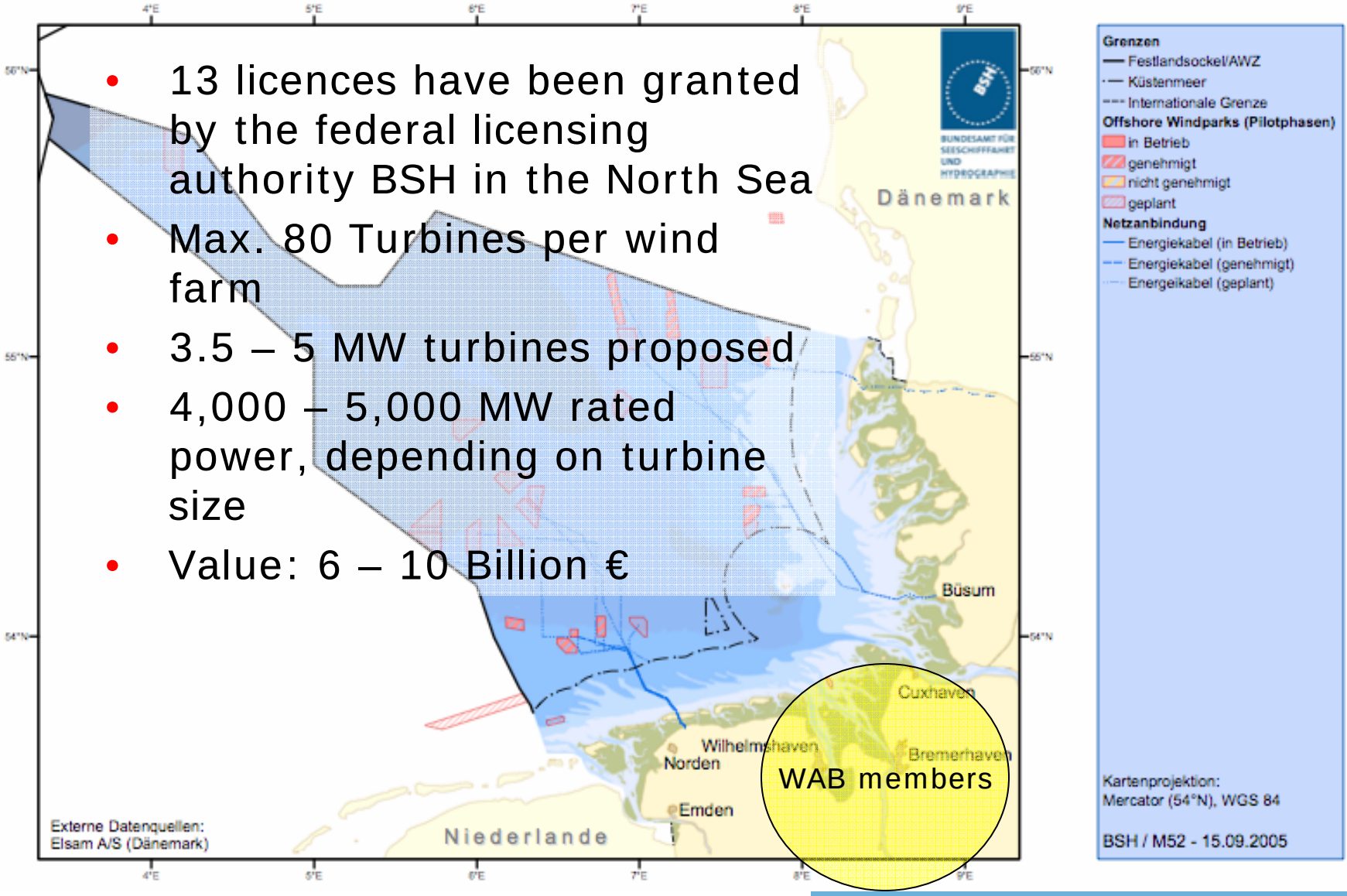
Installed onshore wind power in the EU in 1992: 844 MW

Project pipeline 2006-2007



Licensed wind farms in the North Sea

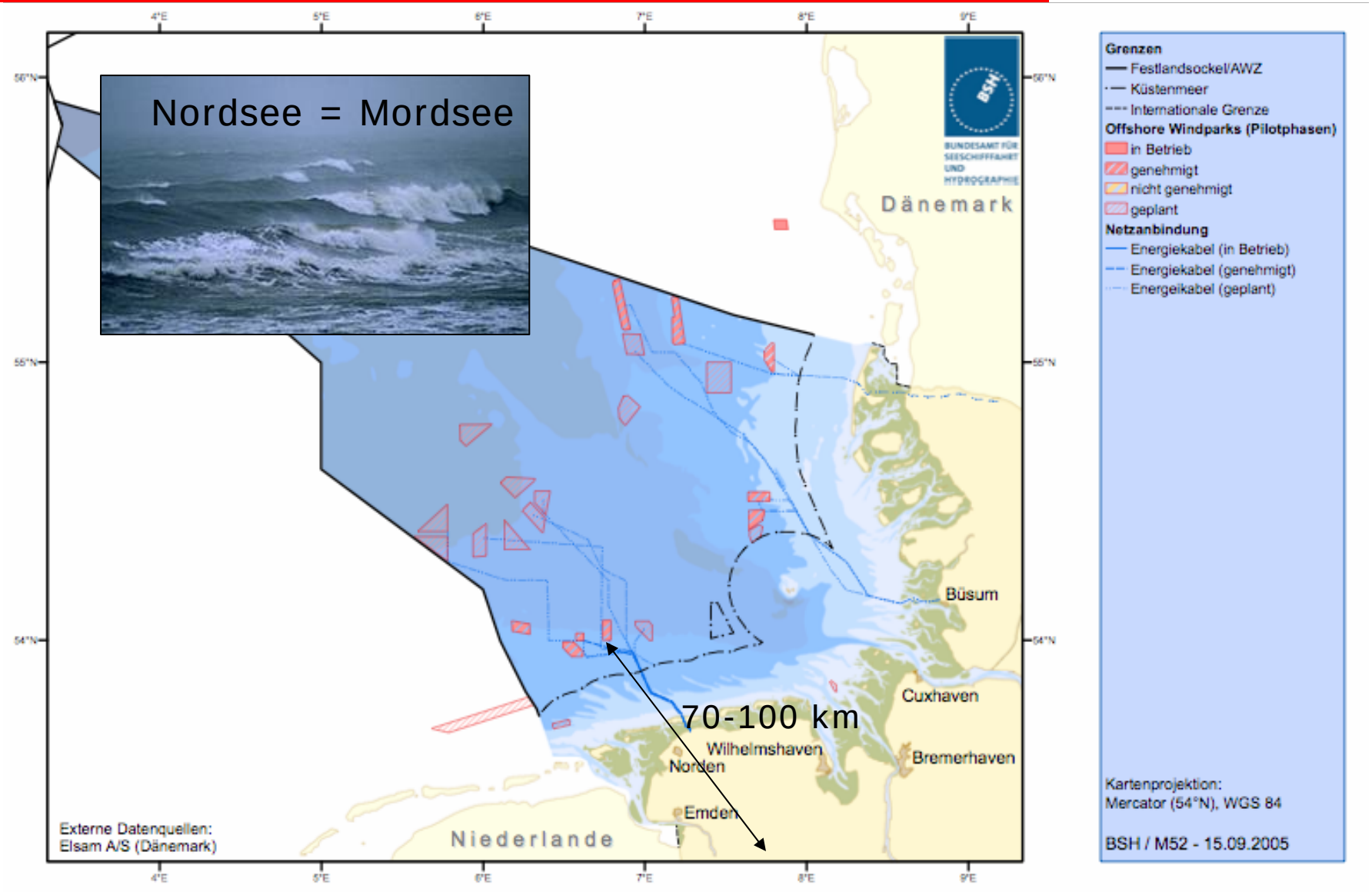
- 13 licences have been granted by the federal licensing authority BSH in the North Sea
- Max. 80 Turbines per wind farm
- 3.5 – 5 MW turbines proposed
- 4,000 – 5,000 MW rated power, depending on turbine size
- Value: 6 – 10 Billion €



Offshore Issues

- Geography
- Prototyping 5 MW class turbines onshore needed
- Development, design and serial production of tripod foundations for water depths >25 meter
- Operation logistics & transport related to port distance
- Improved overall reliability and availability
- Grid capacity and integration

Geography/Environment



Turbines

- Robustness
- Redundancies
- Long service intervals (>12 months)
- Weight
- Reliability... Reliability... Reliability...

Enercon E112

Repower 5M

Siemens SWT-3.6-107

Multibrid M5000

Multibrid M5000

Multibrid Entwicklungsgesellschaft mbH

- 5 MW, specially designed for offshore use
- Single stage robust planetary 1:10 gear
- Special air conditioning system using tower as overpressure „chimney“
- Comparatively „low“ nacelle weight of approx. 300 tonnes
- Operating since December 2004
- Research on operation, materials, climate influences
- Building up of series production in Bremerhaven started 2006, Investment in a 3,000 m² heavy-lift manufacturing hall

Repower 5M

Repower Systems AG



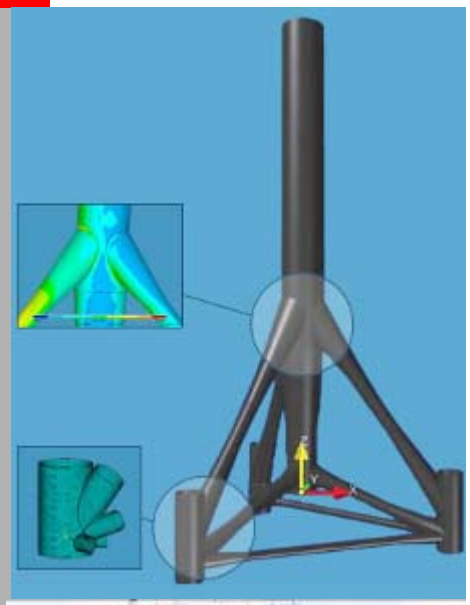
Manufactured in Bremerhaven:

- 2 Turbines for Beatrice
- 2 Turbines for onshore test site in Cuxhaven under construction
- Likely to follow more

Tripod-Foundations

WeserWind GmbH Offshore Construction
Georgsmarienhütte

- Optimised tripod design
  - Weight reduction
  - Serial manufacturing
  - Cost optimisation
  - Combination with concrete elements
  - Corrosion protection
  - Installation possibilities
  - Will be installed onshore with 2nd Multibrid M5000 Prototype in 2006 in Bremerhaven



Metmast

Meteorological mast „Amrumbank West“

- Built by Hochtief AG and WeserWind GmbH in Bremerhaven
- 90 meters high,22 meters water depth
- Commissioned by Essent Wind Deutschland GmbH, E.ON
- Meteorological equipment by Thales Instruments GmbH

R&D project by Windforce GmbH

- WAVEMON dynamic load monitoring system
- Glass fibre fast load analysis
- Installed in foundation to analyse wave loads

Infrastructure „Luneort“

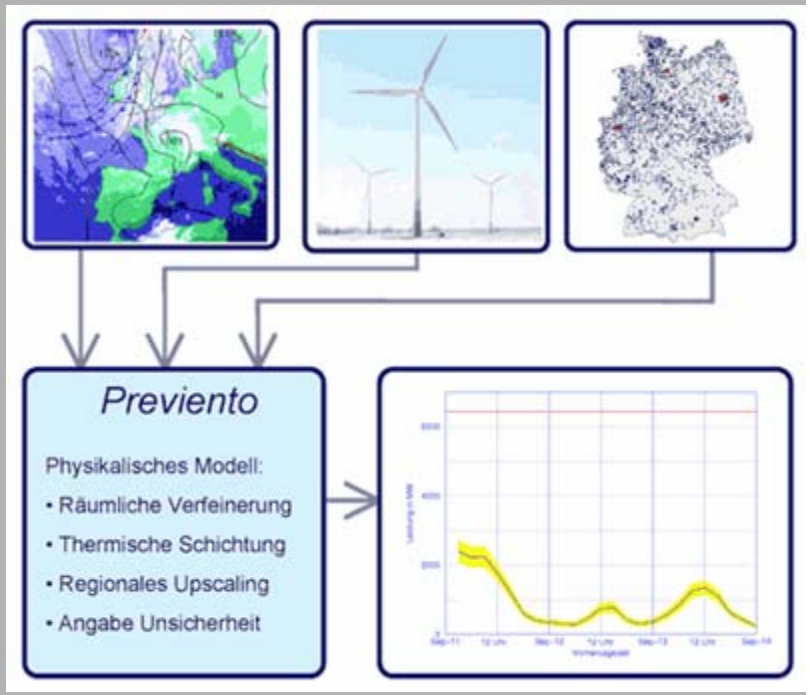
BIS, Bremerhaven economic development agency

- Sand-depositing over an area of 20 ha at Luneort since August 2005 - Overall 60 ha planned
- Own access for seagoing ships
- Existing roll-on/roll-off terminal
- Good links for heavy-load traffic direct motorway and railway connection
- Heavy load preparation: good conditions for manufacturing of offshore wind turbines components
- deep-water quays

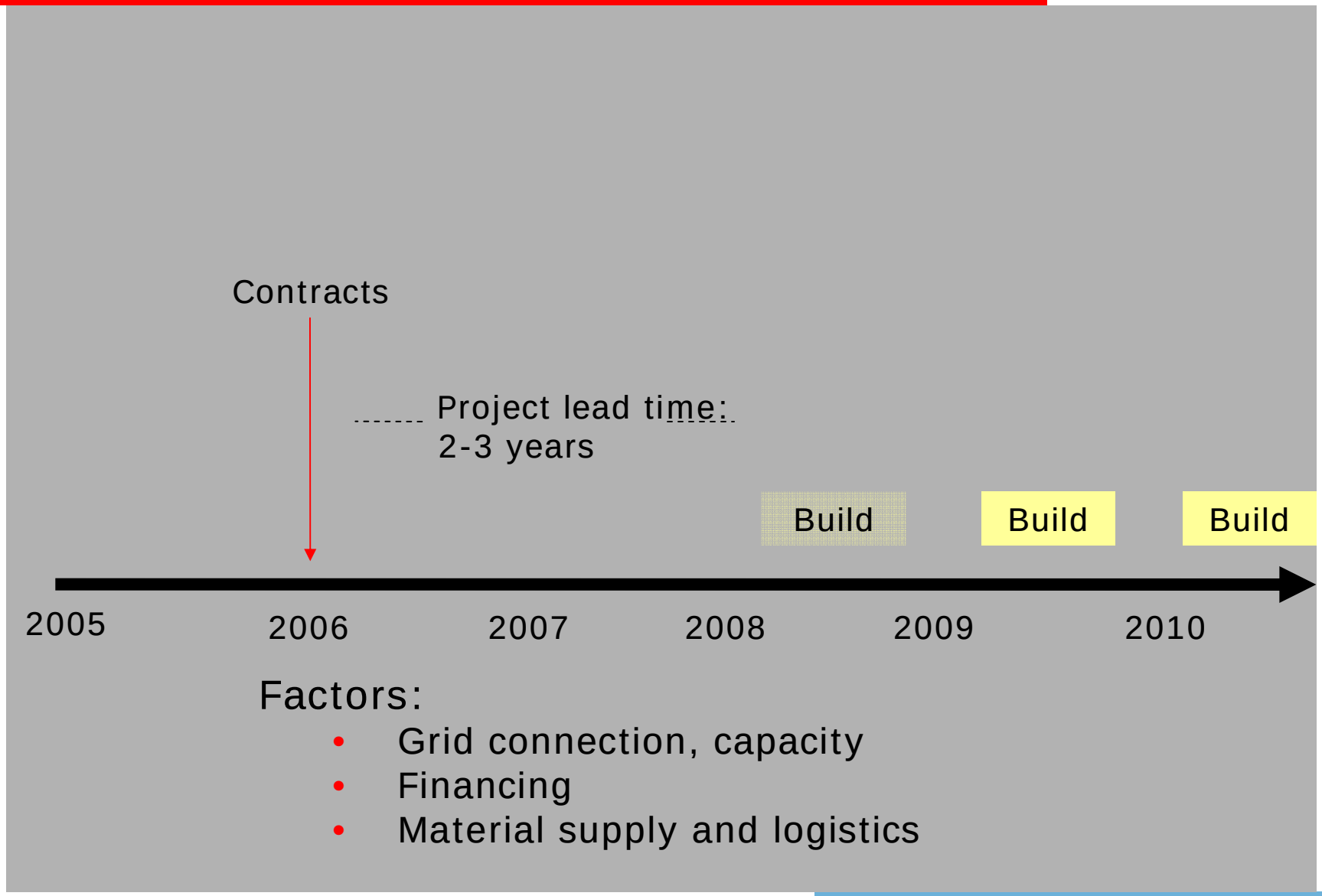
Output power forecasting

Meteocontrol GmbH / Energy & Meteo Systems GmbH in Bremerhaven

- Optimized offshore wind farm power prediction model
  - Using physical turbine characteristics
  - Forecast of offshore turbine loads for O&M
  - Improved forecast of power output for grid operators
  - 15 minutes resolution of forecast



Possible time line for development



Factors:

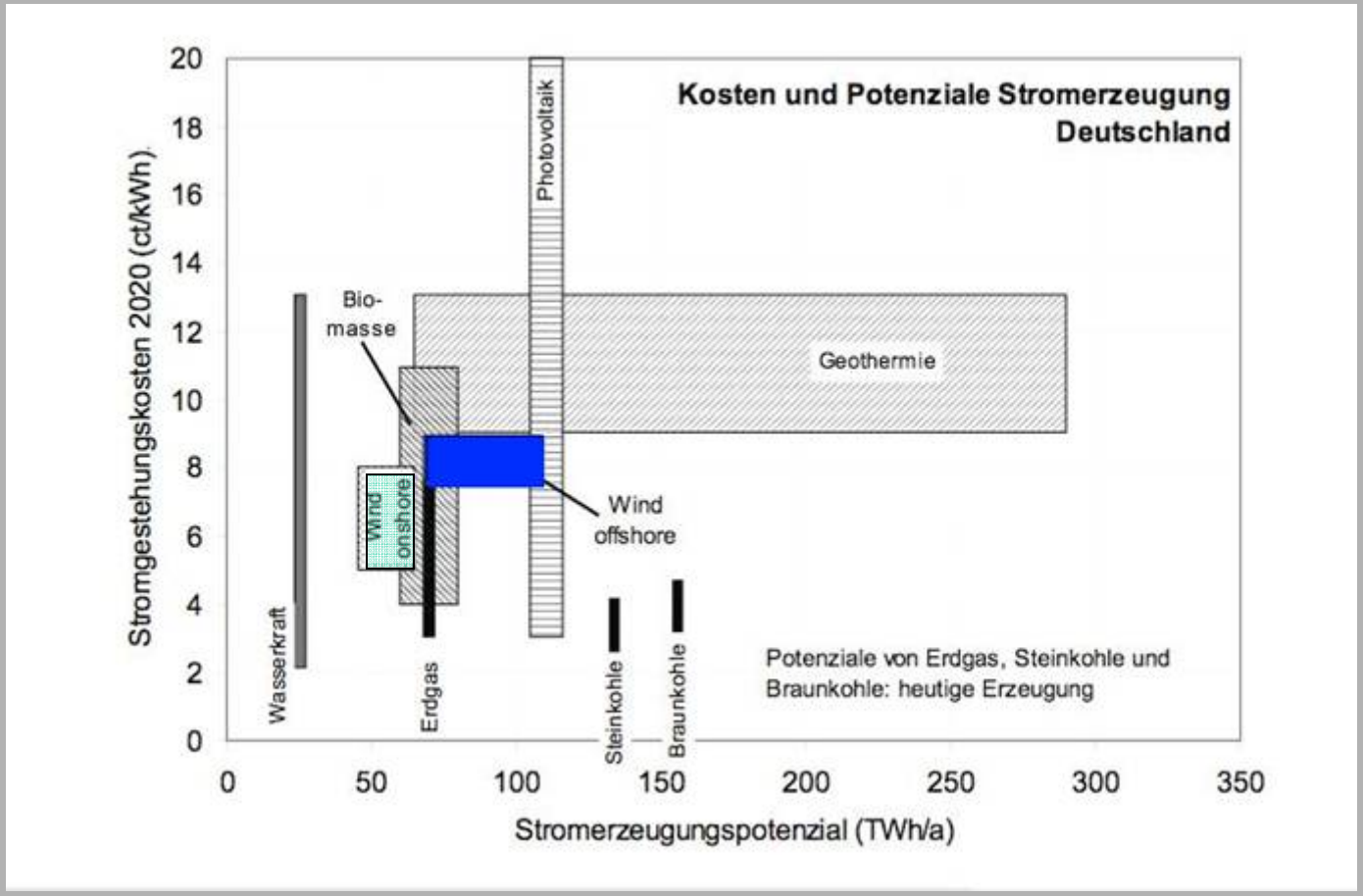
- Grid connection, capacity
- Financing
- Material supply and logistics

Financing: how does it look?

UK	6-7 Cents/kWh certificates + 7-8 Cents/kWh market price Electr. contracts > 10 year
Netherlands	9,7 Cents/kWh bonus + 6 Cents/kWh market price time >10 Jahre
France	13 Cents/kWh for 10 years, then reduction depending on location wind quality
Denmark	Nysted II: Building in 2010 6,8 Cents/kWh, ... But grid financed by state and grid operator

Germany: 9,1 Cents/kWh for 12 years, then dependent on location wind quality reduction to 6,19 Cents/kWh - total 20 years

Renewable potential: offshore needed



Source: WAB/Ludwig-Bölkow-Systemtechnik GmbH, 2006

Summary

- Offshore is necessary to reach renewables targets for Germany
- Strong ommittment of government coalition to offshore wind in coalition agreement
- Feed-in tariff must be raised!
- Industry initiative for fast market development program
- Many real business activities in Bremerhaven region for offshore wind

WAB Offshore Conference: windforce07

- 13th and 14th June 2007, Bremerhaven
- Compact overview of offshore developments in Germany (and Europe)
- Simultaneous translation available

- Thank you for your attention

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