

Offshore~WMEP

Monitoring Offshore Wind Energy Use in Germany and Europe:
From Concept to Execution

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Funded on the base of an act
of the German Parliament

Supervisor

Coordination

Outline

- Motivation
- German onshore monitoring program (WMEP)
- Monitoring offshore wind energy use
 - General monitoring
 - Participant specific analyses
- Conclusion & outlook

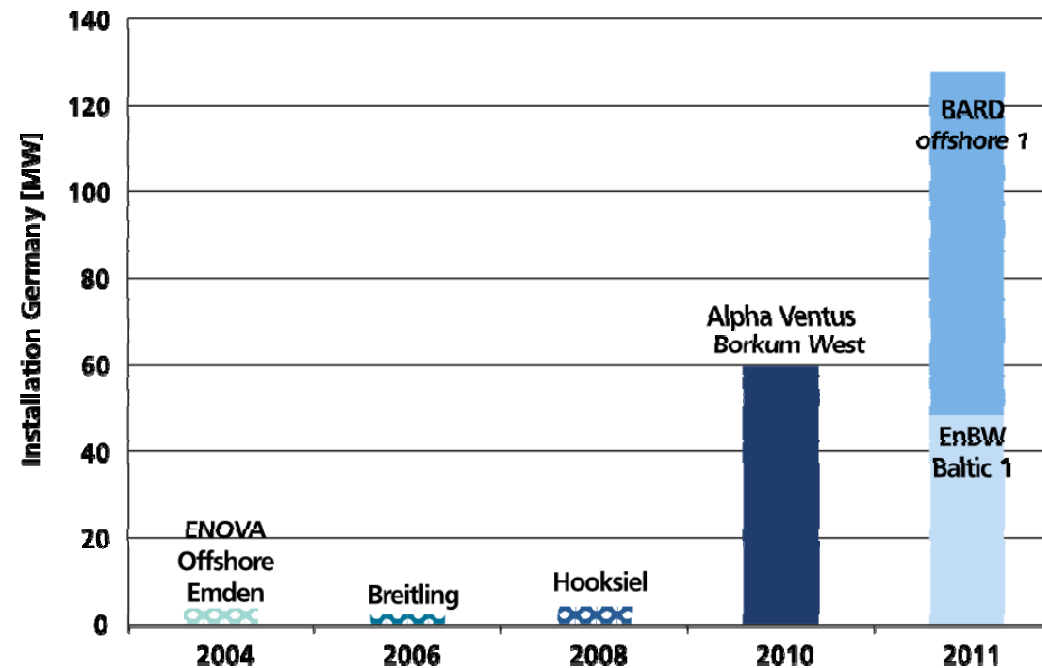
Project partners:



Ingenieurgesellschaft Zuverlässigkeit und
Prozessmodellierung Dresden

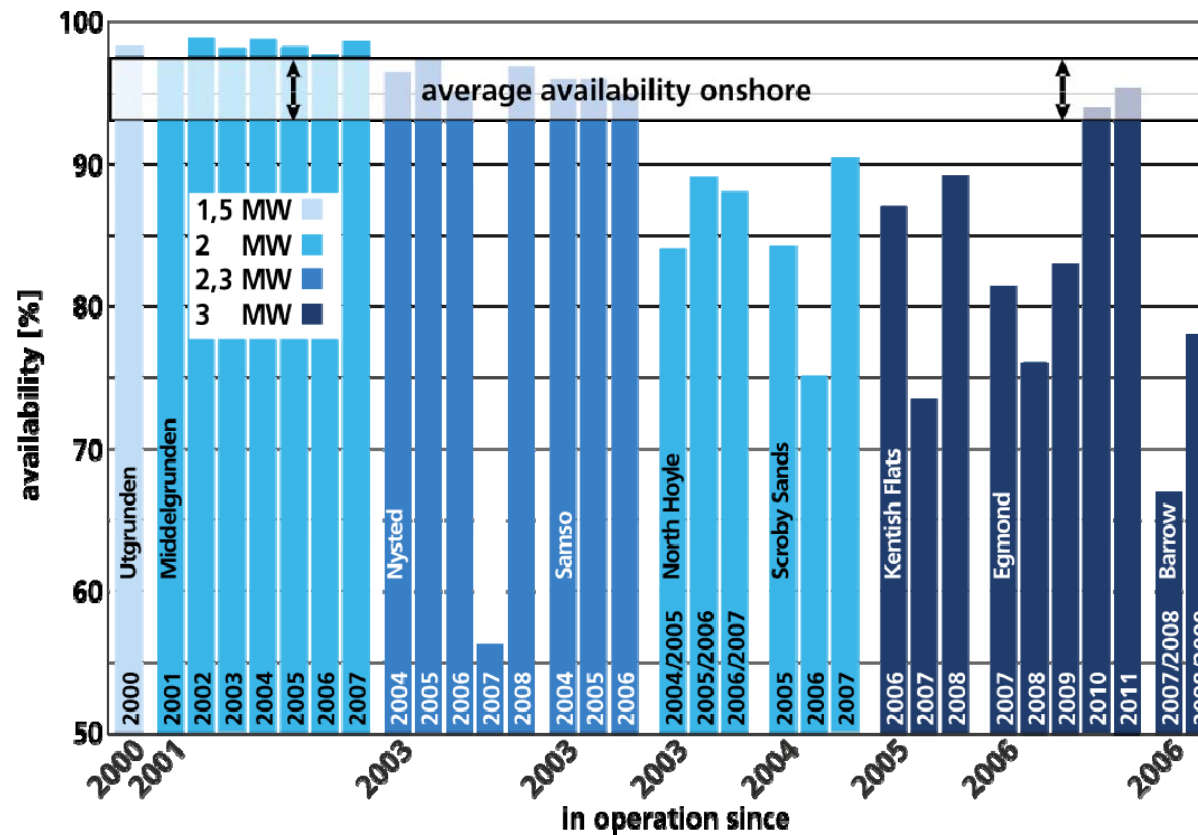
Motivation

- Utilization of offshore wind energy is still in early stages
- Germany's target is 25 GW installed capacity by 2030
- Installed capacity approx. 200 MW (Europe: 3 400 MW)
- Lack of experience and information



Motivation

- Offshore wind turbines don't achieve onshore availability (95-98 %)
- Numerous faults cause unplanned downtime



German Onshore Monitoring Program WMEP

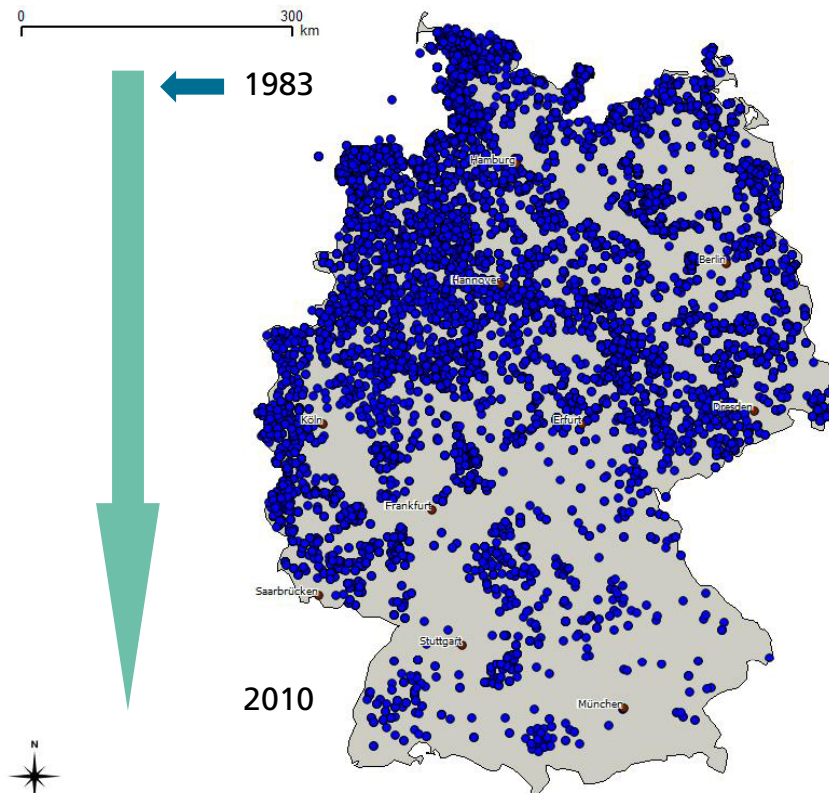
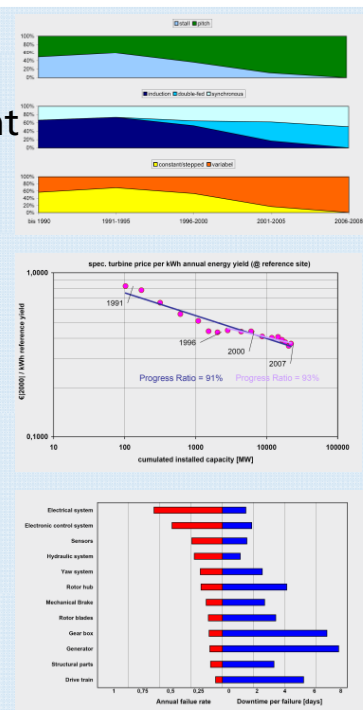
A research initiative within the „250 MW Wind“ funding program (1989-2006)

193 000 monthly operation reports and
64 000 incident reports from about
1 500 wind turbines

Technology development

Learning curves

Reliability



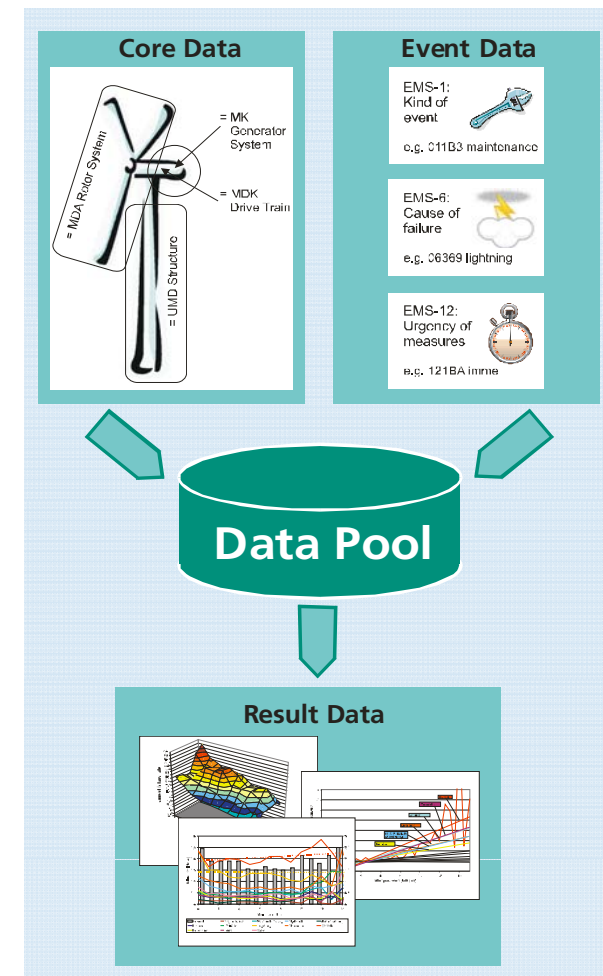
Monitoring Offshore Wind Energy Use Offshore~WMEP

The project:

- Funded by the German Federal Environment Ministry BMU
- Concept phase started Sept 2007 and ended Dec 2011
- The project is a follow-up project to the onshore wind energy monitoring program 'Scientific Measurement and Evaluation Program' (WMEP) and accompanies the offshore wind energy deployment in Germany

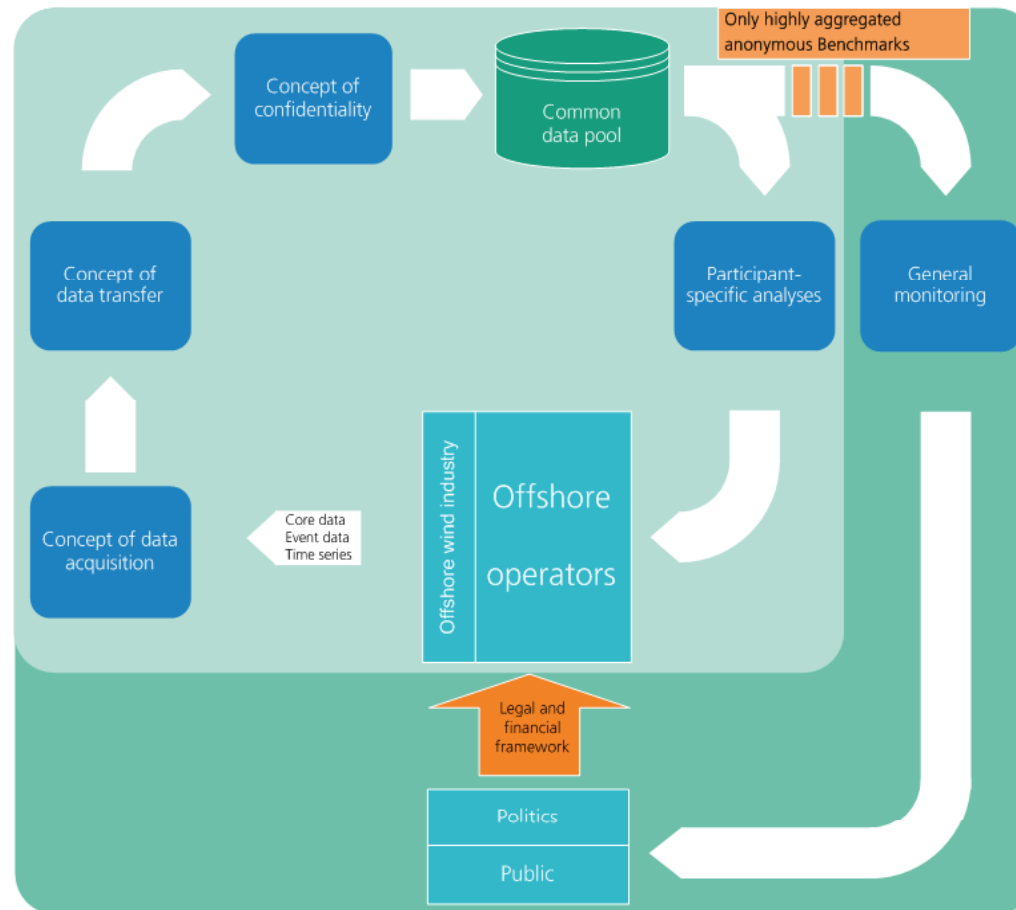
Aims of project:

- To answer fundamental questions on development of the utilization of wind power offshore
→ General monitoring
- To optimize maintenance and availability →
Systematical collection and evaluation of operational experiences

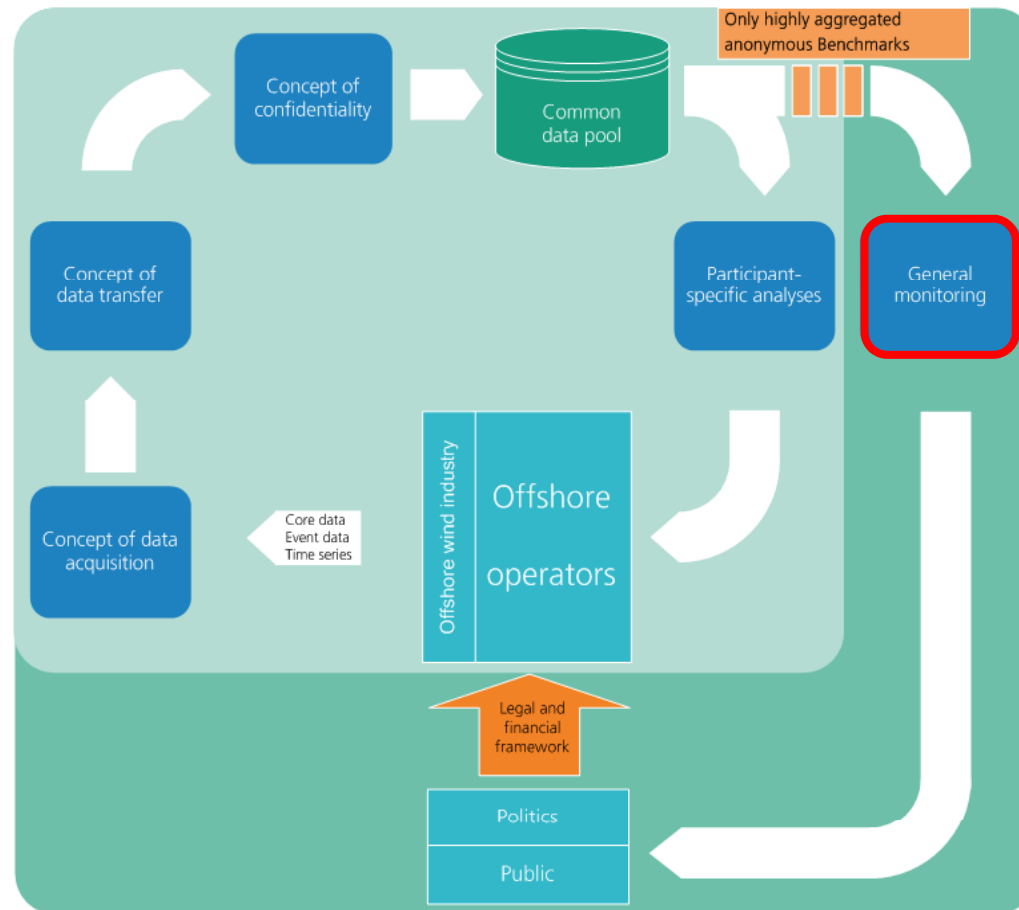


Common database

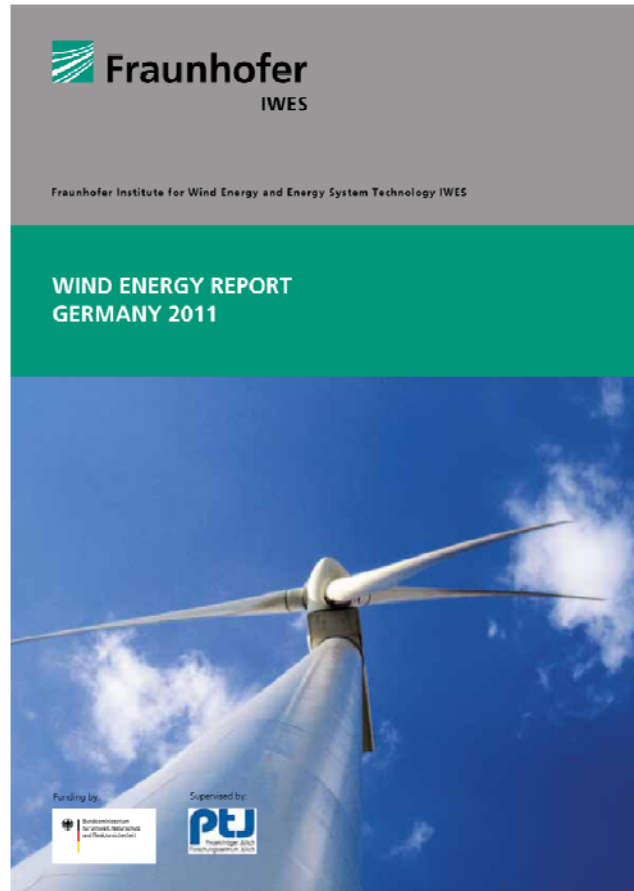
General concept



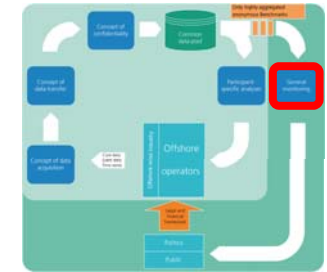
General Monitoring



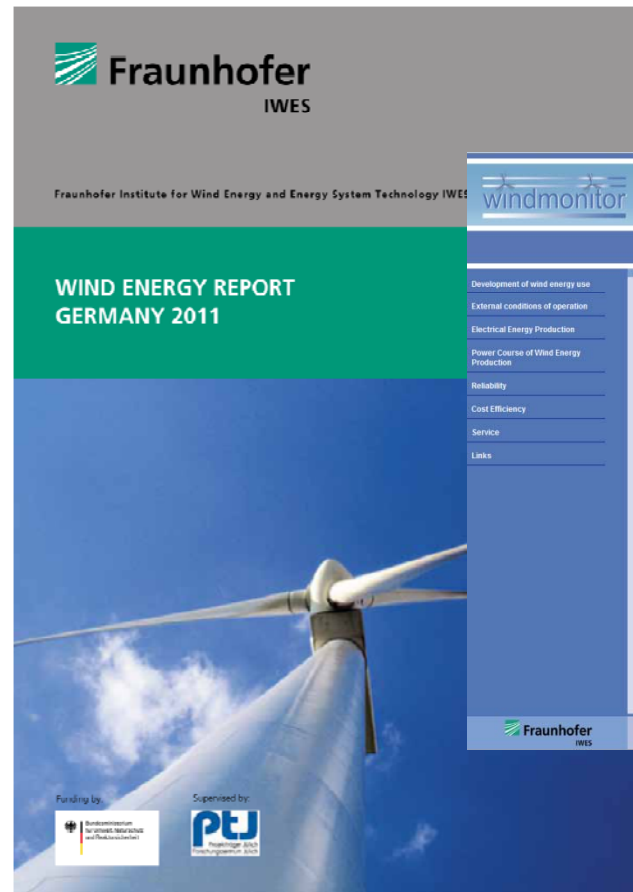
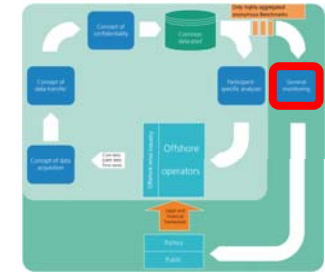
General Monitoring



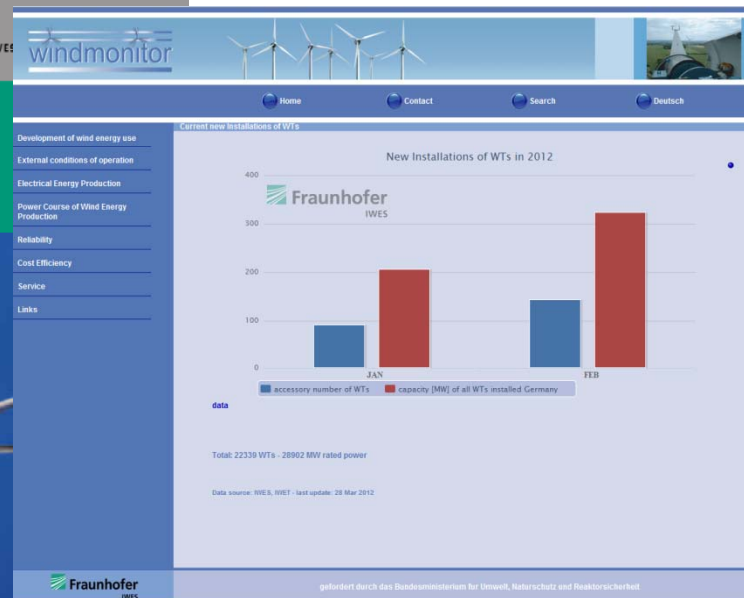
Wind Energy Report Germany 2011



General Monitoring

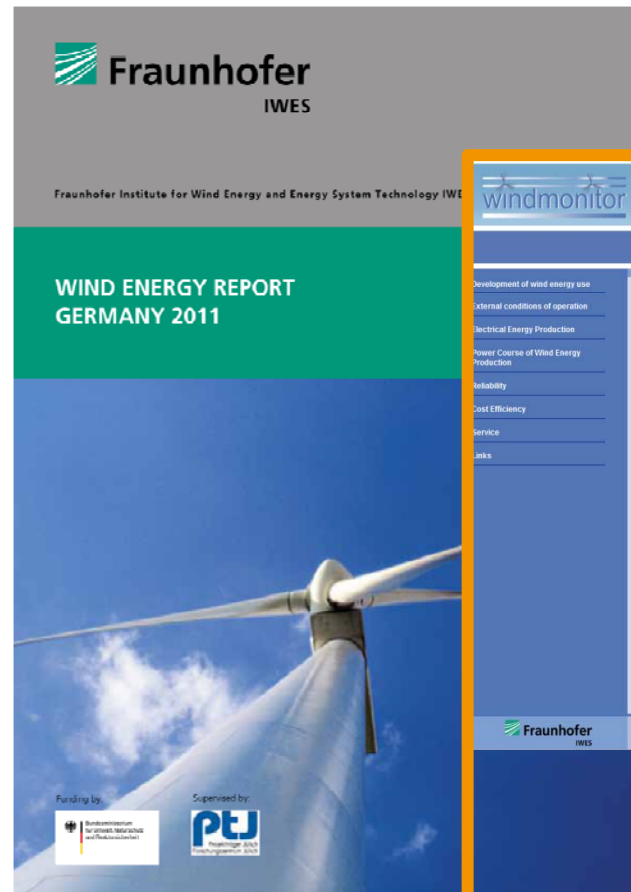
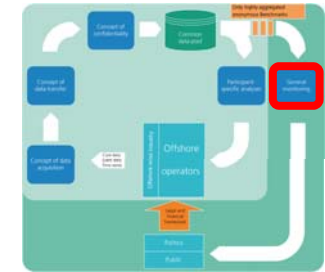


Wind Energy Report Germany 2011



www.windmonitor.de

General Monitoring



Wind Energy Report Germany 2011



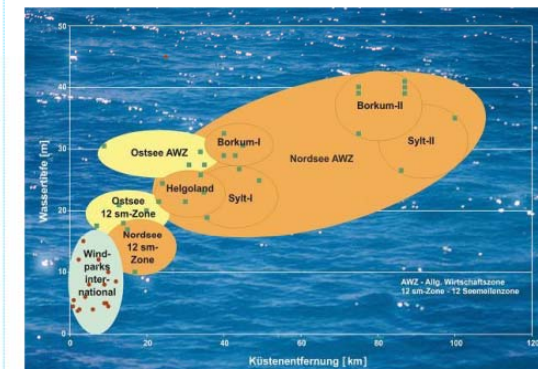
www.windmonitor.de

www.offshore-wmep.de

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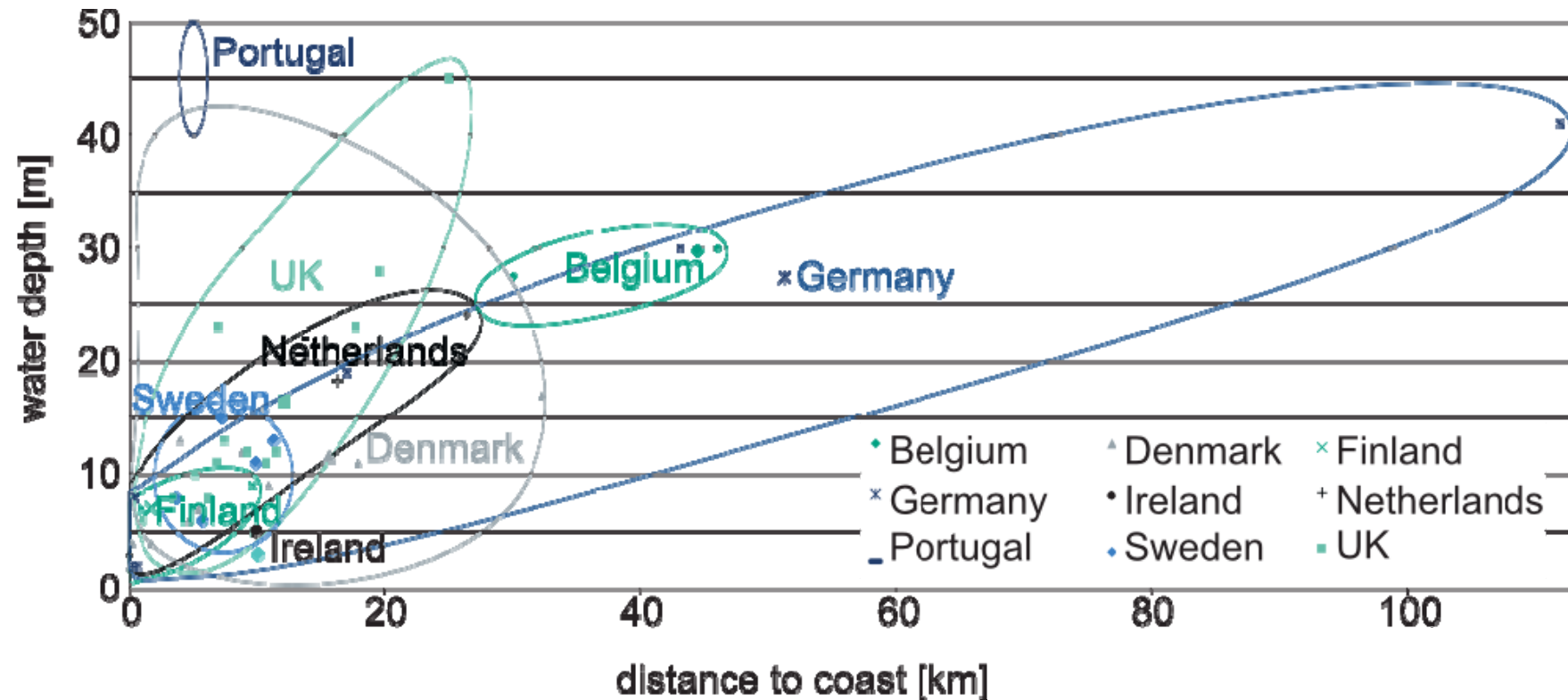
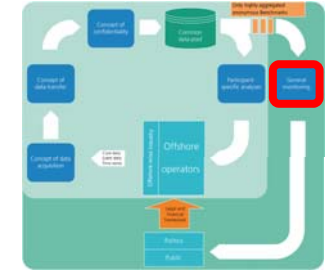
Offshore-WMEP Monitoring der Offshore-Windenergienutzung

Diese Webseite ist die Projektseite des Offshore-Wissenschaftlichen Mess- und Evaluierungsprojekts (Offshore-WMEP). Das Offshore-WMEP hat die Aufgabe den Ausbau der Offshore-Winden wissenschaftlich zu begleiten und wesentliche Erkenntnisse auf diesem Themengebiet zu gewinnen. Auf der Seite wird das Konzept des Projekts und dessen Inhalte vorgestellt.



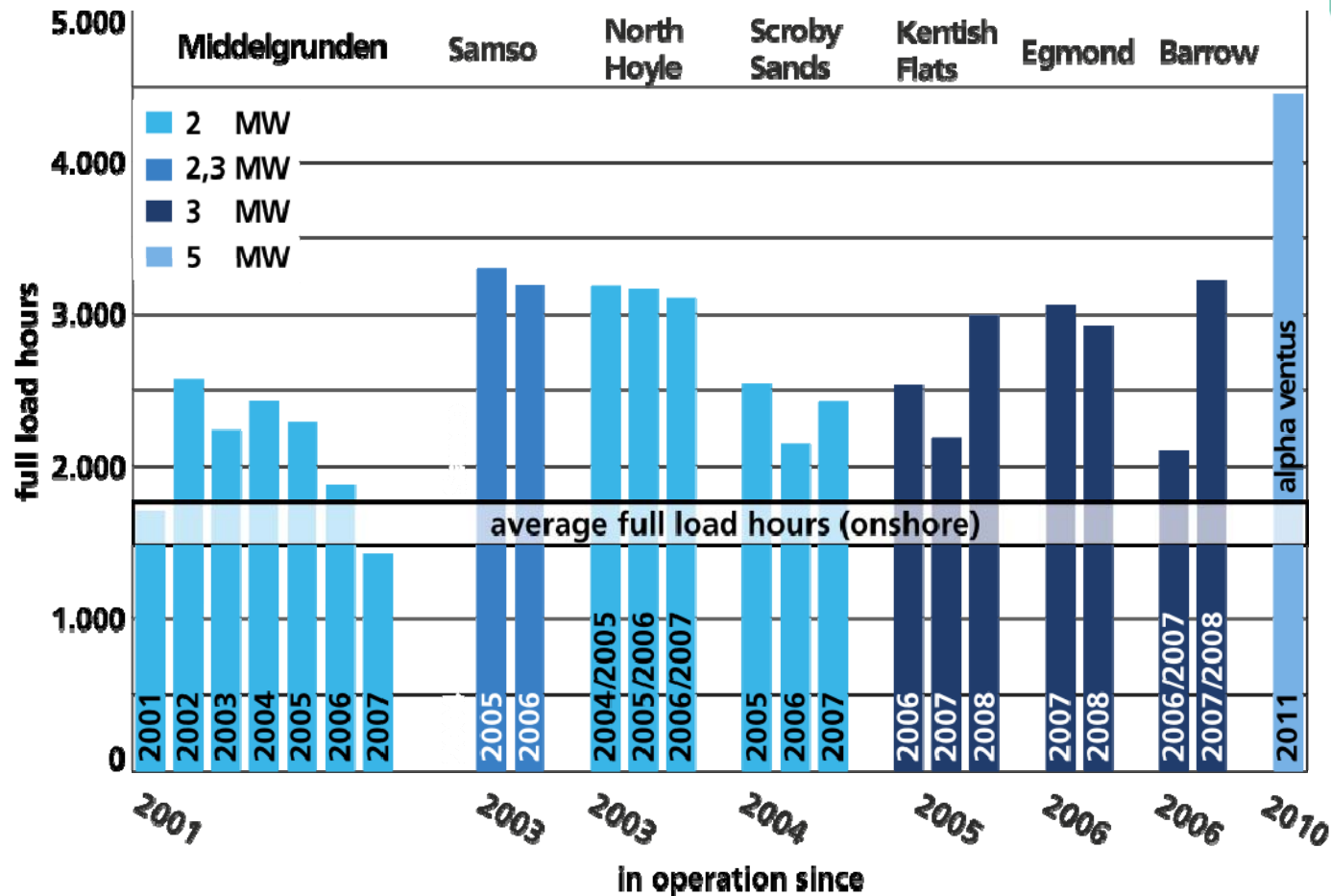
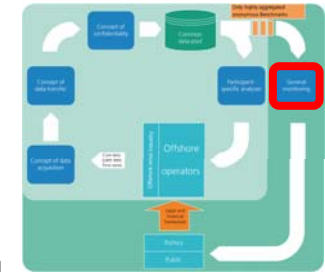
General Monitoring

Some results – site characteristics



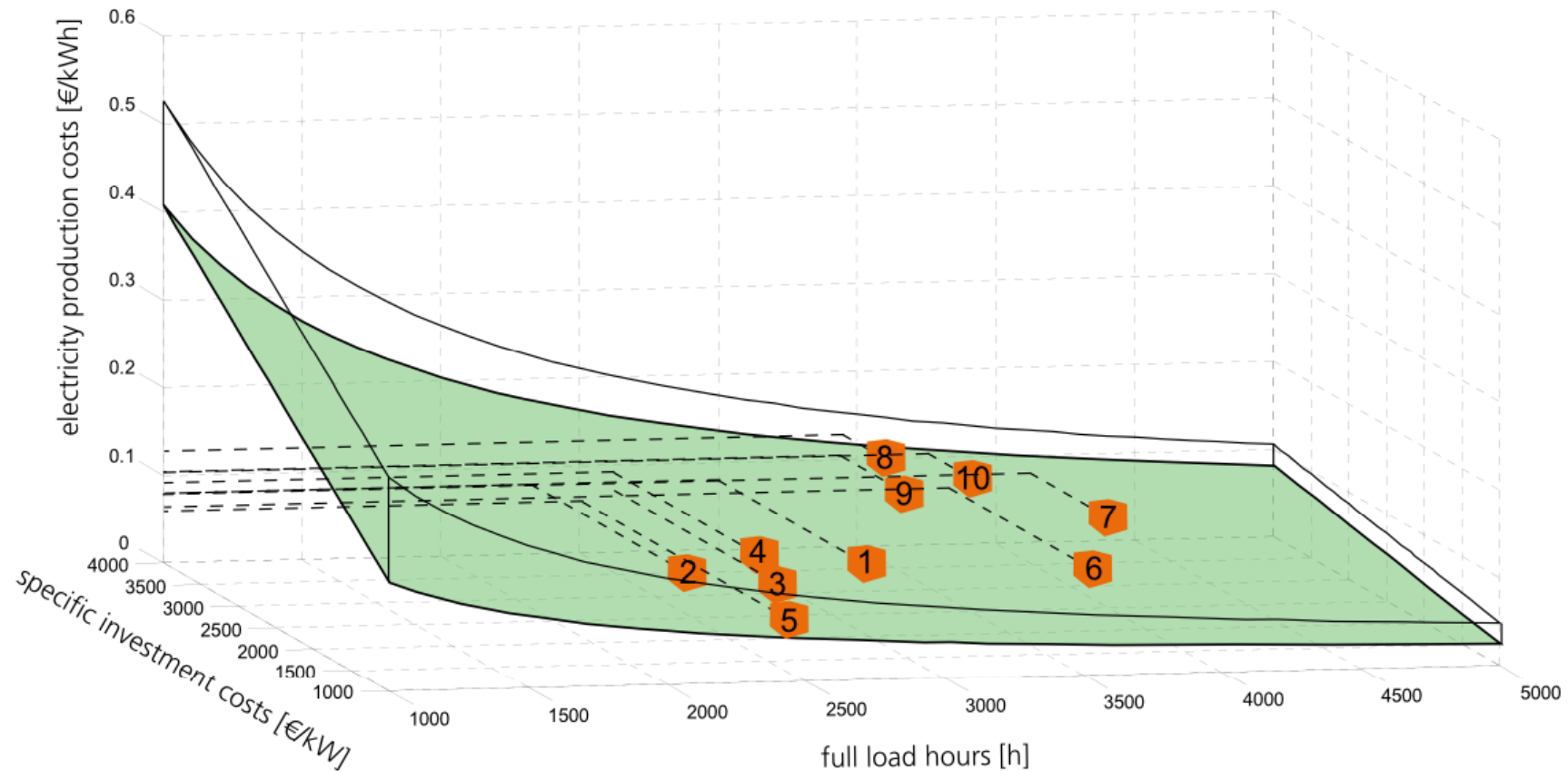
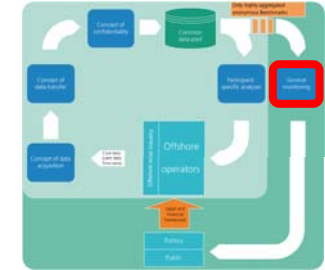
General Monitoring

Some results – full load hours

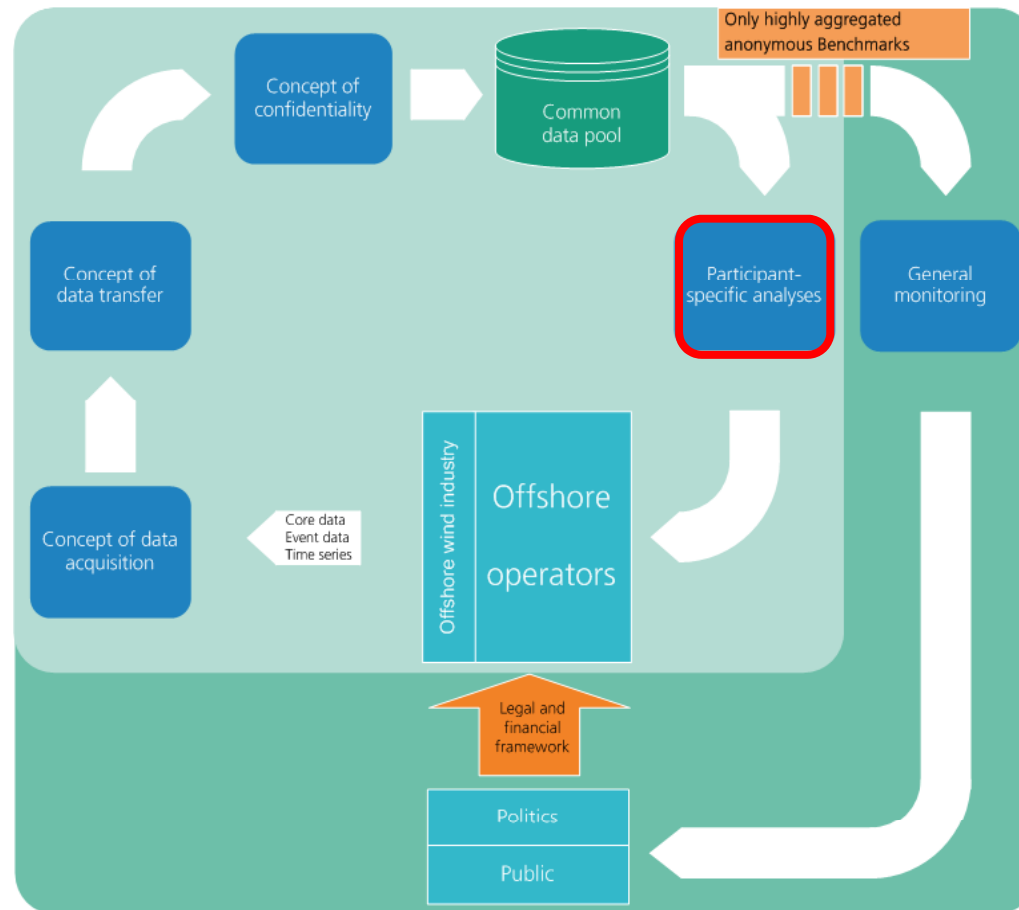


General Monitoring

Some results – electricity production costs

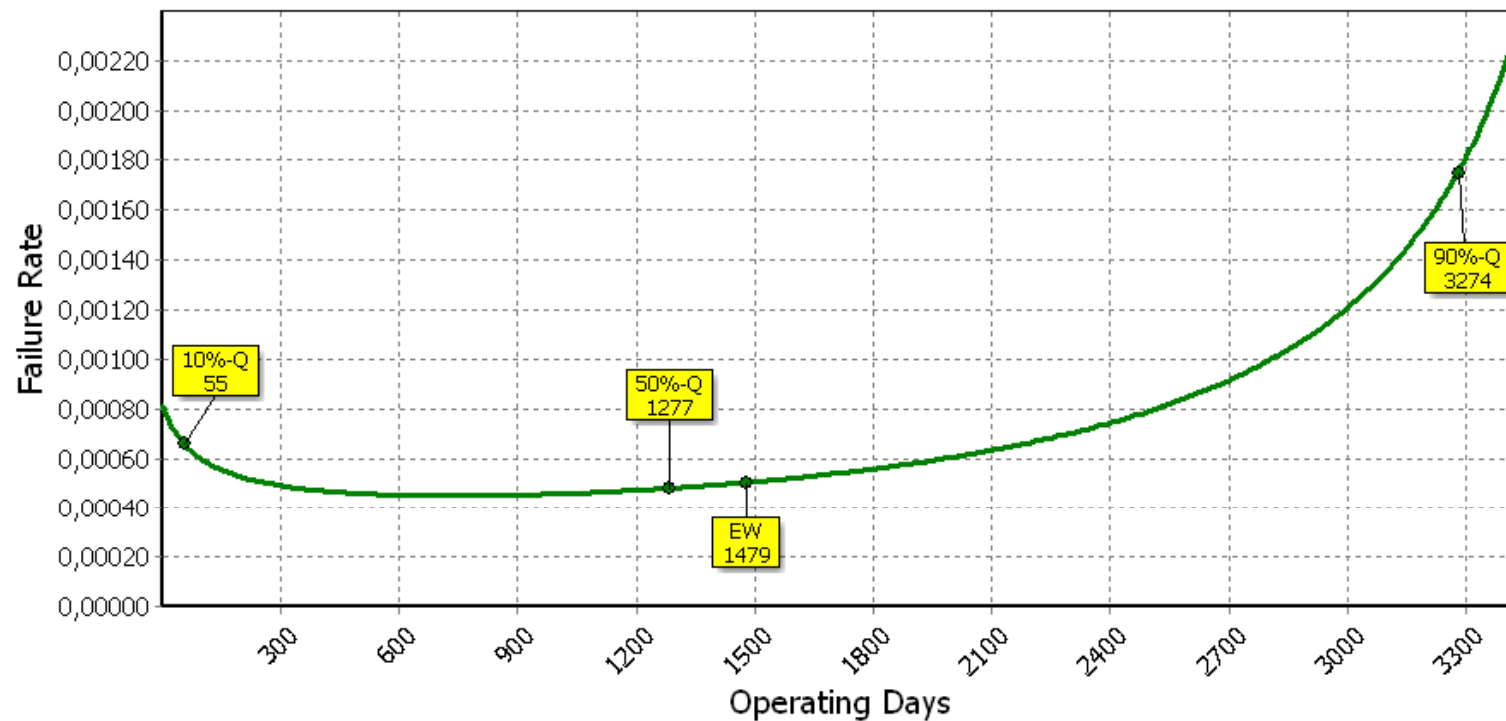
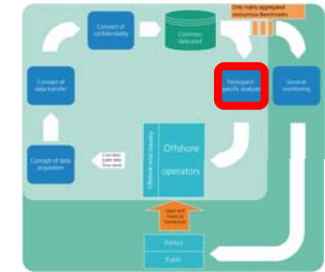


Participant specific analyses



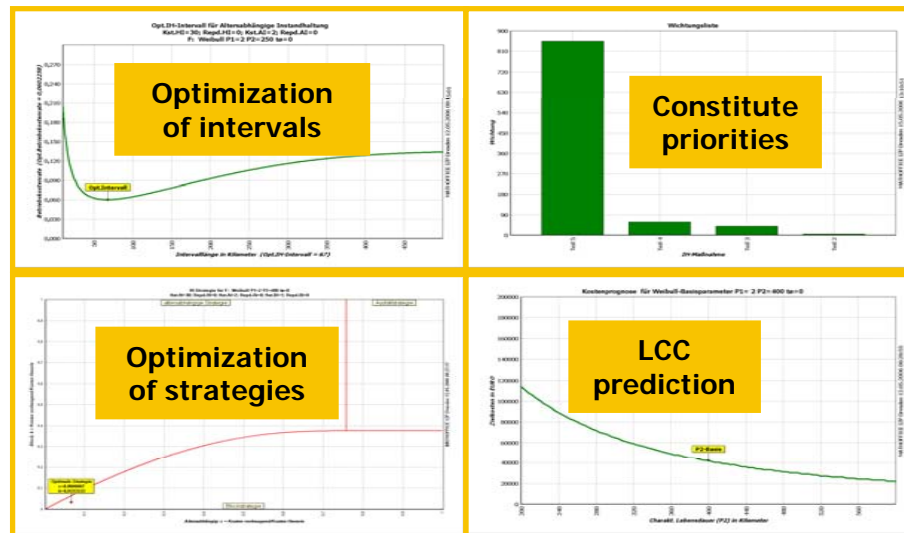
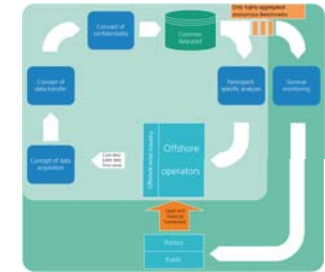
Participant specific analyses

Failure statistics – example analysis



Participant specific analyses

Tools for reliability based maintenance



Source: IZP Dresden



Conclusion

- Offshore~WMEP concept phase ended in 2011
- Needed concepts are ready e.g. confidentiality, data structure
- General monitoring provides information via
 - Annual Wind Energy Report
 - www.windmonitor.de
 - www.offshore-wmep.de
- First operating data is already included in the common database
- Leading operators confirmed to join the project and to feed the database



Outlook

- First execution phase is scheduled to start in Q2/2012
- General monitoring will be continued and expanded
- Further data of offshore wind farms will be included in the database
- Participant specific analyses



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