Windenergy Offshore

Monitoring Overview







- Presentation of PROKON Nord Energiesysteme GmbH
- Experience O&M Onshore
- Requirements for O&M Offshore
- How to Solve the Problem





- PROKON Nord is founding member of ENERTRAG AG
- Installed capacity: 221 MW
- Total number of WT: 185
- 2 building permissions offshore

Windfield (Project)	Region or Federal State	Number	Output MW	Investment in Mio€	Equity in Mio, €	Yearly y Mio. kV
Bobbau	Saxony-Anhalt	5	7,5	10,4	2,9	15,1
Filsum	Lower Saxony	4	7,2	9,4	2,4	13,8
Postlow (Postlow II)	Vorpommern	2	3,8	5,9	0,9	8,8
Merdelou/Fontanelles	France	12	15,6	21,0	4,5	45,2
Dornstedt	Saxony-Anhalt	10	18,0	22,5	5,6	32,1
Uckermark (Klockow)	Brandenburg	1	0,8	1,4	0,3	2,4
Uckermark (Nechlin)	Brandenburg	15	24,6	37,8	8,1	55,9
Uckermark (Neuenfeld)	Brandenburg	14	21,0	35,8	6,7	58,7
Uckermark (fund Uckermark)	Brandenburg	8	12,0	17,6	5,1	26,4
Uckermark (Neuenfeld West2)	Brandenburg	1	1,5	2,5	0,5	4,0
Uckermark (Prenzlau Nord)	Brandenburg	1	1,5	2,0	0,5	3,3
Uckermark (other turbines)	Brandenburg	36	30,9	46,2	11,0	67,8
Bütow/Zepkow (Zepkow)	Mecklenburg	7	4,2	5,4	1,4	7,7
Bütow/Zepkow (Zepkow II)	Mecklenburg	3	1,8	2,3	0,6	3,3
Bütow/Zepkow (Bütow)	Mecklenburg	22	13,2	16,4	4,9	24,1
Höme	Lower Saxony	3	3,9	5,6	1,1	8,7
Klostermoor	Lower Saxony	8	12,0	16,5	4,9	23,7
Quenstedt	Saxony-Anhalt	8	12,0	15,5	4,8	22,4
Postlow	Vorpommern	4	6,0	8,5	2,5	11,8
Freiheit III (Roitzsch)	Saxony-Anhalt	4	2,4	3,3	1,0	4,5
Weenermoor	Lower Saxony	8	12,0	17,4	4,9	25,1
Weenermoor (Weenermoor II)	Lower Saxony	4	6,0	8,7	2,5	12,5
Single wind turbines	Brandenburg	5	2,9	3,3		5,3
Total		185	221	315	77	482



- Offshore Windfarm Borkum West
 - Pilot phase: 60 MW, 12 WT, 2005 2006
 - Completion Phase: 1000 MW, 208 WT, 2008 2009



PROKON Nord



- Offshore Windfarm Cromer
 - 100 MW
 - 30 WT
 - 2006

- Water depth 20-30 m
- Steel tripod foundation
 - Weight: 600 to 1000 to
 - Tubediameter up to 6 m
 - Wallthickness: up to 100 mm
- Rotordiameter WT 100 126 m







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Requirements Offshore

- Accessibility expensive and strongly weather dependant
- Extreme conditions, marinisation of components
- Lifting equipment for heavy or big components extremely expensive
- Additional maintenance caused by offshore structure as a consequence of extreme conditions or regular inspections because of offshore rules (AISC, GL, NORSOK, etc.)
- Missing knowledge offshore structures for WT-loads
- => Remote maintenance and operation important



How to Solve the Problem

- CMS is being installed onshore
- Measuring onshore WTstructures in cooperation with BAM
- Prototype of the M 5000 will be built onshore with a tripod
- Pilot phase with 12 WT for measuring purposes
- 30 WT in UK
- => Defining an integrated tool for monitoring all components to reduce the necessity of uncontrolled unplanned failures or accessing





