

DEWEK 2015 - Conference Program

19 / 20 May 2015 in Bremen, Germany



Sigmar Gabriel
Federal Minister for
Economic Affairs and
Energy

MESSAGE OF GREETING BY SIGMAR GABRIEL PATRON DEWEK 2015

Wind power is the workhorse of the German Energiewende (energy transition). It accounts for every third kilowatt hour of electricity generated from renewable energy sources in Germany. Wind energy thus made a significant contribution towards achieving last year's record level of

27.8 percent of renewables in our electricity mix. For the first time, more electricity was generated from solar, wind, hydro-power and biomass than from lignite. It is our intention to ensure that this positive trend continues, especially by making more use of offshore wind energy and by developing further suitable onshore sites for wind energy.

Last year's amendment of the Renewable Energy Sources Act (EEG) marked an important step forward for wind energy. With annual expansion corridors of 2,500 MW for onshore wind plus repowering, and of 800 MW for offshore wind and the extension of the compressed-tariff model, we are securing the home market of the German wind industry for the long term. We are thus responding to the special importance of the wind sector in terms of energy, structural and industrial policy. Wind power technology has developed into a showcase of German industrial performance and has created thousands of new jobs.

If we are to make full use of the potential, however, the wind industry will now need to play its part as well. We need further improvements in the cost efficiency both of investments in and of the operation of wind turbines, as well as a greater contribution towards energy and grid security, and more research and development to achieve this. This is also the aim of the funding provided towards energy research by the Federal Ministry for Economic Affairs and Energy. The key challenges here are to improve the yield and the reliability of wind turbines over a period of more than 25 years.

A major factor in the continued expansion of wind energy will be the integration of the electricity into the public electricity grids. We need more research into the grid connection of offshore wind farms, load and production management, wind-specific aspects of energy storage and the improvement of wind forecasts.

German companies, universities and research institutes are among the global leaders in the field of wind energy technology. Through their intensive cooperation, they are helping to

secure access to international markets. The German wind industry is competing successfully with specific solutions for the deep-sea application of wind turbines, for rotor blade and turbine concepts for cold climates, and for the environmentally compatible design of turbines and installation processes. The Economic Affairs Ministry is giving intensive backing to these efforts, with a view to achieving a high level of value added in Germany whilst also reducing the industry's dependency on the domestic market by boosting the ratio of exports.

An exchange of experience between wind turbine manufacturers and component suppliers, universities and research institutes is of great importance for a successful development of wind energy. The large number of international participants and the wide range of conference topics are proof of DEWEK's position as a leading wind energy conference.

I wish all participants at DEWEK 2015 an interesting and successful conference.

Yours sincerely,
Sigmar Gabriel

Federal Minister for Economic Affairs and Energy



Olaf Lies
Minister for Economic
Affairs, Labour and
Transport of Lower Saxony

WELCOME ADDRESS BY OLAF LIES

Dear Participants of DEWEK 2015, since the first DEWEK, already 23 years ago, wind energy development has experienced rapid growth. Whereas in 1993 the wind energy capacity installed world-wide amounted to just about 3,000 MW, in 2014 4,750 megawatts of new capacity were installed onshore in Germany alone. Additionally, offshore wind energy in Germany reached an installed capacity of approximately 1,400 MW by the end of the year.

These figures show that wind energy has evolved from a marginal phenomenon to an important part of our energy supply system.

Lower Saxony with its many wind-rich sites in coastal areas has a significant share in this development. Approximately one quarter of the wind energy capacity installed in Germany is located in this federal state. The continued development of wind energy, onshore and offshore, will strengthen the particular role of Lower Saxony in the energy transition. Wind energy plays a key role in making the energy transition a success, because only by making adequate use of existing poten-

tial, Germany will be able to achieve its energy and climate targets. The development of wind energy also has contributed significantly to the establishment of new companies in the region and has developed into a success story particularly in regions previously regarded as economically underdeveloped. In 2013 the number of people employed in Lower Saxony in the field of renewable energies was 55,000, of which 32,000 jobs were created by the wind industry.

The global new investment in renewable energies in 2013 was USD 250 billion minimum. By 2035 global investment in the supply of power and heat from renewable energies is expected to double. Therefore the energy transition in Germany and the global growth in renewables offer excellent economic and employment-related opportunities for Lower Saxony. For a further successful development of wind energy it will be important to continue reducing the costs of power generation, to improve the reliability of wind turbines and to advance system integration. Offshore wind energy, although still rather expensive in comparison with other renewable energy sources, can contribute to system stability and the security of energy supply due to a high number of operating hours and full-load hours.

DEWEK as a forum for exchanging ideas and networking for experts and stake-holders from research and industry has played an important part in the further development of wind energy for many years.

I wish all participants of DEWEK 2015 a successful conference with interesting discussions and valuable impulses for their work.

Yours sincerely,
Olaf Lies

Minister for Economic Affairs, Labour and Transport of Lower Saxony



Photo by: Navina Reus

Dr. Joachim Lohse
Senator for Environment,
Urban Development and
Transportation, Bremen

**WELCOME ADDRESS
BY DR. JOACHIM LOHSE**

The 12th German Wind Energy Conference DEWEK on 19 and 20 May 2015 will once again bring a large number of experts from the field of wind energy research and development to Bremen, which reflects the high priority attached to wind energy in the federal state of Bremen.

Since the beginning of the nineties, the city state of Bremen has been supporting the development of wind energy. Favorable conditions were established for the use of onshore wind energy and for attracting companies of the wind industry to the region. Today we can see the results of the political decisions and framework established during the past 20 years:

Bremen and the surrounding region have evolved into a center for wind energy. Numerous companies have set up business in the area and developed an excellent network. The University of Bremen und die University of Applied Sciences Bremerhaven have established a research infrastructure that is renowned nationally and internationally.

The use of wind energy also has developed rapidly. In 2014 Bremen was the federal state with the largest installed wind energy capacity in relation to its land area. In numbers of wind turbines installed in relation to area in 2014, Bremen came

close behind the top-ranking state of Schleswig-Holstein. In 2011, the Fraunhofer Institute for Wind Energy and Energy System Technology (IWES) established a potential of approximately 200 megawatts of wind energy capacity, 80 % of which had already been developed by the end of 2014. For a densely populated city state with a small land area these are excellent results.

These figures also show, however, that there are only very few areas left that can be used for wind energy in future. The focus therefore will be on the repowering of existing wind turbines and the use of sites in or near industrial areas.

Offshore wind energy on the other hand has a much larger potential and has been supported by the state of Bremen for many years. The Offshore Terminal Bremerhaven (OTB) scheduled for completion within the next few years will provide another strong impetus for the energy transition and the growth of the wind energy sector. In 2014 the 258 offshore wind turbines installed in the German North Sea and Baltic Sea exceeded for the first time the total capacity of one gigawatt. Bremen is following this development with keen interest and pride and is relying on wind energy – onshore and offshore – as a means to achieve the energy transition.

The compromise achieved in the reformation of the Renewable Energy Sources Act (EEG) after an unnecessarily great deal of back and forth, has established a reliable foundation for the further development of wind energy. Wind energy will continue to play a leading role in the energy transition.

I am sure that DEWEK 2015 once more will give new momentum to the further development of wind energy technology. I wish the conference every success and all delegates a pleasant stay in Bremen.

Yours sincerely,
Dr. Joachim Lohse

Senator for Environment, Urban Development and Transportation of the Free Hanseatic City of Bremen



Francisco Martinez
(Managing Director)

**OPENING WORDS
BY THE ORGANIZERS**

2014 has been a record year for wind energy in Germany. The new installed capacity of 4,745 MW onshore and 1,437 MW offshore marks a growth rate never reached before and underlines the importance of the German wind energy market, also on an international level. This development is to a great deal due to the nuclear disaster 2011 in Fukushima, Japan, after which Germany decided to opt out of nuclear power and to initiate a turnaround in energy policy. Throughout Germany new designated areas for wind energy use were assigned, and the development of these new wind farm areas is reflected by the current

figures of new installations. A significant growth of wind energy is also to be expected for 2015 and 2016. This development is accelerated by the efforts of the market players to make use of the available sites before the implementation of the planned tendering system in 2017.

This fundamental system change of promoting wind energy in Germany and its perspectives for the wind industry in Germany, will also be an important topic at the DEWEK on 19/20 May 2015 in Bremen. Therefore, in addition to the traditional sessions with top-class technical papers, the organizers have included a panel discussion in the DEWEK program, on the first conference day, at which the subject „EEG 3.0 / Tendering System“ will be discussed with key players of the industry.

As always, the exchange of specialist knowledge on current topics in the field of wind energy research and application will be in the focus of the 12th German Wind Energy Conference DEWEK 2015. The fact that the DEWEK has established itself as an internationally renowned technical-scientific forum for wind energy experts is shown once more by the high number of 200 abstracts submitted for the conference.

Quite a number of contributions deal with Remote Sensing Measurements, especially LiDAR measurements for onshore and offshore wind energy sites. In view of the growing dimensions of wind turbines, simulation and testing of rotor blades are also becoming more important. Furthermore, DEWEK 2015 features special sessions dealing with New Developments, Operational Experiences und Grid Integration.

Traditionally the two days of the DEWEK are also an excellent opportunity to meet colleagues from universities and research institutes as well as engineers and business partners from the industry. The accompanying exhibition where companies and research institutes present their products and ser-

vices offers the chance to discuss technical details or simply have a chat with colleagues of other companies. With presenters and delegates from 20 countries the conference is also an ideal platform for keeping up-to-date with the latest developments in other countries.

To relax after a day of intensive talks and discussions, enjoy the conference dinner in the beautiful wine cellar of the historical Bremen Town Hall. Good food accompanied by drinks and live music will turn the evening into a perfect get-together at the end of the first conference day. In this spirit we warmly welcome you to Bremen and wish you an interesting 12th German Wind Energy Conference and many valuable new contacts and insights.

Francisco Martinez
Managing Director

Jens Peter Molly
Managing Director

Many Thanks to the Sponsor of DEWEK 2015



Many Thanks to the Media Partner of DEWEK 2015



DEWEK 2015

Exhibition Registration

Advertisement

Booth area prices for both conference days (19th and 20th May 2015):

	Normal rate	Rate for research institutes/universities
Normal rate	125.00 EUR / m ² Space only ¹	68.00 EUR / m ² Space only ¹

all prices are per m² and plus 19% V.A.T.

Unless specified otherwise, the stand fee includes:

- Company description in the exhibition catalogue
- Coffee/tea during breaks
- 1 daily free lunch per 6m² booked (additional lunch can be ordered at a price of 40.- EUR for both days, plus 19 % V.A.T.)

The exhibition in the „Hanse Saal“ is accessible during the whole time of the conference for all participants/visitors.

For ordering please visit www.dewek.de and download the order form.

All stands will be allocated on a first come, first served basis according to availability (see floor plan).

Note: Co-exhibitors have to be registered separately and will be charged 120 € each (administration cost, exhibition catalogue entry, coffee/tea during breaks and 1 daily free lunch, plus 19% V.A.T.).

¹ Space only: back and side walls are compulsory and can be ordered later through the exhibitor service manual

PROGRAM STRUCTURE

19.05.2015, TUESDAY

	Room 1	Room 2	Room 3	Room 4
09.00 - 10.30	Opening Session			Poster Session
10.30 - 11.00	Coffee Break			
11.00 - 12.45	1. New Developments	2. Site Assessment and Economic Viability	3. Operational Experiences	
12.45 - 13.45	Lunch Break			
13.45 - 15.30	4. Application of Remote Sensing	5. Loads	6. Icing and Climate Impact	
15.30 - 16.00	Coffee Break			
16.00 - 17.45	7. Panel Discussion	8. Offshore Foundations	9. Simulation Turbine Control	
17.30 - 19.00	Poster Session – Authors present Beer Reception and Networking Room 4 – Foyer			
20.00	Conference Dinner (Bremer Ratskeller)			

20.05.2015, WEDNESDAY

	Room 1	Room 2	Room 3	Room 4
8.30 - 10.15	10. Lidar I	11. Offshore General	12. Simulation Blade	Poster Session
10.15 - 10.45	Coffee Break			
10.45 - 12.30	13. Lidar II	14. Simulation Turbine and Components	15. Simulation Wind I	
12.30 - 13.30	Lunch Break			
13.30 - 15.15	16. Offshore Wind Conditions	17. Grid Integration	18. Simulation Wind II	
15.15 - 15.45	Coffee Break			
15.45 - 17.15	19. CFD Modeling	20. Offshore Turbine and Components	21. Rotor blades	
17.15 - 17.30	Conference closing			

LECTURES

19.05.2015, TUESDAY

08:00 **Registration in the Foyer of the Conference Hall**

OPENING SESSION

Room 1: Borgward Saal; Chairperson: J. P. Molly

09:00 **Welcome**

J. P. Molly, Managing Director, UL International GmbH (DEWI)
F. Martinez, Managing Director, UL International GmbH (DEWI)

Opening Words

Olaf Lies, Minister for Economic Affairs, Labour and Transport of Lower Saxony

Germany's Research Programme for Renewable Energy

Dr. Georg Menzen, Federal Ministry for Economic Affairs and Energy (BMWi)

10:30 Coffee Break

SESSION NO. 1: NEW DEVELOPMENTS

Room 1: Borgward Saal; Chairpersons: N. N.

11:00 **Tuned Mass Dampers for Application in Onshore and Offshore Wind Turbine Towers**

K.-H. Hanus, S. Glanzner, ESM Energie- und Schwingungstechnik Mitsch GmbH

11:15 **Multidisciplinary Optimisation of a Slip Synchronous PM Generator (SSPMG)**

J. N. Stander, G. Venter, M. J. Kamper, Stellenbosch University, South Africa

11:30 **Development of a Medium Scale Research HAWT for Inflow and Aerodynamics Research in the Large Wind Tunnel of TU Berlin**

J. Fischer, O. Eisele, G. Pechlivanoglou, S. Vey, C. N. Nayeri, SMART BLADE GmbH; C.O. Paschereit, HFI TU Berlin

11:45 **Design and Wind Tunnel Testing of a Leading Edge Slat for a Wind Turbine Airfoil**

A. Manso Jaume, J. Wild, DLR Institut für Aerodynamik und Strömungstechnik; T. Homeyer, M. Hölling, J. Peinke, ForWind-Oldenburg

12:00 **Estimation-based Torque Tracking Control for a Nacelle Test Rig**

M. M. Neshati, University of Bremen; L. Chen, J. Wenske, Fraunhofer IWES, Bremerhaven

12:15 **Discussion**

12:45 **Lunch Break**

SESSION NO. 2: SITE ASSESSMENT AND ECONOMIC VIABILITY

Room 2: Kaisen Saal; Chairpersons: N. N.

11:00 **Turbulence Assessments in the Absence of Measurements – an Evaluation Study**

D. Hilbert, Senvion SE; C. Schmitt, M. Weimbs, juwi Energieprojekte

11:15 **Foresighted Planning of LiDAR Measurement Campaigns by Using Error Maps**

T. Klaas, D. Callies, P. Kühn, L. Pauscher, Fraunhofer IWES, Kassel

11:30 **Mobile LiDAR Mapping of Utility-Scale Wind Farms**

M. Zendeabad, N. Chokani, R. S. Abhari, ETH Zürich, Switzerland

11:45 **Creation of Incentives for Capacity Checks to Support the Development of Adjacent Wind Farms**

M. Rodenhausen, Siemens AG; R. McKenna, KIT Karlsruhe

12:00 **From Wind Speed to Market Value and from Yield to Revenue**

H.-T. Mengelkamp, anemos Gesellschaft für Umweltmeteorologie mbH; E. Kuhnhenne, enervis energy advisors GmbH

12:15 **Discussion**

12:45 **Lunch Break**

SESSION NO. 3: OPERATIONAL EXPERIENCES I

Room 3: Lloyd; Chairpersons: N. N.

11:00 **Practical Experiences from a Load Measurement Campaign for the Assessment of the Remaining Service Life of Wind Turbines**

C. Heilmann, M. Melsheimer, A. Grunwald, BerlinWind GmbH; R. Kamieth, R. Liebich, TU Berlin

11:15 **Evaluation of a Wind Turbine Fatigue Load Monitoring System Based on Standard SCADA Signals in Different Wind Farm Flow Conditions**

L. Vera-Tudela, M. Kühn, ForWind-Oldenburg

11:30 **3D Laser Optical Measurement of the Rotor Blade Angle**

T. Kleinselbeck, D. Hagedorn, WIND-consult GmbH

11:45 **Field Studies on Absolute Blade Angle Deviations at Wind Turbine Rotors and their impact on lifetime consumption and yield**

M. Melsheimer, A. Grunwald, C. Heilmann, BerlinWind GmbH

12:00 **Survey on Wind Farm O&M in Japan**

A. Yoshimura, ITOCHU Techno-Solutions Corporation (CTC), Japan; K. Tanaka, M. Lida, The University of Tokyo, Japan; S. Adachi, Sampo Japan Nipponkoa Risk Management, Japan; T. Takimoto, A. Sasaki, M. Itoh, New Energy and Industrial Technology Development Organization, Japan

12:15 **Discussion**

12:45 **Lunch Break**

SESSION NO. 4: APPLICATION OF REMOTE SENSING

Room 1: Borgward Saal; Chairpersons: N. N.

13:45 **Low-level Jet Climatologies for Northern and Southern Germany from SODAR and RASS Measurements**

S. Emeis, S. Helgert, Karlsruhe Institute of Technology

14:00 **Vertical Wind Speed Distribution and Low-Level Jet at Braunschweig Airport**

B. Bernalte, A. Lampert, D. Wulff, Th. Kenull, K. zum Berge, TU Braunschweig

14:15 **Bias of Mean Wind Estimate due to Non-Perfect Availability of Remote Sensing Data**

G. Peters, Metek GmbH; B. Hennemuth, Consult. Meteorol.

14:30 **Field Results of New Sodar Transducer Horn**

A. Hastings-Black, Vaisala Inc, USA

14:45 **A New Bistatic Wind LiDAR for Highly Resolved Wind Vector Measurements**

M. Eggert, C. Gutmuths, H. Müller, H. Többen, Physikalisch-Technische Bundesanstalt

- 15:00 Discussion
15:30 Coffee Break

SESSION NO. 5: LOADS

Room 2: Kaisen Saal; Chairpersons: N. N.

- 13:45 **Numerical Investigation of the Load Reduction Potential of a Flexible Hub Mounting on Two-bladed Wind Turbines**
B. Luhmann, P. W. Cheng, Universität Stuttgart; H. Seyedin, Skywind GmbH
- 14:00 **Stochastic Model for Indirect Estimation of Instantaneous and Cumulative Loads in Wind Turbines: A Systematic Approach for Offshore Wind Farms**
P. G. Lind, J. Peinke, ForWind-Oldenburg; M. Wächter, Fraunhofer IWES, Oldenburg
- 14:15 **Numerical Study of Rotational Effects on Wind Turbines**
I. Herraes, J. Peinke, ForWind-Oldenburg; B. Stoevesandt, Fraunhofer IWES, Oldenburg
- 14:30 **New Infrastructure and Test Procedures for Analyzing the Effects of Wind and Grid Loads on the Local Loads of Wind Turbine Drivetrain Components**
C. Liewen, D. Radner, D. Bosse, R. Schelenz, G. Jacobs, CWD – Center for Wind Power Drives Institut für Maschinenelemente und Maschinengestaltung
- 14:45 **CFD Analysis of 10-MW Wind Turbines**
V. Leble, Y. Wang, G. Barakos, University of Liverpool, UK
- 15:00 Discussion
15:30 Coffee Break

SESSION NO. 6: ICING AND CLIMATE IMPACT

Room 3: Lloyd; Chairpersons: N. N.

- 13:45 **Development of Ice Classes for the Certification of Wind Turbines Under Icing Conditions**
K. Freudenreich, M. Steiniger, DNV GL Renewables Certification, Hamburg; X. Gu, P. Thomas, Fraunhofer IWES; Ville Lehtomäki, VTT Technical Research Centre of Finland
- 14:00 **Durable Hydrophobic Coatings for Icing Protection of Wind Energy Plant**
K. Lummer, N. Rehfeld, V. Stenzel, Fraunhofer IFAM
- 14:15 **Performance of ENERCON Wind Turbines Under Icing Conditions in Europe**
U. Heikkilä, R. Gugerli, M. Müller, S. Koller, R. Cattin, Meteotest, Switzerland
- 14:30 **Development of a Rain and Particle Erosion Test Scenario to Enhancing the Rotor Blade Performance and Durability**
J. Liersch, J. Michael, Key Wind Energy GmbH; M. Mühlbauer, P. U. Thamsen, TU Berlin
- 14:45 **The Choice of Climate Impact Loss Factor of Wind Power Generation according to the Outdoor Heating Temperature in China**
X. Ren, J. Cui, The Forestry Design and Research Institute of Heilongjiang Province, China
- 15:00 Discussion
15:30 Coffee Break

SESSION NO. 7: PANEL DISCUSSION: EEG 3.0 – TENDERING SYSTEM

Room 1: Borgward Saal

- 16:00 Key players discuss the expectations for a German tendering system, considering also experience with Brazilian auction model

Moderator: Andreas Neumann, Radio Bremen

Panelists:

- Juarez Castrillon Lopes, EPE (Empresa de Pesquisas Energética, Brazil);
- Thorsten Falk, BMWi, III/5 - Federal Ministry for Economic Affairs and Energy, Work group tendering system for wind power
- Hermann Albers, BWE
- Dr. Klaus Meier, WPD
- Holger Meents, Bremer Landesbank
- Dr. Jörg Buddenberg, EWE

SESSION NO. 8: OFFSHORE FOUNDATIONS

Room 2: Kaisen Saal; Chairpersons: N. N.

- 16:00 **Influence of the Loading Frequency on the Fatigue Performance of Submerged Small-Scale Grouted Joints**
A. Raba, P. Schaumann, ForWind-Hannover
- 16:15 **Novel Test Facilities for Grouted Connections**
M. Werner, L. Lohaus, D. Cotardo, Leibniz Universität Hannover
- 16:30 **Offshore Pile Design in the Light of Test Results**
M. Baeßler, BAM Federal Institute of Materials Research and Testing
- 16:45 **Monopod Bucket Foundations Under Lateral Cyclic Loading**
A. Foglia, Fraunhofer IWES, Hannover; L. Bo Ibsen, Aalborg University, Denmark
- 17:00 **Numerical Simulation of Cyclic Horizontally Loaded Piles Under Special Loading Conditions**
J. Albiker, M. Achmus, K. Thieken, Leibniz University of Hannover
- 17:15 Discussion

SESSION NO. 9: SIMULATION TURBINE CONTROL

Room 3: Lloyd; Chairpersons: N. N.

- 16:00 **Numerical Modelling for Optimization of Wind Farm Turbine Performance**
M. O. Mughal, M. Lynch, F. Yu, B. McGann, F. Jeanneret, J. Sutton, Curtin University, Perth
- 16:15 **Multivariable Control Model for Simulation and Control Design of Wind Turbines**
B. Ritter, H. Fürst, Industrial Science GmbH; U. Konigorski, TU Darmstadt; M. Eichhorn, IAV GmbH
- 16:30 **Investigation of the Interaction Between Wind Turbines and Atmospheric Flow with a Coupling of the Aeroelastic Code FAST and the LES Code PALM**
M. Bromm, M. Kühn, ForWind-Oldenburg
- 16:45 **Correlation-Model of Rotor-Effective Wind Shears and Wind Speed for LiDAR-based Individual Pitch Control**
F. Haizmann, D. Schlipf, P. W. Cheng, Stuttgart Wind Energy (SWE)
- 17:00 **Collaborative Research on Wind Turbine Load Control under Realistic Turbulent Inflow Conditions**
C. N. Nayeri, S. Vey, D. Marten, G. Pechlivanoglou, C. O. Paschereit, TU Berlin; X. Huang, M. Meinke, W. Schröder, RWTH Aachen; G. Kampers, M. Hölling, J. Peinke, Univ. of Oldenburg; A. Fischer, T. Lutz, E. Krämer, Univ. of Stuttgart; U. Cordes, K. Hufnagel, K. Schiffmann, H. Spiegelberg, C. Tropea, TU Darmstadt
- 17:15 Discussion



POSTER EXHIBITION WITH AUTHORS PRESENT

Room 4: Foyer, Poster Session – 17:30-19:00

The authors will be available for discussion of their posters and answering of questions. A simultaneous translation is not available.

Beer Reception & Networking

The beer reception taking place in the Foyer at the same time is a good opportunity for networking with the other participants.

CONFERENCE DINNER WITH LIVE MUSIC

Location: Bremer Ratskeller – 20:00

Bremer Ratskeller, Am Markt, 28195 Bremen, Tel: 0421/321676



20.05.2015, WEDNESDAY

08:00 Registration in the Foyer of the Conference Hall

SESSION NO. 10: LIDAR I

Room 1: Borgward Saal; Chairpersons: N. N.

- 08:30 **“GW Wakes”: Measurements of Wake Effects in »alpha ventus« with Synchronised Long-Range LiDAR Windscanners**
J. Schneemann, D. Bastine, H. Beck, M. v. Dooren, G. Steinfeld, D. Trabucchi, J. J. Trujillo, M. Kühn, ForWind-Oldenburg; J. Schmidt, Fraunhofer IWES, Oldenburg
- 08:45 **Analysis of Wake Sweeping Effects Based on Load and Long-Range LiDAR Measurements**
H. Beck, J.-J. Trujillo, M. Kühn, ForWind-Oldenburg
- 09:00 **Fraunhofer IWES Wind LiDAR Buoy Validation**
C. Rudolph, J. Gottschall, G. Wolken-Möhlmann, T. Viergutz, B. Lange, Fraunhofer IWES, Bremerhaven
- 09:15 **Offshore Wind Turbine Power Performance Measurement Using a Nacelle Mounted LiDAR and a Sector Scanning LiDAR from the Transition Piece**
A. Vignaroli, R. Wagner, M. Courtney, DTU Wind Energy, Denmark; S. McKeown, R. Cussons, SSE, UK; R. Krishna Murthy, M. Boquet, Leosphere, France; S. Davoust, Avent Technology, France
- 09:30 **Measurement of Turbine Inflow with a 3D WindScanner System and a SpinnerLiDAR**
A. Vignaroli, R. Wagner, N. Angelou, M. Sjöholm, T. Mikkelsen, DTU Wind Energy, Denmark
- 09:45 **Discussion**
- 10:15 **Coffee Break**

SESSION NO. 11: OFFSHORE GENERAL

Room 2: Kaisen Saal; Chairpersons: N. N.

- 08:30 **Design Tool for Offshore Wind Farm Clusters**
I. Waldl, Overspeed; C. Hasager, G. Giebel, DTU Wind Energy, Denmark; G. Schepers, ECN, Petten, The Netherlands
- 08:45 **Weather Risk Optimization over the Offshore Wind Farm Project Life Cycle**
M. Wiggert, G. Wolken-Möhlmann, Fraunhofer IWES, Bremerhaven
- 09:00 **The M3EA Project: A New Large Floating Platform Dedicated to Wind and Environmental Measurements**
J. Barreau, Nass&Wind Offshore, France
- 09:15 **Simulation-based Evaluation of Operation and Maintenance Logistics Concepts for Offshore Wind Power Plants**
T. Münsterberg, C. Jahn, Fraunhofer Center for Maritime Logistics and Services
- 09:30 **A New Efficient Technology to Reduce Offshore Piling Noise**
B. Bruns, C. Kuhn, IGB TU Braunschweig; K.-H. Elmer, OffNoise-Solutions GmbH
- 09:45 **Discussion**
- 10:15 **Coffee Break**

SESSION NO. 12: SIMULATION BLADE

Room 3: Lloyd; Chairpersons: N. N.

- 08:30 **Numerical Investigation of Unsteady Aerodynamic Effects on Thick Flatback Airfoils**
G. Bangga, Th. Lutz, E. Krämer, Institute of Aerodynamics and Gas Dynamics (IAG), University of Stuttgart
- 08:45 **Analysis of a Structural-Aerodynamic Coupled Method for Nonlinear Aeroelastic Response of Large-Scaled HAWT**
P. Lyu, M. Liao, Northwestern Polytechnical University, China
- 09:00 **Damping Model for Fatigue Test Planning of a Wind Turbine Blade**
H. Gu Lee, KIMS-WTRC, Korea
- 09:15 **RANS Based Prediction of the Airfoil Turbulent Boundary Layer – Trailing Edge Interaction Noise for Mildly Separated Flow Conditions**
Th. Lutz, J. Dembowski, E. Krämer, University of Stuttgart
- 09:30 **Parameterized Analysis of Swept Blades Regarding Bend-Twist Coupling**
A. Sevinc, O. Bleich, A. Reuter, Fraunhofer IWES, Bremerhaven; C. Balzani, Leibniz Universität Hannover
- 09:45 **Discussion**
- 10:15 **Coffee Break**

SESSION NO. 13: LIDAR II

Room 1: Borgward Saal; Chairpersons: N. N.

- 10:45 **Calibration Procedures for Nacelle-Mounted Profiling LiDARs**
A. Borraccino, M. Courtney, R. Wagner, DTU Wind Energy, Denmark; M. Harris, C. Slinger, ZephIR Lidar, UK; S. Davoust, Avent Lidar, France
- 11:00 **Determination of Stationary and Dynamical Power Curves in Inhomogeneous Wind Flow Using a Nacelle-based LiDAR System**
I. Würth, A. Rettenmeier, P. W. Cheng, Stuttgart Wind Energy (SWE), University of Stuttgart; M. Wächter, P. Lind, J. Peinke, ForWind-Oldenburg
- 11:15 **Comparison of the Rotor Equivalent Wind Speed of Ground- and Nacelle-based LiDAR**
M. Hofsäß, D. Kozłowski, P. W. Cheng, Stuttgarter Lehrstuhl für Windenergie (SWE); T. Siebers, Kenersys GmbH
- 11:30 **Power Curve Filtered with TI Measured with a Two-Beam Nacelle LiDAR**
R. R. Lamata, DONG Energy Wind Power, Denmark; B. Canadillas, U. Bunse, UL International GmbH (DEWI)
- 11:45 **Robust Low Cost Offshore Power Curve Tests with LiDAR**
P. J. M. Clive, SgurrEnergy Ltd, UK
- 12:00 **Discussion**
- 12:30 **Lunch Break**



SESSION NO. 14: SIMULATION TURBINE AND COMPONENTS

Room 2: Kaisen Saal; Chairpersons: N. N.

- 10:45 **Improved Design of Wind Turbines by Combining of Measurement and Simulation**
Th. Rosenlöcher, B. Schlecht, Technische Universität Dresden
- 11:00 **Development of Active Load Alleviation Methods for Large Wind Turbines**
A. E. Öngüt, S. Flock, R. Schelenz, G. Jacobs, M. Behr, RWTH Aachen University
- 11:15 **Numerical Investigation on Tower Effects for Downwind Turbines**
B. Stoevesandt, F. Habib, B. Mehra, Fraunhofer IWES, Oldenburg; H. Rahimi, J. Peinke, ForWind-Oldenburg
- 11:30 **Parametric Model Generation and Automated Sizing Process for the Analysis of Wind Turbine Blades**
S. Dähne, C. Willberg, DLR e. V.
- 11:45 **Development and Validation of Comprehensive Structural Rotorblade Design and Simulation Tool (PMV) with Flexible Pre and Post Processing Interfaces**
G. Pechlivanoglou, O. Eisele, G. Weinzierl, T. Philippidis, SMART BLADE GmbH; I. Masmanidis, University of Patras, Greece
- 12:00 **Discussion**
- 12:30 **Lunch Break**

SESSION NO. 15: SIMULATION WIND I

Room 3: Lloyd; Chairpersons: N. N.

- 10:45 **MCP: Squeezing Uncertainty out of the Long-Term Wind Climate**
J. Sander, Sander + Partner
- 11:00 **Complex Micro Siting Optimization: Experimental Validation in an Atmospheric Boundary Layer Wind Tunnel**
A. M. Loredo-Souza, J. M. L. Mattuella, Universidade Federal do Rio Grande do Sul-UFRGS, Brazil
- 11:15 **Improve the Power Forecast of a Wind Power Plant with Mathematical Optimization Methods**
F. Jung, C. Büskens, University of Bremen; M. Siefert, Fraunhofer IWES, Kassel
- 11:30 **Characterization of Mesoscale Wind Fluctuations in Space and Time**
A. Mehrens, L. von Bremen, D. Heinemann, ForWind-Oldenburg
- 11:45 **Brazilian Wind Indexes**
G. Haydt, F. Rosa, J. Lopes, EPE, Brazil
- 12:00 **Discussion**
- 12:30 **Lunch Break**

SESSION NO. 16: OFFSHORE WIND CONDITIONS

Room 1: Borgward Saal; Chairpersons: N. N.

- 13:30 **Status and Outlook of the Meteorological Long-Term Measurements at FINO1**
T. Neumann, R. Frühmann, F. Bégué, UL International GmbH (DEWI)
- 13:45 **Advances in Monitoring, Simulation and Short-Term Forecasting at the Offshore Wind Farm "EnBW Baltic 1"**
L. von Bremen, C. Junk, M. Dörenkämper, G. Steinfeld, D. Heinemann, M. Kühn, ForWind-Oldenburg

- 14:00 **Shadow Effects in an Offshore Wind Farm – Potential of Vortex Methods for Wake Modelling**
F. Beyer, B. Luhmann, P. W. Cheng, Stuttgart Wind Energy (SWE)
- 14:15 **Offshore Wake Model Validation – Methodology for Linking Model Results and Operational Data**
N. Mittelmeier, T. Blodau, Senvion SE; M. Kühn, ForWind-Oldenburg
- 14:30 **Validation of Wind Turbine Wake Model Results Using In-Situ Measured Water Properties**
A. Schneehorst, J.-G. Fischer, K. Herklotz, Federal Maritime and Hydrographic Agency (BSH)
- 14:45 **Discussion**
- 15:15 **Coffee Break**

SESSION NO. 17: GRID INTEGRATION

Room 2: Kaisen Saal; Chairpersons: N. N.

- 13:30 **Optimal Operation of Doubly-Fed Induction Generator Wind Farm with VSC-HVDC Grid Connection**
L. J. Cai, Senvion SE; U. Karaagac, J. Mahseredjian, Ecole Polytechnique de Montreal
- 13:45 **Methodology for the Evaluation of Wind Turbine Harmonic Emissions**
S. Tentzerakis, F. Santjer, M. Bärschneider, UL International GmbH (DEWI)
- 14:00 **Aspects for Improvement of Measurement and Assessment Procedures of Harmonic Emission of Wind Power Plants**
Fritz Santjer, UL International GmbH (DEWI); Bernd Weise, DigSILENT GmbH; T. Pausch, J. Brombach, FGW e.V.
- 14:15 **Trade-off Between Storage and Inter-Country Transmission Needs in a European Energy System Dominated by Renewable Sources**
A. Kies, L. von Bremen, ForWind-Oldenburg; K. Nag, E. Lorenz, D. Heinemann, University of Oldenburg
- 14:30 **Reliability Indexes of Wind Farms in Brazil**
G. Haydt, F. Rosa, J. Lopes, EPE, Brazil
- 14:45 **Discussion**
- 15:15 **Coffee Break**

SESSION NO. 18: SIMULATION WIND II

Room 3: Lloyd; Chairpersons: N. N.

- 13:30 **Choice of Wind Flow Models for Energy Yield Assessment**
C. Abiven, Natural Power, France
- 13:45 **Sensitivity of Analytical Wake Models to Parameter Settings**
C. Schmitt, juwi Energieprojekte GmbH; C. Meissner, WindSim AS, Norway
- 14:00 **Topographic Effects on the Wakes of a Large Wind Farm**
C. Peralta, C. Y. Chang, J. Schmidt, B. Stoevesandt, Fraunhofer IWES, Oldenburg; J. Caldas, E. L. Zapparoli, Casa dos Ventos Energias Renováveis, Brazil
- 14:15 **Extensive Verification of WRF Mesoscale Model Downscaling**
J. Bethke, J. Kampmeyer, H.-T. Mengelkamp, anemos GmbH; D. Callies, Fraunhofer Institut for Wind Energy and Energy System Technology (IWES)



- 14:30 **Large Eddy Simulation of the Flow Around a Wind Turbine Blade**
X. Huang, M. Meinke, W. Schröder, RWTH Aachen University
- 14:45 **Discussion**
- 15:15 **Coffee Break**

SESSION NO. 19: CFD MODELING

Room 1: Borgward Saal; Chairperson: N. N.

- 15:45 **Wake Modelling of an Offshore Wind Farm Using OpenFOAM**
A. Javaheri, B. Canadillas, UL International GmbH (DEWI)
- 16:00 **Determining Offshore Mast Shadow Correction Functions with CFD Methods**
F. Wilts, F. Kinder, T. Neumann, UL International GmbH (DEWI)
- 16:15 **An Extensive Validation of CFD Flow Modelling**
P. Leask, DNV GL, Oldenburg; A. Poenariu, DNV GL, Hamburg; D. Medici, DNV GL, Italy; U. Horn, DNV GL, UK; J.-F. Corbett, DNV GL, Denmark
- 16:30 **Studying the Effect of Blade Deflections on the Aerodynamic Performance of Wind Turbine Blades Using OpenFOAM**
B. Dose, J. Peinke, ForWind-Oldenburg; B. Stoevesandt, Fraunhofer IWES, Oldenburg
- 16:45 **How Much Do CFD Models Improve the Accuracy of the Flow Modelling?**
B. Jimenez, D. Rimpl, K. Mönnich, UL International GmbH (DEWI), Oldenburg
- 17:00 **Discussion**

SESSION NO. 20: OFFSHORE TURBINE AND COMPONENTS

Room 2: Kaisen Saal; Chairpersons: N. N.

- 15:45 **Measurement-based Investigations of Directional Dependence of Extreme Load Parameters for Offshore Wind Turbines**
B. Schmidt, S. Marx, M. Hansen, Leibniz Universität Hannover
- 16:00 **Determination of the Reliability for a Multimegawatt Offshore Gearbox**
D. Strasser, F. Thoma, S. Yükses, P. Schmaltz, Bosch Rexroth AG
- 16:15 **Model Testing and Numerical Simulation in Floating Offshore Wind Turbine Design – Overview and Conclusions from Practical Applications**
D. Matha, F. Beyer, F. Sandner, P. W. Cheng, University of Stuttgart
- 16:30 **Stability Analysis of Floating Wind Turbine Using 1/64 Scale Model**
T. Koyanagi, K. Karikomi, S. Iwasaki, A. Nakamura; Mitsubishi Heavy Industries, Japan
- 16:45 **Inspecting Defective Rotor Blades by Thermographic Monitoring from Greater Distances: A Review on Results of the Three-Year Project IKARUS**
R. Krankenhagen, T. Worzewski, M. Doroshtnasir, BAM Federal Institute for Materials Research and Testing
- 17:00 **Discussion**

SESSION NO. 21: ROTOR BLADES

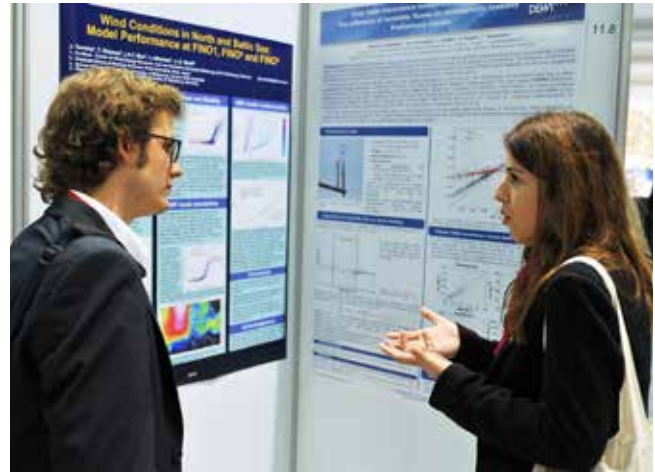
Room 3: Lloyd; Chairpersons: N. N.

- 15:45 **Investigating the Aerodynamic Implications of Slender Wind Turbine Blade Design**
F. Berger, M. Kühn, ForWind-Oldenburg
- 16:00 **Blade Bearing Testrig**
M. Stammer, Fraunhofer IWES, Hannover; S. Sagner, Senvion SE
- 16:15 **Tolerance Management and Online Process Assurance in the Production Chain of Rotor Blades**
B. Wieland, N. Liebers, DLR e.V., Braunschweig; H. Ucan, DLR e.V., Stade
- 16:30 **High Resolution X-ray Inspection of Rotor Blades**
W. Holub, U. Haßler, Fraunhofer Development Center X-ray Technology EZRT Fürth
- 16:45 **Detection of Wake Impingement by Rotor Loads**
C. L. Bottasso, S. Cacciola, J. Schreiber, TU München
- 17:00 **Discussion**

CLOSING THE CONFERENCE

Room 1: Borgward Saal

- 17:15 J. P. Molly, UL International GmbH (DEWI)



POSTERS

Room 4: Foyer

1. **Verification**
 - 1.1 **Performance Verification of Wind Turbines and Wind Farms**
F. Flottemesch, T. Wobben, Ecofys Germany/Netherlands
 - 1.2 **Impact of Market-Value Based Remuneration on Design and Operation of Wind Turbines**
N. Cosack, LEINE LINDE SYSTEMS GmbH; M. Becker, Kenersys GmbH
 - 1.3 **Estimation Method of the Subsidy for Wind Produced Electricity**
M. Capellaro, TUM Lehrstuhl für Windenergie
 - 1.4 **The Wind Farm Whisperers: Data Acquisition and Analysis for Offshore Wind Farm Optimization**
P. J. M. Clive, SgurrEnergy Ltd, UK
 - 1.5 **Operational Assessment of Power Production**
A. Strunk, J. Meis, J. Brombach, EWC Weather Consult GmbH
2. **New Developments**
 - 2.1 **FWT 3000 – Experiences with the Prototype**
D. Lahr, H. Zint, FWT Production GmbH
 - 2.2 **The Development of Pressure Rigidised Blades – The Challenges**
J. N. Stander, G. Venter, Stellenbosch University, South Africa
 - 2.4 **Multi-Megawatt Wind Turbine Drive Train with Multiple High-Speed Generators**
S. Serowy, F. Barenhorst, R. Schelenz, G. Jacobs, RWTH Aachen University
 - 2.5 **Oral presentation in session 1**
 - 2.6 **The Next Generation of Flexible Crane Systems in Wind Turbine Nacelles**
J. R. Hansen, Terex MHPS GmbH
 - 2.7 **Passive Load Reduction in Wind Turbine Blades with an Adaptive Camber Airfoil**
G. Pechlivanoglou, Smart Blade; H. Spiegelberg, TU Darmstadt; M. D. Lennie, TU Berlin
 - 2.8 **Bearing Upgrades Improve Field Performance and Lead to Future Design Practices**
F. Platz, G. Tollé, Timken Europe, France
 - 2.9 **Probabilistic Approach to Predict Impact of Tolerances on Performance of Wind Turbine Blades**
J. Bijlani, P. Sudhakar, R. Hansen, J. Madsen, LM Wind Power A/S, Denmark
3. **Testing**
 - 3.2 **Optimized Materials for Wind Turbines**
L. Kirsch, J. Mosch, A. Kühn, B. Wieland, DLR
 - 3.4 **Experimental Fatigue Assessment of High Strength Bolts with Large Diameters in Consideration of Boundary Layer Effects**
R. Eichstädt, P. Schaumann, Leibniz Universität Hannover; M. Oechsner, F. Simonsen, TU Darmstadt
 - 3.5 **Experimental and Numerical Generation of Turbulent Inflow Conditions for Wind Turbine Airfoils**
A. Fischer, Th. Lutz, E. Krämer, University of Stuttgart; U. Cordes, K. Hufnagel, C. Tropea, TU Darmstadt

- 3.6 Direct Roving Placement for the Production of Wind Energy Rotor Blades**
Y. Grohmann, N. Stoffers, A. Kühn, T. Mahrholz, DLR e. V., Stade
- 3.7 Influence of an Alternative Static Full-Scale Testing Procedure on Blade Design**
M. Bätge, M. Rosemeier, E. Putnam, Fraunhofer IWES, Bremerhaven
- 3.8 Wind Tunnel Applications for Wind Energy in Brazil**
V. G. Guedes, A. A. Mustto C., A. V. Pinto Junior, CEPEL, Brazil
- 3.9 Automated and Quality Assured Production Chain for Rotor Blades**
H. Ucan, N. Stoffers, DLR e.V., Stade
- 4. Simulation I (Wind Turbine)**
- 4.1 Industry 4.0 in the Wind Power Industry on the Example of Intelligent Hydraulic Bolting to Meet the VDI / VDE 2862 Part 2**
P. Junkers, HYTORC Barbarino & Kilp GmbH
- 4.2 Remaining Life Time Prognosis of Wind Turbine Supporting Structures**
C. T. Geiss, C. U. Große, Technical University Munich
- 4.4 The Dynamic Response of Wind Turbine Blades Under the Transient Loads**
Y. Yaojie, L. Mingfu L. Pin, Northwestern Polytechnical University, China
- 4.5 Characteristic Load Cases for Rotor Blade Design**
H. Gontier, T. Rolf, D. Schulze, WINDnovation GmbH
- 4.7 Vertical Axis Wind Turbines from a Certification Point of View**
R. T. Bayo, C. Martens, DNV GL, Hamburg; L.Vita, DNV GL, Denmark
- 4.8 Advanced Airfoil Simulations Based on Reynolds-Averaged Navier-Stokes Equations**
M. Schramm, B. Stoevesandt, Fraunhofer IWES, Oldenburg; J. Peinke, ForWind-Oldenburg
- 4.9 The Dynamic Stability Analysis of Wind Turbines Under Different Control Strategies**
L. Mingfu, Y. Yaojie, L. Pin, Northwestern Polytechnical University, China
- 4.11 Oral presentation in session 5**
- 4.12 Consideration of Flexible Gears for Detailed Gearbox Analysis**
C. Schulz, S. Mulski, A. Caballero, SIMPACK AG
- 4.13 Reliable Validation of Load Simulation Models**
J. Gerlach, K. Grigutsch, DEWI-OCC Offshore and Certification Centre GmbH
- 5. Simulation II (Wind)**
- 5.3 WindSage: Combining Multiple NWPs with Deep Neural Networks (DNN) for an Improved Wind Power Forecast**
M. Felder, A. Kaifel, F. Sehnke, K. Ohnmeiß, Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW); J. Meis, A. Strunk, J. Sack, EWC Weather Consult GmbH
- 5.4 An Accurate Wind Resource Assessment in Complex Terrain Using Numerical Simulations**
Y. Kim, T. Lutz, University of Stuttgart
- 5.5 Oral presentation in session 18**
- 6. Measurements**
- 6.4 Analysis of Low Level Jets in Northern Germany**
S. Meves, GEOMAR; E.-M. Nikolai, WKN AG
- 6.5 Effects of Rotor Induction on the Propagation of Disturbances Towards Wind Turbines**
M. Boquet, S. Davoust, A. Abdelsalam, R. Rutteman, Avent Lidar Technology, France; J. W. Wagenaar, K. Boorsma, ECN Wind Energy, Netherlands
- 6.6 Advanced Use of MCP Methods to Correlate Short Term Measurement Data with Long Term Data**
R. Friedl, RSC GmbH
- 6.7 Rotor Unbalance Detection and Mitigation**
V. Petrovic', C. L. Bottasso, S. Cacciola, M. Capellaro, D. Castro Uriegas, TU München
- 6.8 Laser Based Geometry Measurement of Rotor Blades**
J. D. Mayer, C. Lucks, Windcomp GmbH
- 6.9 A New Approach to Elimination of Aerodynamic Imbalances of Wind Turbines**
S. Bartholomay, M. Hillman, T. Rische, cp.max Rotortechnik GmbH & Co. KG
- 6.10 Structural Vibration Measurements at Wind Turbines Using Video-based Tracking**
C. Heilmann, A. Grunwald, M. Melsheimer, J. Müller, M. Peters, BerlinWind GmbH
- 6.13 On the Cup Anemometer Working Condition Monitoring**
S. Pindado, A. Martínez, E. Vega, Á. Sanz-Andrés, E. Meseguer, L. García, Universidad Politécnica de Madrid, Spain
- 6.14 Analytical and Experimental Analysis of the Wake Effects on Turbines in Wind Farms to Optimize the Overall Energy Production.**
J. Weiß, S.-E. Rosenow, WZE Wind to Energy GmbH; R. McKenna, Karlsruhe Institute for Technology (KIT)
- 6.15 Met Mast Based Model for Turbulence Assessments in Central and Southern Germany**
T. Zirngibl, S. Kartun, TÜV Süd Industrie Service GmbH
- 6.16 Assessment of LiDAR Correction for Wind Measurements in Complex Terrain**
F. Bégué, T. Neumann, UL International GmbH (DEWI)
- 7. Lidar/Sodar Measurements**
- 7.1 The First Measurement Campaign of Mitsubishi Electric's Wind LiDAR in European Test Site**
M. Imaki, N. Kotake, S. Kameyama, H. Asada, T. Harada, H. Tanaka, M. Enjo, Mitsubishi Electric Corporation, Japan
- 7.2 High-Availability Wind LiDAR System Adapting to Atmospheric Environment for Reliable Wind Resource Assessment**
N. Kotake, M. Imaki, S. Kameyama, H. Asada, T. Harada, H. Tanaka, M. Enjo, Mitsubishi Electric Corporation, Japan
- 7.3 Turbine Mounted Pulsed LiDAR for Performance Verification in Complex Terrain**
L. Wagner, GWU-Umwelttechnik GmbH; S. Davoust, Avent Lidar Technology, France; T. Burchhart, R. Zauner, Verbund GmbH, Austria; J. Parplies, C. Schmitt, juwi Energieprojekte GmbH; C. Gray, Uptime Engineering GmbH, Austria
- 7.4 Assessment of Turbulence Measurements for Offshore Turbine Testing with Nacelle-based LiDAR**
R. Gandoin, DONG Energy Wind Power, Denmark
- 7.5 Classification and Sensitivity Analysis of Turbine-mounted and LiDARS**
A. Woodward, J. Medley, M. Pitter, C. Slinger, M. Harris, ZephIR Lidar, UK
- 7.6 LiDAR Use Cases for the Acquisition of High Value Data Sets**
P. J. M. Clive, SgurrEnergy Ltd, UK
- 7.7 A Comparison of 2- and 5-Beam Nacelle Mounted LiDAR Measurements on an Offshore Wind Turbine**
P. J. M. Clive, SgurrEnergy Ltd, UK
- 7.8 A Detailed Analysis of Ship-LiDAR Measurements with Comparison to FINO1**
G. Wolken-Möhlmann, J. Gottschall, B. Lange, Fraunhofer IWES, Bremerhaven
- 7.9 Oral presentation in session 4**
- 7.10 Representativeness of Short-Term Wind Profile Measurements with Remote Sensing Devices and Consideration of Seasonal Effects**
A. Westerhellweg, D. Fabian, J. Raabe, UL International GmbH (DEWI), Oldenburg
- 8. Grid Integration**
- 8.1 Advanced Integration of Offshore Wind Energy into the Grid System by Power to Gas**
J. Bendfeld, Y. Bouyraaman, S. Krauter, University of Paderborn
- 8.2 Facing the European Perspective: Revision of Wind Power Upscaling**
B. U. Schyska, L. von Bremen, ForWind-Oldenburg
- 8.3 A Process to Enable Wind Turbines to Provide Control Reserve at Minimum Loss of Energy Yield**
J. Liersch, J. Michael, Key Wind Energy GmbH; V. Marschner, TU Berlin

- 8.4 Probabilistic Wind Farm Group Forecasting Using Bayesian Model Averaging**
H. G. Beyer, P. P. Revheim, University of Agder, Norway
- 9. Operational Experiences**
- 9.1 Influence of Wind Conditions Under Icing Conditions on the Result of a Risk Assessment**
F. Storck, TÜV NORD SysTec GmbH & Co. KG
- 9.2 Economical Risk Simulation of Maintenance Contracts of Wind Farms**
D. Althaus, J. Hauschild, IQZ GmbH; J. Liersch, Key Wind Energy GmbH
- 9.3 Regional Contribution to the Wind Energy Development in Germany – Analysis of Selected Administrative Districts until end of 2014**
C. Ender, B. Neddermann, UL International GmbH (DEWI)
- 9.4 Wind Energy Development in Germany – Analysis of the Development in the DIBT Wind Zones Until End of 2014**
C. Ender, B. Neddermann, UL International GmbH (DEWI)
- 9.5 Land Requirement Values for Wind Farms**
B. Neddermann, T. Schorer, UL International GmbH (DEWI)
- 9.6 Small Wind: Perceptions of Brazilian Market**
M. G. Pereira, R. M. Dutra, Electric Power Research Center (Cepel), Brazil; B. E. M. Montezano, Padre Leonel Franca Foundation, Brazil
- 9.7 Wind Farm Development in Turkey**
Prof. Dr. Tanay Sidki Uyar, Head, Energy Section, Marmara University, Istanbul Turkey
- 10. Offshore**
- 10.1 Additive Manufacturing and Spare Parts Logistics in Offshore Wind Energy**
A. Barz, H.-D. Haasis, Institute of Shipping Economics and Logistics, Bremen; K. Lange, School of International Business and Supply Chain Management (HIWL), Bremen
- 10.2 Performance of Merra Data in Offshore Wind Energy Applications**
J. Bendfeld, University of Paderborn; S. Balluff, RWE Npower, UK
- 10.3 Load Reduction for Floating Offshore Wind Turbines Using Tuned Liquid Column Dampers**
H. R. Karimi, Y. Si, University of Agder, Norway
- 10.4 Supply Chain Concept for Industrial Assembling of Offshore Wind Jackets**
G. Michels, Salzgitter AG
- 10.5 Radial Bolted Connection Between Monopile and Transition Piece**
L. Meesenburg, P.E. Concepts GmbH
- 10.6 Geotechnical Stability Verification of Offshore Foundations with Respect to Scouring in the North Sea in Accordance with BSH**
A. Ahmari, E. Fitti Paldi, SGS Germany GmbH
- 10.8 Process FMEA: Preventive Risk Measures for Offshore Wind Farm Projects**
J. Dimas, Trianel Windkraftwerk Borkum GmbH & Co. KG
- 10.9 Oral presentation in session 11**
- 10.10 Adverse Weather Risk: Impact, Assessment and Mitigation Approaches**
M. Wiggert, G. Wolken-Möhlmann, Fraunhofer IWES, Bremerhaven
- 10.11 Realistic Scenario for the Development of Offshore Wind Power in Germany**
B. Neddermann, T. Neumann, UL International GmbH (DEWI)
- 11. Monitoring**
- 11.2 Bolted Joint Lifetime Monitoring**
A. Etxezarreta, I. Alberdi, Erreka Fastening solutions, Spain
- 11.4 Using Vibration-based Condition Monitoring to Characterise the Progression of Main Bearing Faults**
S. Wharton, J. Coultate, Romax Technology Ltd, UK

- 12. Influence on Environment**
- 12.1 RAVE Underwater Operational Noise Measurements in the Offshore Wind Park alpha ventus – Final Results**
H. van Radecke, M. Benesch, University of Applied Sciences Flensburg
- 12.4 Environmental Impacts of Noise, Vibrations and Electromagnetic Emissions from Marine Renewables (MARVEN)**
F. Thomsen, M. Kosecka, DHI, Denmark; J. Gabriel, UL International GmbH (DEWI); A. Gill, Cranfield University, UK; P. Sigray, Swedish Defence Research Institute; A. Norro, Museum – Operational Directorate Natural Environment Management, Belgium; T. Folegot, Quiet Oceans, France; M. Andre, Universitat Politècnica de Catalunya, Spain; D. Risch, Scottish Association for Marine Science, UK
- 12.5 Real Time Underwater Sound Measurement System MAUI – Pile Driving Noise Assessment at Site**
A. Lübben, F. Wilts, T. Neumann, UL International GmbH (DEWI); K. Kloske, Bernhard Weyres GmbH
- 12.6 Assessment of Amplitude Modulation of Wind Farm Noise and an Approach of Mitigation**
J. Gabriel, S. Vogl, T. Neumann, UL International GmbH (DEWI)
- 12.7 IEC 61400-11 Acoustic Noise: Differences Between Edition 2.1 and 3.0**
S. Vogl, UL International GmbH (DEWI)

21.05.2015, THURSDAY EXCURSION

Technical Excursion to Interesting Wind Power Locations

On 21 May, the day after the conference, we offer our traditional one-day excursion to interesting wind power locations. The first destination has already been defined, it is the “Dynamic Nacelle Testing Laboratory” of Fraunhofer IWES in Bremerhaven. Further destinations in Bremerhaven/Cuxhaven will follow and will be published on dewek.de and in the Final Program as soon as more information is available.

Price: € 60.- (incl. V. A. T. / lunch included)

For booking please use the conference online registration. Bookings during the conference can only be accepted if the excursion is not fully booked. If there are not enough participants, the excursion will be cancelled and the money refunded.

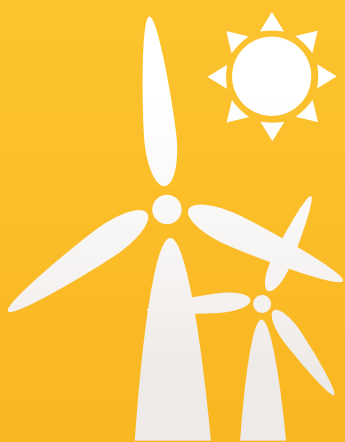
Departure: 08:30 hrs
Return: 18:00 hrs

Details about the “Dynamic Nacelle Testing Laboratory”

- Prime mover: 10 MW Twin Direct Drive (15 MW overload capability up to 6min.)
- Artificial grid: 44 MVA converter capacity
- Measurements: over 600 synchronous, high-defintion measurements channels



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DEWEK 2015

19 / 20 May 2015
Bremen, Germany

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