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, hydropower 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. Wind power technology has developed into a showcase of German industrial performance and has created thousands of new jobs.

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
tential, 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

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

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 services 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**

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

<table>
<thead>
<tr>
<th>Normal rate</th>
<th>Rate for research institutes/universities</th>
</tr>
</thead>
<tbody>
<tr>
<td>125.00 EUR / m² Space only</td>
<td>68.00 EUR / m² Space only</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Time</th>
<th>Room 1</th>
<th>Room 2</th>
<th>Room 3</th>
<th>Room 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00-10:30</td>
<td>Opening Session</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30-11:00</td>
<td>Coffee Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00-12:45</td>
<td>1. New Developments</td>
<td>2. Site Assessment and Economic Viability</td>
<td>3. Operational Experiences</td>
<td></td>
</tr>
<tr>
<td>12:45-13:45</td>
<td>Lunch Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:30-16:00</td>
<td>Coffee Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:00-17:45</td>
<td>Panel Discussion</td>
<td>8. Offshore Foundations</td>
<td>9. Simulation Turbine Control</td>
<td></td>
</tr>
<tr>
<td>17:30-19:00</td>
<td>Poster Session – Authors present Beer Reception and Networking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20:00</td>
<td>Conference Dinner (Bremer Ratskeller)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**20.05.2015, WEDNESDAY**

<table>
<thead>
<tr>
<th>Time</th>
<th>Room 1</th>
<th>Room 2</th>
<th>Room 3</th>
<th>Room 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Registration in the Foyer of the Conference Hall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>Welcome</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09:00-10:15</td>
<td>Lidar I</td>
<td>10. Offshore General</td>
<td>11. Simulation Blade</td>
<td></td>
</tr>
<tr>
<td>10:15-10:45</td>
<td>Coffee Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:45-12:30</td>
<td>Lidi II</td>
<td>14. Simulation Turbine and Components</td>
<td>15. Simulation Wind I</td>
<td></td>
</tr>
<tr>
<td>12:30-13:30</td>
<td>Lunch Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:15-15:45</td>
<td>Coffee Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:15-17:30</td>
<td>Conference closing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## LECTURES

**19.05.2015, TUESDAY**

**OPENING SESSION**

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

**09:00**  Welcome  
J. P. Molly, Managing Director, UL International GmbH (DEWI)
F. Martínez, 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. Glatzner, 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-Laune, 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. Kuhn, L. Pauscher, Fraunhofer IWES, Kassel

**11:30**  Mobile LiDAR Mapping of Utility-Scale Wind Farms  
M. Zendehbad, 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. Melshheimer, A. Grunwald, BerlinWind GmbH;  
R. Kamnieth, 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. Kleinseelbek, 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. Melshheimer, 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, Sompó Japan Nipponkoa Risk Management, Japan;  
T. Takimoto, A. Saiaki, 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. Wulfth, Th. Kenufl, K. zum Berge, TU Braunschweig

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

**14:30**  Field Studies of New Sodar Transducer for Mesoscale Measurements  
A. Hastings-Black, Vaisala Inc, USA

**14:45**  A New Bistatic Wind LIDAR for Highly Resolved Wind Vector Measurements  
M. Eggert, C. Gutsmuths, H. Müller, H. Többen, Physikalisch-Technische Bundesanstalt
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 Farms: 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. Herrera, J. Peinke, ForWind-Oldenburg; B. Storevands, 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 Drive Train Components
C. Liewen, D. Radner, D. Bosse, R. Schelzen, G. Jacobs, CWD – Center for Wind Power Drives Institut für Maschinen- und Maschinenbau
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. Freudenberg, M. Steinger, 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 Plants
K. Lummert, N. Rehfled, 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 Energéticas, 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. Schumann, 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. Alibek, 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
17:00 Collaborative Research on Wind Turbine Load Control under Realistic Turbulent Inflow Conditions
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 alphaventus with Synchronised Long-Range LIDAR Windscanners
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. Sjöholm, T. Mikkelsen, DTU Wind Energy, Denmark; S. Davoust, Avent Technology, France
09:30  Measurement of Turbine Inflow with a 3D WindScanner System and a SpinnertLiDAR
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. Scheipers, 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 MSEA 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 Aerelastic 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. Demboowski, 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
11:15  Comparison of the Rotor Equivalent Wind Speed of Ground- and Nacelle-based LiDAR
M. Hofsaß, D. Kozlowski, P. W. Cheng, Stuttgart 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, 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
14:30 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. Javaheiri, 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. Mönich, 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. Yüksel, P. Schmutz, 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. Stammel, 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)
3.6 Direct Roving Placement for the Production of Wind Energy Rotor Blades
Y. Grohmann, N. Stoffers, A. Kühn, T. Mahnholz, 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. Musto 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 & Klip GmbH

4.2 Remaining Life Time Prognosis of Wind Turbine Supporting Structures
C. T. Geiss, C. U. Große, Technical University Munich

4.3 The Dynamic Response of Wind Turbine Blades Under the Transient Loads
Y. Yaojie, L. Mingfu L. Pin, Northwestern Polytechnical University, China

4.4 Characteristic Load Cases for Rotor Blade Design
H. Gontier, T. Rolf, D. Schulze, WINdInnovation GmbH

4.5 Vertical Axis Wind Turbines from a Certification Point of View
R. T. Bayo, C. Martens, DNV GL, Hamburg; L.Vita, DNV GL, Denmark

4.6 Advanced Airfoil Simulations Based on Reynolds-Averaged Navier-Stokes Equations
M. Schramm, B. Stoevesandt, Fraunhofer IWES, Oldenburg; J. Peinke, ForWind-Oldenburg

4.7 The Dynamic Stability Analysis of Wind Turbines Under Different Control Strategies
C. Schulz, S. Mulski, A. Caballero, SIMPACK AG

4.8 Advanced 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 NWP with Deep Neural Networks (DNN) for an Improved Wind Power Forecast

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, F. Davies, A. Abdelmam, R. Rutten, Avent Lidar Technology, France; J. W. Wagenaar, K. Boorsma, ECN Wind Energy, Netherlands

6.6 Advanced Use of MCD 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, J. Michael, Key Wind Energy GmbH; V. Marschner, TU Berlin

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. Herrmann, A. Runzfeld, M. Meisheimer, J. Müller, M. Peters, BerlinWind GmbH

6.11 On the Cup Anemometer Working Condition Monitoring
S. Pindado, A. Martinez, E. Vega, A. Sanz-Andrés, E. Meseguer, L. García, Universidad Politécnica de Madrid, Spain

6.12 Analytical and Experimental Analysis of the Wake Effects on Turbines in Wind Farms to Optimize the Overall Energy Production.
J. Weiß, S.-E. Rensen, W2E Wind to Energy GmbH; R. McKenna, Karlsruhe Institute for Technology (KIT)

6.13 Met Mast Based Model for Turbulence Assessments in Central and Southern Germany
T. Zirngibl, S. Kartun, TÜV Süd Industrie Service GmbH

6.14 Assessment of LDAR Correlation 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. Kotoke, 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. Kotoke, 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. Burchart, R. Zauner, Verbund GmbH, Austria; J. Parplies, C. Schmitz, Juwi Energieprojekte GmbH; C. Gray, Uptime Engineering GmbH, Austria

7.4 Assessment of Turbulence Measurements for Offshore Turbine Testing with Nacelle-based LiDAR
R. Gandoon, 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, Zephyr 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 3

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. Bouyaaman, 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

DEWI MAGAZIN NO. 46, FEBRUARY 2015 61
F. Storck, TÜV NORD SysTec GmbH & Co. KG

9.2 Economical Risk Simulation of Maintenance Contracts of Wind Farms
D. Althaus, J. Hauschild, IQ2 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 Fundation, Brazil

9.7 Wind Farm Development in Turkey
Prof. Dr. Tanay Sıdkı 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, Bremer; K. Lange, School of International Business and Supply Chain Management (HIWL), Bremen

10.2 Performance of Merra Data in Offshore Wind Energy
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. Sj, 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. Meensenburg, 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

10.7 Process FMEA: Preventive Risk Measures for Offshore Wind Farm Projects
J. Dimas, Trianel Windkraftwerk Borkum GmbH & Co. KG

10.8 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. Coulter, 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. Sirig, Swedish Defence Research Institute; A. Norro, Museum – Operational Directorate Natural Environment Management, Belgium; T. Folgeot, Quiet Oceans, France; D. 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. Lübchen, F. Wiltz, 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-definition measurements channels
MOVING ENERGY FORWARD

DISCOVER THE NEW SCIENCE OF SUSTAINABLE ENERGY

From energy generation to distribution, management and usage, we are helping advance new sustainable sources and technologies, making energy cleaner, more reliable and more efficient. Through New Science, UL is working to mitigate sustainable energy risks and safeguard innovation.

TRENDS. JOURNALS. INFOGRAPHICS. VIDEOS.
UL.COM/NEWSCIENCE
Two days of concentrated wind energy technology and research with focus on multimegawatt wind turbines and the German far-offshore wind energy application.

• Up to 105 oral presentations
• 600 participants (expected)
• Technical excursion
• 50 exhibitors (expected)