

Organized by the Danish Wind Industry Association &  
Danish Research Consortium for Wind Energy

DANISH WIND  
INDUSTRY ASSOCIATION

# Program

Danish Wind Industry Annual Event 26-27 March 2014



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## WELCOME

For the first time, the Danish Wind Industry Association and the Danish Research Consortium for Wind Energy join forces to create a unique event gathering all corners of the wind industry. The Danish Wind Industry Annual Event takes place at an exciting and challenging time for the wind industry. In these years, the industry is evolving rapidly with new innovations, companies, and partnerships now being part of everyday life in our industry.

At the same time, the markets driving the industry are proving to be challenging. In the time after 2020, there are still too many possible scenarios creating difficulties for sound investments decisions. The key challenge for our industry is that we are still very much tied to the will of the political agenda. In order for us to untie ourselves, Cost of Energy must be lowered to the point where wind turbines outmatch fossil fuel technologies.

We are very well underway towards reaching this goal. The answer to the challenge is to be found at this year's Annual Event where leading researchers from private and public companies and institutions have come together to share knowledge and insight on future technologies. The vision of this Annual Event is to build even stronger bridges between research institutions and industry.

In Denmark, we have an impressive track record of new products and processes and we need to consistently be innovative and work together across the entire value chain to maintain our current leading position on the global markets.

On behalf of the Danish Wind Industry Association and the Danish Research Consortium for Wind Energy we welcome you to this two-day event. We hope you will make use of this unique opportunity to expand your horizon and join in on the debate on tomorrow's wind industry.



Jan Hylleberg  
CEO

Danish Wind Industry Association



Peter Hjuler Jensen  
Deputy Head

DTU Wind Energy

# Day 1

Wednesday 26th of March

09:00 – 16:30

**VENUE** – Messecenter Herning

## R&D CONFERENCE: NEW RESEARCH RESULTS AND FUTURE PERSPECTIVES

The overall purpose on day 1 of Danish Wind Industry Annual Event is research progress and achievements in the Danish Research Consortium for Wind Energy. Research results and perspectives will be presented by various representatives from danish universities, GTS instituts and companies within the field of wind energy in Denmark. The participants will get hand-on presentations and the latest knowledge from various research areas will be presented in workshops.

16:00 – 17:30

**VENUE** – Siemens Wind Power, Brande

## DANISH WINDINDUSTRY ASSOCIATION GENERAL ASSEMBLY

Only members of the Danish Wind Industry Association.

17:30 – 21:00

**VENUE** – Siemens Wind Power, Brande

## NETWORK EVENING AND GUIDED TOUR

Guided tour and network evening at Siemens Wind Power.

## R&D CONFERENCE

09:00 Registration and breakfast

09:45 **Welcome**

Peter Hjuler Jensen, Deputy Head, DTU Wind Energy/DFFV Coordinator

10:00 **SESSION 1**

New research results and future perspectives in the areas:

### **Wind resources and climate design circumstances**

Head of Section Hans E. Jørgensen, DTU Wind Energy

### **Aerodynamics, aeroacustics and aero-servoelastics**

Head of Section Flemming Rasmussen, DTU Wind Energy

### **Structures and Materials**

'Multi-scale Analysis of mechanical wind energy engineering systems – limitations and challenges'  
Associate Professor Lars Overgaard, AAU, Dept. of Mechanical and Manufacturing Engineering

**Session Chair:** Professor John Dalsgaard Sørensen, AAU, Dept. of Civil Engineering

10:45 Coffee break

11:15 **SESSION 2**

New research results and future perspectives in the areas:

### **Electric design**

'Challenges in electrical design and control of wind turbines'  
Professor Zhe Chen, AAU, Dept. of Energy Technology

### **Wind integration in the electrical system**

'New research results and future perspectives in the research area power system integration'  
Professor Poul Sørensen, DTU Wind Energy

### **Offshore technology and O&M**

'Offshore wind energy: research, needs and danish competences'  
Associate Professor Henrik Bredmose, DTU Wind Energy/DFFV Coordinator

**Session Chair:** Peter Hjuler Jensen, Deputy Head, DTU Wind Energy

12:00 Lunch

13:00 **SESSION 3**

New research results and future perspectives in the areas:

### **Experimental tests and measurements**

'Experimental test and measurements in relation to wind energy'  
Head of Section Poul Hummelshøj, DTU Wind Energy

### **Societal aspects**

'Economics of wind – how regulation and power market design can make a difference'  
Researcher Sascha T. Schröder, DTU Management and Engineering

### **Environmental aspects**

Senior Research Scientist Henrik Skov, DHI

**Session Chair:** Rune Dietz, AU, dept. of Bioscience

13.45

**SESSION 4**

**Parallel workshops organized by working groups**

Scientific challenges in the research fields are presented and future work and initiatives will be discussed.

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3	WORKSHOP 4	WORKSHOP 5	WORKSHOP 6	WORKSHOP 7	WORKSHOP 8	WORKSHOP 9
<p><b>Aerodynamics, aerodynamics and aero-servoelastics</b></p> <p>Aerodynamics Senior Researcher Christian Bak, DTU Wind Energy</p> <p>Aeroacoustics Senior Researcher Wei Jun Zhu, DTU Wind Energy</p> <p>Automation &amp; Control Professor Thomas Bak, AAU, dept. of Electronic Systems</p>	<p><b>Societal aspects</b> 'Is this the moratorium of wind power in Denmark?'</p> <p>Senior Researcher Kristian Borch, DTU Management Engineering</p>	<p><b>Environmental aspects</b> 'Impacts of underwater noise from offshore wind farms on marine mammals'</p> <p>Senior Marine Scientist Frank Thomsen, DHI</p> <p>'Collision risks for birds and bats at land-based and offshore wind farms'</p> <p>Senior Researcher Mark Desholm, AU, Dept. of Bioscience</p>	<p><b>Electric design - Emerging generator technologies and power electronics</b> 'Superconducting Generators for Wind Turbines'</p> <p>Postdoc Nenad Mijatovic</p> <p>'Switched reluctance generator with excitation assistance'</p> <p>Postdoc Xiao Liu, AAU, Dept. of Energy Technology</p> <p>'Reliability in low-voltage MW drive trains considering grid codes'</p> <p>PhD Student Dao Zhou, AAU/Danfoss Power Electronics</p>	<p><b>Offshore technology and O&amp;M</b> 'Advancing beyond shallow waters: structural optimization of WT substructures'</p> <p>Senior Researcher Mathias Stolpe, DTU Wind Energy</p> <p>'Geotechnical challenges and state of research for the suction bucket foundation'</p> <p>Professor Lars Bo Ibsen, AAU, Dept. of Civil Engineering</p> <p>'The effect of nonlinear wave forcing on monopile wind turbines'</p> <p>Postdoc Signe Schløer, DTU Wind Energy</p>	<p><b>Wind resources and climate design circumstances</b> 'Wasp online – a tool for siting small wind turbines'</p> <p>Morten Thøgersen, EMD International</p> <p>'Siting conditions for offshore wind turbines – extreme winds and waves'</p> <p>Senior Researcher Xiaoli Larsen, DTU Wind Energy and Rodolfo Bolaños, DHI</p> <p>'A new model for wake calculations of large windfarms and farm to farm losses : Fuga'</p> <p>Senior Researcher Søren Ott, DTU Wind Energy</p> <p>'WASP CFD – Wind resource assessment and siting in complex terrain'</p> <p>Senior Development Engineer Brian Ohrbeck Hansen, DTU Wind Energy</p>	<p><b>Structures and Materials</b> -Development trends in wind energy – multidisciplinary challenges and opportunities for structures, machine elements and materials</p> <p>'Recent developments in load estimation and its effect – improved input, modeling and application'</p> <p>Senior Associate Professor Ole Balling, AU, Dept. of Engineering</p> <p>'Towards rotor blades longer than 0.1 km – challenges for materials and structures'</p> <p>Head of Section Bent F. Sørensen, DTU Wind Energy</p> <p>'Machine elements optimization'</p> <p>Associate Professor Niels L. Pedersen, DTU MEK</p>	<p><b>Wind integration in the electrical system</b> 'Distributed model predictive control for active power control of wind farm'</p> <p>Associate Professor Qiuwei Wu, DTU Electrical Engineering</p> <p>'Aspects of relevance for wind power in power system defense plans'</p> <p>PhD Student Kaushik Das, DTU Wind Energy</p> <p>'WAMS based hierarchical voltage control scheme for large scale wind integrated power system'</p> <p>PhD Student Zakir Hussain Rather, AAU, Dept. of Energy Technology</p>	<p><b>Experimental tests and measurements</b> 'WindScanners - A new tool to measure 3D wind'</p> <p>Senior Researcher Mike Courtney, DTU Wind Energy</p> <p>'Applications of autonomous, GPS synchronized sensors for Wind Turbine Measurements'</p> <p>Acoustic consultant Lars Sommer Søndergaard, DELTA</p> <p>'A brief overview of experimental research within geotechnical and structural engineering'</p> <p>Senior Associate Professor Kenny Kataoka Sørensen, AU, Dept. of Engineering</p>

14.45 Coffee break

15.10

**SESSION 5**

**Parallel thematic workshops on 'burning issues'**

Thematic scientific challenges across the research fields are presented and future work and initiatives will be discussed.

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3	WORKSHOP 4
<p><b>Environmental barriers</b> Introduction by senior Research Scientist Henrik Skov, DHI</p> <p>'Strategic planning of wind farms in relation to environmental issues'</p> <p>Associate Professor Niels-Erik Clausen, DTU Wind Energy</p> <p>'Environmental barriers – need for strategic tools for identification of low-sensitive areas for wind farm development'</p> <p>Senior Environmental Manager Kurt Jensen, DONG Energy Renewables</p>	<p><b>Offshore Challenges</b> Introduction by Associate Professor Henrik Bredmose, DTU Wind Energy</p> <p>'New standards for wave loads on offshore wind turbines' Research Scientist Jesper Mariegaard, DHI, &amp; Senior Metocean Engineer Hans Fabricius Hansen, DHI</p> <p>'Quantification of net support structure damping in normal operation and stand still'</p> <p>Senior Researcher Anand Natarajan, DTU Wind Energy</p> <p>'Corrosion monitoring within offshore wind foundation structures'</p> <p>Corrosion Specialist Anders Rosborg Black, FORCE</p> <p>'Super element formulation of jackets for aero-elastic computations'</p> <p>Senior Researcher Torben Larsen, DTU Wind Energy</p>	<p><b>Grid integration – ancillary services from wind power plants – enhancing the value of wind power</b> Introduction by Professor Poul Sørensen, DTU Wind Energy</p> <p>'Cost and value of ancillary services. ReservecES'</p> <p>Senior Researcher Nicolaos Cutululis, DTU Wind Energy</p> <p>'Simulation based validation of ancillary services from wind power plants (ForskEL EASEWIND)'</p> <p>Senior Researcher Anca Hansen, DTU Wind Energy</p> <p>'Ancillary services from HVDC connected Wind Power Plants'</p> <p>PhD Student Lorenzo Zeni, DONG Energy/DTU Wind Energy</p> <p>'Optimal Spinning Reserve by taking advantage of probabilistic forecasting'</p> <p>PhD Student Javier Saez Gallego, DTU Compute</p>	<p><b>Noise</b> Introduction by Senior Researcher Christian Bak, DTU Wind Energy.</p> <p>'Wind turbine annoyance and tonality'</p> <p>Lars S. Søndergaard, Delta Acoustics</p> <p>'Low frequency noise from wind turbines'</p> <p>Bo Søndergaard, Grontmij</p> <p>'Low noise wind turbine design'</p> <p>Stefan Oerlemans, Siemens Wind Power</p> <p>'What's cooking? About wind turbine noise in a research perspective'</p> <p>Franck Bertagnolio, DTU Wind Energy</p>

16.45 Bus transportation to Siemens Wind Power in Brande

17.30-21.30 Network event at Siemens Wind Power in Brande

Why should you consider replacing your control system or SCADA in your existing wind turbine?



The investment in a new control system will be relatively small and will easily be paid back over a 3-4 year period for a 600 kW wind turbine

A new control system will enable you to:

- Get access to the source code and make software changes yourself
- Optimize the control algorithms
- Reduce O&M
- Get access to more data
- Add sensors for additional information and monitoring
- Have easier access to spare parts
- Add new park functionalities like park power management
- Add new functionality for your turbine, e.g. the IEC61400-25 protocol suite or the IEC61400-26 availability counters

We will be happy to install the retrofit kit in your wind turbines, and we can also provide you with instruction manuals for easy installation.

# Day 2

Thursday 27th of March

The day will consist of two different tracks.

09:30 –16:30

**VENUE** – Messecenter Herning

## **TRACK 1** – OPTIMIZING WIND INDUSTRY BUSINESS

This track will concentrate on optimizing the wind industry business.

There will among other things be focus on global market tendencies, supply chain suited for fluctuating markets and long term development and a political panel discussing the post 2020 situation.

09:30 –16:30

**VENUE** – Messecenter Herning

## **TRACK 2** – THE FUTURE OF WIND TECHNOLOGIES

Application-oriented research and innovation will be brought into focus.

We will concentrate on the application of research results within the field of wind energy and how these results will contribute to the development of more cost-effective wind turbines. Ideas on how the wind energy technology can be more competitive will be proposed.

# Track 1

## OPTIMIZING WIND INDUSTRY BUSINESS

### 09:30 **Welcome**

Lars Krarup, Mayor, Herning  
Jan Hylleberg, CEO, Danish Wind Industry Association  
Peter Hjuler Jensen, Deputy Head, DTU Wind Energy/DFV Coordinator  
Georg Sørensen, Managing Director, MCH

### 09:55 **OPENING SESSION** **New eyes on the industry**

#### **Keynote speakers**

Anders Runevad, Vestas Wind Systems  
Samuel Leupold, Executive Vice President, DONG Energy

#### **Executive panel**

Samuel Leupold, Executive Vice President, DONG Energy  
Jan Kjærsgaard, CEO, Siemens Wind Power  
Sven Utermöhlen, Director Offshore Wind, E.ON Climate & Renewables

**Moderated by** Jan Hylleberg, CEO, Danish Wind Industry Association

### 10:40 **EXECUTIVE PANEL** **Global market tendencies**

Torben Andersen, CEO Onshore, Mainstream Renewable Power  
Lars Bondo Krogsgaard, CCO, Nordex  
Nikolaj Harbo, CEO, SE Blue Renewables  
Finn R. Nielsen, Vice President Wind Power, ABB  
Carsten Nielsen, Vice President, Semco

**Moderated by** Steen Broust Nielsen, Partner, MAKE

11:20 Coffee break

### 11:50 **MAKE MARKET UPDATE** **Zone sessions round 1**

Zone 1: Offshore – introduction by K2 Management  
Zone 2: Asia Pacific – introduction by Niebuhr Gears  
Zone 3: EMEA – introduction by Svendborg Brakes  
Zone 4: Americas – Introduction by Harting

**Presented by** MAKE and company moderator

### 12:20 **MAKE MARKET UPDATE** **Zone sessions round 2**

Zone 1: Offshore – introduction by K2 Management  
Zone 2: Asia Pacific – introduction by Niebuhr Gears  
Zone 3: EMEA – introduction by Svendborg Brakes  
Zone 4: Americas – Introduction by Harting

**Presented by** MAKE and company moderator

12:50 Lunch and poster presentation

### 13:50 **EXECUTIVE PANEL** **Developing an efficient wind supply chain**

Tomi-Alarik Mansio, Head of Commodity Management, Siemens Wind Power  
Tommy Gundelund Jespersen, CEO, kk-electronic  
Henrik Jacobsen, CEO, Aluwind  
Claus A. Petersen, Vice President Danfoss Power Electronics  
Geert Skovsgaard, CEO, Bach Composite Industry

**Moderated by** Jakob Lau Holst, COO, Danish Wind Industry Association

### 14:45 **ZONE SESSIONS** **Supply chain**

**Quality Assurance** – Presentations by Siemens Wind Power, Vestas, kk-electronic & LM Wind Power  
**Logistic** – Presentations by Vestas Wind Systems, Blue Water Shipping, Port of Esbjerg  
**Production and manufacturing** – Presentations by SDU, AH-Industries, Hydratech & kk-electronic  
**Aftersales** – Presentations by DMP Mølleservice, Vestas Wind Systems & CC Jensen

**Presented by** industry representatives

15:15 Coffee break

### 15:45 **POLITICAL PANEL** **Post 2020: Green business = Risky business?**

Jeppe Kofod, MP, Socialdemokraterne  
Bendt Bendtsen, MEP, Konservative  
Ulla Tørnæs, MP, Venstre  
Tine Roed, Deputy Director General, Confederation of Danish Industry  
Anders Stouge, Deputy Director General, Danish Energy Association  
Thomas Becker, CEO, European Wind Industry Association

**Moderated by** Jan Hylleberg, CEO, Danish Wind Industry Association

16:25 Award ceremony for the best PhD presentation, sum up and goodbye

# Track 2

## APPLICATION-ORIENTED RESEARCH AND INNOVATION

### 09.30 Welcome

Lars Krarup, Mayor, Herning  
Jan Hylleberg, CEO, Danish Wind Industry Association  
Peter Hjuler Jensen, Deputy Head, DTU Wind Energy/DFFV  
Coordinator

### 09.55

#### EXECUTIVE PANEL

##### How to maintain global technology leadership in Denmark?

Henrik Stiesdal, CTO, Siemens Wind Power  
Frank Nielsen, CTO, LM Wind Power  
Eskild Holm Nielsen, Dean, AAU  
Torben Lorentzen, Technology Manager, FORCE Technology

**Moderator:** Peter Hjuler Jensen, Deputy Head, DTU Wind Energy/DFFV Coordinator

### 10.40 Technology session 1

#### ZONE A

##### Wind resources and climate design circumstances – application of research results

'How well can the industry predict the wind resources: overview of the results from on shore and offshore CREYAP exercises'

Senior Researcher Niels G. Mortensen, DTU Wind Energy

'Studies of of large wind farm effects on the wind climate'

Postdoc Patrick Volker, DTU Wind Energy

'New mesoscale modelling of icing forecast'

Senior Vice President Lars Landberg, DNV GL

**Session Chair:** Director Jørn Rasmussen, DHI

#### ZONE B

##### Electric design – advanced control in wind turbines – application of research results

'Virtual power plant using energy storage'

PhD student Daniel-Ioan Stroe, AAU, Dept. of Energy Technology

'Fault tolerant control of wind turbines'

Associate Professor Peter Fogh Odgaard, AAU, Dept. of Electronic Systems

'Challenges and opportunities for virtual power plant systems'

Chief Specialist Philip Kjaer, Vestas Wind Systems

**Session Chair:** Professor Zhe Chen, AAU Dept. of Energy Technology

### 11.20 Coffee break

### 11.50

#### ZONE A

##### PhD competition presentations

1. 'Uncertainty quantification of wind farm models'

Juan Pablo Murcia Leon, DTU Wind Energy

2. 'Design of marine foundations with no scour protection'

Ionut-Emanuel Stroescu, AAU Civil

3. 'Bayesian experimental design of wind turbine towers, incorporating structural health monitoring'

Mads Knude Hovgaard, AU/Rambøll

4. 'Modeling of icing impacts on wind parks'

Neil Davis, DTU Wind Energy

5. 'Wind power integration into weak power systems'

El-Sayed M. Abulanwar, AAU Energy Technology

6. 'Automated operational modal analysis, a tool within structural health monitoring'

Peter Olsen, AU Eng

7. 'New airfoil serie and design of a low noise blade for large wind turbines'

Iva Hrgovan, DTU Wind Energy

8. 'Analysis and control of DFIG-based wind turbine for low voltage ride through'

Rongwu Zhu, AAU Energy Technology

9. 'Damage detection tool using vibrational data'

Jannick Balleby Hansen, AU IHA

10. 'A High efficient DC/DC converter for high power application'

Kiwoo Park, AAU Energy Technology

11. 'HVDC connected wind power plants: an overview of power system services provision'

Lorenzo Zeni, DONG Energy/DTU Wind Energy

12. 'Laboratory simulation of RCF cracks in wind turbine components'

Shravan Janakiraman, DTU Mechanical Engineering

**Introduction by** Associate Professor Henrik Bredmose, DTU Wind Energy

### 12.50 Lunch and poster session

### 13.50 Technology session 2

#### ZONE A

##### Aerodynamics, aeroacustics and aeroelastics – application of research results

Application of aerodynamic research results

Professor Niels N. Sørensen, DTU Wind Energy

Application of aeroelastic research results

Senior Researcher Torben Juul Larsen, DTU Wind Energy

Application of research results in the industry

Chief Engineer & Senior Manager Christian Frank Andersen, LM Wind Power

##### Structural design, machine elements and materials – application of research results

'Assessment of curing stresses in fibrous composite material using a bi-axial residual stress specimen'

Postdoc Johnny Jakobsen, AAU, Dept. of Mechanical and Manufacturing Engineering

'Instrumented fracture mechanics for adhesive bonding and laminates: principles and applications'

Postdoc Michal K. Budzik, AU, Department of Engineering - Materials Engineering

'Process induced shape distortions in composites molding – resin curing influence on root section geometry'

Senior Engineer Michael Wenani Nielsen, LM Wind Power.

**Session Chair:** Technology Manager Torben Lorentzen, FORCE

#### ZONE B

##### Wind integration in the electrical system – application of research results

'Modelling of wind power fluctuations and forecast errors'

Professor Poul Sørensen, DTU Wind Energy

'Harmonic stability in wind power plants'

Postdoc Xiongfei Wang, AAU, Dept. of Energy Technology

Opponent Chief Specialist Philip Kjaer, Vestas Wind Systems

#### Environmental aspects

##### – application of research results

'Environmental impacts from offshore wind farms – application of new assessment techniques and models'

Senior Research scientist Henrik Skov, DHI and Opponent Jesper Kyed Larsen, Vattenfall

**Session Chair:** Associate Professor Niels-Erik Clausen, DTU Wind Energy

### 15.15 Coffee break

### 15.45 Technology session 3

#### ZONE A

##### Experimental tests and measurements – application of research results

'Experimental test and measurements – Research priorities?'

Head of Section Poul Hummelshøj, DTU Wind Energy

'Applied Measurement Technologies – state of the art case studies'

Senior Researcher Mike Courtney, DTU Wind Energy

'Technology Testing in Siemens Wind Power A/S'

Blade Design Engineer Drew Patrick Gertz, Siemens Wind Power A/S

**Session Chair:** Head of Section Hans E. Jørgensen, DTU Wind Energy

#### ZONE B

##### Offshore technology and O&M – application of research results

'New methods for optimization of installation and service operations for offshore wind turbines'

John Koch Nielsen, FORCE, Ole Svenstrup Petersen, DHI

'The Wave Loads project. Key results and future trends'

Associate Professor Henrik Bredmose, DTU Wind Energy

**Session Chair:** Head of Section Hans E. Jørgensen, DTU Wind Energy

### 16.25 Award ceremony for the best PhD presentation, sum up and goodbye



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## 6 Danish wind municipalities

wishes the Danish Wind Industry Association a successful Annual Event

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Home to all parts of the wind power value chain – *not seen anywhere else in the world*

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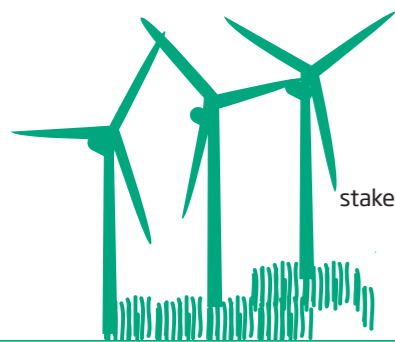
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State of Green is the official green brand for Denmark. The web portal [stateofgreen.com](http://stateofgreen.com) is the world's one-stop-entry to Denmark's green solutions and it provides information on Danish stakeholders, technologies and know-how within energy, climate adaptation, water and environment.

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