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## Session 1: Keynote Session & Panel

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09:00 – 10:55 / 25 October 2011 / Scandia Ballroom / Discussion leader: Thomas Ackermann,  
(Energynautics, Germany)

**The contributions of the Keynote Session are not part of the Workshop Proceedings and the USB memory stick**

**Anne Højer Simonsen**

(Deputy Permanent Secretary, Ministry of Climate and Energy of Denmark)

**Torben Glar Nielsen**

(Director of the Danish TSO Energinet.dk, Denmark)

**Finn Strøm Madsen**

(President, Vestas Technology R&D, Denmark)

## Session 2a: Country Studies - I

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11:25 – 13:00 / 25 October 2011 / Room Suecia / Discussion leader: Charles Smith (UWIG, USA)

**Western Wind and Solar Integration Study**

D. Lew (NREL, USA), R. Piwko, G. Jordan, N. Miller (GE Energy, USA), K. Clark (NREL, USA),  
L. Freeman (GE Energy, USA), M. Milligan (NREL, USA)

**Managing Wind Penetrations of 50% and higher**

A. Rogers, J. O'Sullivan, P. Coughlan (EirGrid, Ireland), A. Kennedy (SONI, Ireland)

**Limits to Integration of Renewable Energy Sources. The Spanish Experience and Challenges**

J. Revuelta (REE, Spain)

**Voltage Stability Analysis of the Eastern Danish Power System with a High Share of Wind Energy**

N. Qin, V. Akhmatov, T. Lund, H. Abildgaard, M. K. Jørgensen (Energinet.dk, Denmark)

## Session 2b: Modeling - I

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11:25 – 13:00 / 25 October 2011 / Room Dania / Discussion leader: Reigh Walling (GE Energy, USA)

**Overview, Status and Outline of the New IEC 61400 -27 - Electrical Simulation Models for Wind Power Generation**

P. Sørensen (Risø DTU, Denmark), B. Andresen (Siemens Wind Power, Denmark), J. Fortmann (REpower, Germany), K. Johansen (Energinet.dk, Denmark), P. Pourbeik (EPRI, USA)

**Simplified Model of DFIG**

M. Mata Dumenjó, J. Sánchez Navarro, V. Casadevall Benet, J. Gil Cepeda, L. García Caballero (Alstom Wind, Spain)

**Simplified Model of Wind Turbines with Doubly-Fed Induction Generator**

A. Timbus, P. Korba (ABB, Switzerland), A. Vilhunen, G. Pepe, S. Seman, J. Niiranen (ABB Oy, Finland)

**Towards a Cross-Platform Binary Interface for Time-Domain Simulation Models**

R. Hendriks (Siemens, Germany/TU Delft, the Netherlands), J. Fortmann, M. Bley, L. Cai (REpower, Germany), O. Ruhle (Siemens, Germany), B. Kulicke (Ingenieurbüro Kulicke, Germany)

## Session 2c: Wind Forecasting

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11:25 – 13:00 / 25 October 2011 / Room Nortvegia / Discussion leader: Hans-Peter Waldl  
(Overspeed, Germany)

### **Offshore Wind Power Prediction in Critical Weather Conditions**

N. Cutululis (Risø DTU, Denmark), N. Dettlefsen (Energinet.dk, Denmark), P. Sørensen (Risø DTU, Denmark)

### **Increasing the Competition on Reserve for Balancing Wind Power with the help of Ensemble Forecasts**

J. U. Jørgensen, C. Möhrlein (WEPROG, Denmark)

### **An Overview of Wind Power Forecast Types and their Use in Large-scale Integration of Wind Power**

H. A. Nielsen, T. S. Nielsen (ENFOR, Denmark), H. Madsen (DTU, Denmark)

### **Future Wind Power Forecast Errors, Need for Regulating Power, and Costs in the Swedish System**

F. Carlsson (Vattenfall R&D, Sweden)

### **The Distribution of Wind Power Forecast Errors from Operational Systems**

B.-M. Hodge, E. Ela, M. Milligan (NREL, USA)

## Session 3a: Country Studies - II

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14:00 – 15:40 / 25 October 2011 / Room Suecia / Discussion leader: Hannele Holttinen  
(VTT, Finland)

### **Wind Integration – A Survey of Global Views of Grid Operators**

L. Jones (Alstom Grid, USA), C. Clark (US Department of Energy, USA)

### **Large Scale Renewable Energy Integration: Recent Experiences in the USA**

T. Gentile, D. J. Morrow, S. Mukherjee (Quanta Technology, USA), B. Kruimer (Quanta Technology, the Netherlands)

### **Wind Power Integration and Grid Code Issues in the Italian Power System**

G. Giannuzzi (Terna, Italy), O. Lamquet, S. Pasquini, M. Pozzi, F. Pretolani (CESI, Italy), C. Sabelli, C. Trenta, R. Zaottini (Terna, Italy)

### **Wind Curtailment Strategies and Applications in Wind Farms Cluster Areas**

Y. Huang, C. Liu (China Electric Power Research Institute [CEPRI], China)

## Session 3b: Testing and Validation

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14:00 – 15:40 / 25 October 2011 / Room Dania / Discussion leader: Eckehard Tröster  
(Energynautics, Germany)

### **Wind Farm Simulation and Certification of its Grid Code Compliance - a Review of Lessons Learned from the German Experiences**

F. Kalverkamp, M. Meuser, B. Schowe-von der Brelie, J. Stüeken (FGH, Germany)

### **Wind Power Plants Validation and Performance Tests - Hydro-Québec Experience**

M. Asmine, C. Bélanger (Hydro-Québec, Canada)

### **Experiences in Simulating and Testing Coordinated Voltage Control Provided by Multiple Wind Power Plants**

T. Arlabán (Acciona Windpower, Spain), J. Peiró (REE, Spain), O. Alonso (Acciona Windpower, Spain), R. Rivas (REE, Spain), D. Ortiz (Acciona Windpower, Spain), G. Quiñonez-Varela, P. Lorenzo (Acciona Energy, Spain)

### **Harmonic Generation and Mitigation by Full-Scale Converter Wind Turbines: Measurements and Simulations**

L. H. Kocewjak, J. Hjerrild (DONG Energy, Denmark), C. L. Bak (Aalborg University, Denmark)

## Session 3c: HVDC

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14:00 – 15:40 / 25 October 2011 / Room Nortvegia / Discussion leader: Peter W. Christensen,  
(Vestas, DK)

### **Ancillary Services and Operation of Multi-terminal HVDC Systems**

Y. Phulpin (INESC, Portugal), D. Ernst (University of Liège, Belgium)

### **Optimizing the Performance of a VSC HVDC Control System**

M. C. Nguyen, K. Rudion, Z. A. Styczynski (Otto-von-Guericke-University Magdeburg, Germany)

### **LCC Based Multiterminal HVDC for Integration of Large Scale Wind Power**

X. Yang, C. Yue, D. Yao (ABB China, China)

### **Power Transmission and Large Scale Wind Farm Integration using Multi-Terminal DC Systems**

J. Rafferty, L. Xu (Queen's University Belfast, United Kingdom)

### **Standardization of VSC-HVdc Interface with Offshore Wind Generation**

E. Larsen (GE Energy, USA), G. Drobnyak (GE Energy, Germany), H. Elahi (GE Energy, USA)

## Session 4a: Power System Balancing - I

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16:20 – 18:30 / 25 October 2011 / Room Suecia / Discussion leader: Stephan Wachtel  
(GE Wind Energy, Germany)

### **Variability of Load and Net Load in Case of Large Scale Distributed Wind Power**

H. Holttinen, J. Kiviluoma (VTT, Finland), A. Estanqueiro (LNEG, Portugal), E. Gómez Lázaro (University Castilla-La Mancha, Spain), B. Rawn (TU Delft, the Netherlands), J. Dobschinski (Fraunhofer IWES, Germany), P. Meibom (Risø DTU, Denmark), E. Lannoye (University College Dublin, Ireland), T. Aigner (NTNU, Norway), Y.-H. Wan, M. Milligan (NREL, USA)

### **Controlling Imbalance Risk of Wind Power with a Dynamic Spinning Reserve Margin**

W. de Boer, M. Duvoort, G. Dekker (KEMA, the Netherlands)

### **Risk Coordination in the Computation of Operating Balancing Reserves for Wind Power Integration**

N. Menemenlis, M. Huneault (IREQ/Hydro-Québec, Canada), A. Robitaille (Hydro-Québec, Canada)

### **The Impact of Alternative Dispatch Intervals on Operating Reserve Requirements for Variable Generation**

M. Milligan, J. King, B. Kirby (NREL, USA), S. Beuning (Xcel Energy, USA)

### **Cross Border Renewable Energy Trade between Baja California and California**

M. A. Avila Rosales (CFE Mexico [retired], Mexico)

## Session 4b: Offshore Grid Connection - I

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16:20 – 18:50 / 25 October 2011 / Room Dania / Discussion leader: Søren Ranneries  
(DONG Energy, Denmark)

### **The First Three 800 MW Wind Park Grid Connection Projects with XLPE HVDC Cables**

D. Zhang, T. Lebioda, M. Koochack-Zadeh, J. Jung (TenneT Offshore, Germany)

### **400 MW Grid Connection to the Anholt Offshore Wind Farm in a Single 220 kV Cable System**

T. Kvarts (Energinet.dk, Denmark), M. Bailleul (General Cable, France), J. M. Domingo (General Cable, Spain), Y. Douima, F. Petitot (General Cable, France), A. Jensen, S. T. Salwin (nkt cables, Denmark)

### **Kriegers Flak - Challenges and Status of the first European "Two-in-One Project"**

P. Jørgensen, M. L. Lundø (Energinet.dk, Denmark)

### **Conceptual Study of an Offshore Grid in the Norwegian Sector of the North Sea**

J. Hang, Ø. Rui, K. Karijord, M. Theisen (Statnett, Norway), B. Johansson (Solvina, Sweden), O. J. Bjercknes (Aker Solutions, Norway)

### **OffshoreGrid: Techno-Economic Model for Future Offshore Electricity Transmission**

P. Kreutzkamp, J. De Decker, N. Picot (3E, Belgium)

### **Testing Constraints and Opportunities for Offshore Renewable Energy: Strategic Development of Offshore Networks for Interconnection and Market Access**

G. Bathurst (TNEI Services, United Kingdom), K. Bell (University of Strathclyde, United Kingdom)

## Session 4c: Modeling - II

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16:20 – 18:30 / 25 October 2011 / Room Nortvegia / Discussion leader: Ana Estanqueiro (LNEG, Portugal)

### **Short Circuit Current Calculation for Wind Turbines with Doubly-Fed Induction Generator (DFIG) System: Problems and Solution Approaches**

V. Dinkhauser, L. Cai (REpower, Germany), S. Bolik (REpower UK, United Kingdom)

### **A Universal Methodology for Specification and Modeling of Wind Turbine Short-Circuit Current Contribution Characteristics**

R. Walling, E. Gursoy (GE Energy, USA)

### **A Study of Collector System Grounding Design with Type-4 Wind Turbines at the Le Plateau Wind Power Plant in Canada**

J.-N. Paquin (BBA, Canada), I. Jaskulski, J. Cassoli (Enercon, Germany), M. Fecteau (Hydro-Québec/TransÉnergie, Canada), C. Murray (Invenergy, USA)

### **Application of Real Time Digital Simulation in Modeling Wind Turbines with Reduced and Full Converter Schemes**

K. Protsenko, B. Badrzadeh (Vestas Technology, Denmark), P. F. Mayer (Vestas Technology, Singapore), Z. Luo (Vestas Americas, USA)

### **Real-Time Simulation of Wind Power Plants with VSC-HVDC Link for Network Integration Studies**

P. Le-Huy, O. Tremblay, R. Gagnon, P. Giroux (IREQ/Hydro-Québec, Canada)

## Session 5a: Market Issues

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08:30 – 10:40 / 26 October 2011 / Room Suecia / Discussion leader: Jens Bömer (Ecofys, Germany)

### **Operational Management of Intraday and Balancing Markets - a Survey**

J. Andersen (Aarhus University, Denmark), N. Detlefsen (Energinet.dk, Denmark)

### **Electricity Market Design Options and Balancing Rules in Offshore Grids**

S. T. Schröder (Risø DTU, Denmark), L. Sundahl (Energinet.dk, Denmark)

### **Frequency Control Ancillary Service Requirements with Wind Generation - Australian Projections**

J. Riesz, F.-S. Shiao, J. Gilmore, D. Yeowart, A. Turley, I. Rose (ROAM Consulting, Australia)

### **Are Integration Costs and Tariffs Based on Cost-Causation?**

M. Milligan, E. Ela, B.-M. Hodge (NREL, USA), B. Kirby (Consultant to NREL, USA), D. Lew (NREL, USA), C. Clark, J. DeCesaro, K. Lynn (US Department of Energy, USA)

### **Stationary and Dynamic Offshore Power System Operation Planning**

K. Rudion (Otto-von-Guericke University Magdeburg, Germany), A. Orths, H. Abildgaard, P. B. Eriksen, K. Søgaard (Energinet.dk, Denmark), M. Gurbiel (Otto-von-Guericke University Magdeburg, Germany), M. Powalko (Energinet.dk, Denmark), A. Styczynski (Otto-von-Guericke University Magdeburg, Germany)

## Session 5b: Future High Penetration Aspects

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08:30 – 10:40 / 26 October 2011 / Room Dania / Discussion leader: Alan Rogers (Eirgrid, Ireland)

### **Danish Fossil Independent Energy System 2050 - From Strategic Investigations to Intra-Hour Simulation of Balancing Issues**

A. B. Hansen, A. Orths, K. Falk, N. K. Detlefsen (Energinet.dk, Denmark)

### **Time to implement TSO 2.0**

J. Warichet, J.-J. Lambin (Elia, Belgium), O. Bronckart (Coreso, Belgium), C. Druet, W. Michiels (Elia, Belgium)

### **Transition to a Fully Renewable Power System in Europe**

G. B. Andresen (Aarhus University, Denmark), D. Heide (Johann Wolfgang Goethe University Frankfurt, Germany), M. G. Rasmussen, M. Greiner (Aarhus University, Denmark)

### **The Importance of Grid Expansion in a High Wind Penetration Scenario for Europe until 2050**

E. Tröster, L. Glotzbach, T. Ackermann (EnergyNautics, Germany), M. Fürsch, C. Jägemann, S. Nagl, S. Hagspiel, D. Lindenberger (EWI, Germany)

### **HVDC Grids for Continental-wide Power Balancing**

M. Callavik, J. Åhström (ABB Grid Systems, Sweden), C. Yuen (ABB Corporate Research, Switzerland)

## Session 5c: Offshore Grid Connection - II

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08:30 – 10:40 / 26 October 2011 / Room Nortvegia / Discussion leader: Ralph Hendriks  
(Siemens, Germany/TU Delft, the Netherlands)

### **Validation of a Switching Operation in the External Grid of Gunfleet Sand Offshore Wind Farm by Means of EMT Simulations**

I. Arana, J. Okholm (DONG Energy, Denmark), J. Holbøll (DTU, Denmark)

### **Transient Studies in Large Offshore Wind Farms, Taking Into Account Network/Circuit Breaker Interaction**

J. Glasdam (DONG Energy, Denmark), C. L. Bak (Aalborg University, Denmark), J. Hjerrild, I. Arana (DONG Energy, Denmark)

### **Overvoltages During Energisation of an Offshore Wind Farm**

F. Moore (Cardiff University, United Kingdom), R. King (Alstom Grid, United Kingdom), A. Haddad, H. Griffiths (Cardiff University, United Kingdom), M. Osborne (National Grid, United Kingdom), N. Jenkins (Cardiff University, United Kingdom)

### **Voltage Control in Offshore Wind Farms Using Switched Compensation Elements (MSCs, MSRs) Together with the Reactive Power Capability of the Wind Turbine Generators**

A. Handschick, A. J. Hernandez, F. Schettler, B. Strobl (Siemens, Germany)

### **Power-Hardware-In-the-Loop Test of VSC-HVDC connection for Off-shore Wind Power Plants**

R. Sharma (Siemens Wind Power, Denmark), S. T. Cha, Q. Wu, T. W. Rasmussen (DTU, Denmark), K. H. Jensen (Siemens Wind Power, Denmark), J. Østergaard (DTU, Denmark)

## Session 6a: Smart Grid and Wind Power – I

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11:00 – 13:00 / 26 October 2011 / Room Suecia / Discussion leader: Poul Sørensen  
(Risø DTU, Denmark)

### **The Role of Wind Turbines in Smart Distribution Systems**

P. Lund (Energinet.dk, Denmark), N. Martensen, T. Ackermann (Energynautics, Germany), J. Harrell (Spirae, USA)

### **Potential of the Flexibility of Heat Pump Operation for Wind Power Integration**

G. Papaefthymiou, B. Hasche, C. Nabe (Ecofys, Germany)

### **Using Dynamic Line Rating to minimize Curtailment of Wind power Connected to Rural Power Networks**

P. Schell (Ampacimon, Belgium), J.-J. Lambin (Elia, Belgium), B. Godard, H.-M. Nguyen, J.-L. Lillien (University of Liège, Belgium)

### **Optimizing the Performance of Renewable Sources Using Virtual Renewable Power Plants**

L. Rodrigues, A. Estanqueiro (LNEG, Portugal)

## Session 6b: Modeling III

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11:00 – 13:00 / 26 October 2011 / Room Dania / Discussion leader: Jens Fortmann  
(Repower, Germany)

### **Loss of (Angle) Stability of Wind Power Plants - The Underestimated Phenomenon in Case of Very Low Short Circuit Ratio**

V. Diedrichs (Jade Hochschule, Germany), A. Beekmann, S. Adloff (Enercon, Germany)

### **On Impact of Voltage Control Characteristics of Wind Power Plants on Damping of Electromechanical Oscillations**

T. Rauhala, A.-J. Nikkilä (Fingrid Oyj, Finland)

### **Improving the Methodology to Model Reservoir Hydro Power in a Unit Commitment Model Using Simplified RiverSystem Constraints**

E. Rinne, J. Kiviluoma (VTT, Finland)

### **Simulation of Offshore Wind Farm Integrated into Power Grid Using VSC HVDC System**

H. Guo, C. M. Nguyen, K. Rudion, Z. A. Styczynski (Otto-von-Guericke-University Magdeburg, Germany)

## Session 6c: Offshore Grid Connection - III

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11:00 – 13:00 / 26 October 2011 / Room Nortvegia / Discussion leader: Lawrence E. Jones,  
(Alstom Grid, USA)

### **Experience with Connecting Five UK Round 2 Offshore Wind Farms to the Grid**

P. Glaubitz (Siemens, Germany), J. Finn, A. Shafiu (Siemens, United Kingdom)

### **Risk Based Approach for Offshore Grid Development**

T. Langeland, C. Greiner (Det Norske Veritas, Norway), C. Öhlen (STRI, Sweden)

### **Dynamics and Control of Multi-terminal HVDC Systems for Off-shore Wind Farm Integration**

E. Ciapessoni, D. Cirio, A. Gatti, A. Pitto (RSE, Italy)

### **Application of Over-current Relay in Offshore Wind Power Plant Grid with VSC-HVDC Connection**

S. K Chaudhary, R. Teodorescu (Aalborg University, Denmark), P. Rodriguez (TU of Catalonia, Spain), P. C. Kjær (Vestas Technology, Denmark)

### **Determination of Hotspots in Submarine Power Cables in Offshore Wind Farms using Distributed Temperature Sensing Technology**

S. V. Kjær, D. Schwartzberg, W. Christiansen, M. Z. Zinglensen (DONG Energy, Denmark)

## Session 7a: Frequency Control and Inertia

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14:00 – 15:40 / 26 October 2011 / Room Suecia / Discussion leader: Eckard Quitmann  
(Enercon, Germany)

### **Inertia for Wind Power Plants – State of the Art Review Year - 2011**

P. W. Christensen, G. C. Tarnowski (Vestas Technology, Denmark)

### **Frequency Activated Fast Power Reserve for Wind Power Plant Delivered from Stored Kinetic Energy in the Wind Turbine Inertia**

T. Knüppel, P. Thuring, S. Kumar, M. N. Kragelund, R. Nielsen, K. André (Siemens Wind Power, Denmark)

### **Provision of Frequency Control by Wind Farms**

M. Speckmann, A. Baier (Fraunhofer IWES, Germany)

### **The Effects of Different Regulation Strategies on Jiangsu's Wind Integration**

L. Hong, H. Lund, B. Möller, C. Wang (Aalborg University, Denmark)

## Session 7b: Smart Grid and Wind Power – II

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14:00 – 15:40 / 26 October 2011 / Room Dania / Discussion leader: Bri-Mathias Hodge (NREL, USA)

### **Need of Harmonized Generic Model Standards for Flexible Grids in a Smart Future**

T. Gehlhaar, T. Wehrend (Germanischer Lloyd, Germany), H. Langkowski, D. Schulz (Helmut Schmidt University Hamburg, Germany)

### **Flexible Plug and Play Low Carbon Networks - Enabling the Connection of Wind Generation**

C. Marantes, S. Georgiopoulos, G. Manhangwe, D. Openshaw (UK Power Networks, United Kingdom)

### **Decrease of Wind Power Balancing Costs Due to Smart Charging of Electric Vehicles**

J. Kiviluoma (VTT, Finland), P. Meibom (Risø DTU, Denmark)

### **Raising the Accommodation Ceiling for Wind Power by Intelligent Response of Demand and Distributed Generation**

P. MacDougall (TNO, the Netherlands), C. Warmer (ECN, the Netherlands), K. Kok (TNO, the Netherlands)

## Session 7c: Wind Power Plant Aspects

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14:00 – 15:40 / 26 October 2011 / Room Nortvegia / Discussion leader: Michael Nørtoft Frydensbjerg  
(Siemens Wind Power, Denmark)

### **Power Quality Monitoring Guideline for Wind Farms Connected to Extra High Voltage Grids**

S. Rabe, K. Rudion, Z. Styczynski (Otto-von-Guericke-University Magdeburg, Germany), Y. Sassnick,  
M. Wilhelm (50Hertz Transmission, Germany)

### **Network Fault Response of Transmission Systems with Active Distribution Systems during Reverse Power Flows**

J. C. Boemer (TU Delft, the Netherlands/Ecofys, Germany), A. van der Meer, B. G. Rawn (TU Delft, the Netherlands), R. L. Hendriks (TU Delft, the Netherlands/Siemens, Germany), M. Gibescu (TU Delft, the Netherlands), M. van der Meijden (TU Delft/TenneT TSO, the Netherlands), W. Kling (TU Eindhoven, the Netherlands), J. A. Ferreira (TU Delft, the Netherlands)

### **Land Cable Systems for the Connection of Wind Farms**

H. Brakelmann, J. Brüggmann (University of Duisburg-Essen, Germany), W. Frisch (IFK, Austria)

### **Mitigation of Grid Frequency Excursions at Hourly Transitions by Wind Power**

J. E. S. de Haan, J. Frunt, W. L. Kling (TU Eindhoven, the Netherlands)

## Poster Papers

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### **Simulated Switching Transients in the External Grid of Walney Offshore Wind Farm**

I. Arana, D. Johnsen, T. Sørensen (DONG Energy Power, Denmark), J. Holbøll (DTU, Denmark)

### **Can Weather Radars Help Monitoring and Forecasting Wind Power Fluctuations at Offshore Wind Farms?**

P.-J. Trombe, P. Pinson, H. Madsen (DTU Informatics, Denmark), N. E. Jensen, L. B. Pedersen (DHI Weather Radar Systems, Denmark), A. Sømmer (Vattenfall, Denmark), N. F. Le (DONG Energy, Denmark)

### **Grid Frequency Responses of Wind Power Variability and Predictability**

J. E. S. de Haan, J. Frunt, W. L. Kling (TU Eindhoven, the Netherlands)

### **The Effect of Wind Integration on Economic Dispatch and CO<sub>2</sub> Emissions in a Closed Operated Dutch Power System**

A. G. Q. de Jong, J. E. S. de Haan, J. Frunt (TU Eindhoven, the Netherlands), E. Pelgrum (TenneT TSO, the Netherlands), W. L. Kling (TU Eindhoven, the Netherlands)

### **Large-Scale Integration of Wind Power in Integrated Assessment Models**

O. Balyk, K. Karlsson (Risø DTU, Denmark)

### **Advanced Extreme and Ramp Event Forecasting and Alarming to Support Stability of Energy Grids**

H.-P. Waldl, P. Brandt (Overspeed, Germany)

### **A Study of Offshore Wind HVDC System Stability and Control**

H. Liu, J. Sun (Rensselaer Polytechnic Institute, USA)

### **Impedance Modeling and Control of Grid-Parallel Inverters**

M. Cespedes, J. Sun (Rensselaer Polytechnic Institute, USA)

### **TWENTIES Project: Wind Power for Wide-area Control of the Grid**

J. C. Pérez, C. Combarros, D. Rubio, R. Veguillas, M. J. Hermosa (Iberdrola, Spain), I. Egido (IIT Comillas University, Spain)

### **Possibilities of Applying Wind Farms Oversizing to Increasing Wind Energy Production in a System with Limited Transmission Capacity**

M. Bajor, R. Jankowski (Institute of Power Engineering Gdansk, Poland)

### **Improving Real-Time Thermal Ratings Using Computational Wind Simulations**

D. Greenwood, G. Ingram, P. Taylor (Durham University, United Kingdom), D. Kadar (Scottish Power Energy Networks, United Kingdom), A. Tewkesbury (Astrium Geo-Information Services, United Kingdom)

### **Wind Power Production Variations in the Swedish Power System**

F. Carlsson (Vattenfall, Sweden)

### **Case Study of Coordinated Voltage Control and Network Losses in an Existing Medium Voltage Network with Large Penetration of Wind Power**

I. Lisse, O. Samuelsson, J. Svensson (Lund University, Sweden)

### **A Comprehensive Approach to Consider Renewable Energy Integration in the Planning Process of Large Power Systems**

G. Callegari, D. Canever, D. Provenzano, A. Prudenzi (CESI, Italy.)



### **Control System Structure of Multi-terminal VSC-HVDC Transmission System**

E. Karatsivos, J. Svensson, O. Samuelsson (Lund University, Sweden)

### **Rate of Change of Frequency and Frequency Deviation in the Nordic Power System with Increasing Wind Power**

J. Björnstedt, O. Samuelsson (Lund University, Sweden)

### **Wind Farms' Influence on Stability in an Area with High Concentration of Hydropower Plants**

S. Engström, J. Persson, P. Olsson (Vattenfall, Sweden), U. Lundin (Uppsala University, Sweden)

### **Environmental Severity Classes for Main Electrical Components in Offshore Wind Turbines**

M. Henriksen (DTU, Denmark), E. Koldby (ABB, Denmark), J. Holbøll, A. Holdyk (DTU, Denmark)

### **Compatibility Between Electric Components in Wind Farms**

A. Holdyk, J. Holbøll (DTU, Denmark), I. Arana (DONG Energy, Denmark)

### **Maximizing Wind Power Integration in Distribution System**

S. Nursebo Salih, P. Chen, O. Carlson (Chalmers TU, Sweden)

### **The Impact of High Wind Power Penetration on Hydroelectric Unit Operations**

B.-M. Hodge, D. Lew, M. Milligan (NREL, USA)

### **Evaluating the Synergies of Renewable Generation and PHEVs**

E. Ibanez, D. Lew, M. Milligan (NREL, USA), G. Jordan, R. Piwko (GE Energy, USA)

### **The Value of Wind Forecasting**

D. Lew (NREL, USA), G. Jordan (Consultant, USA), R. Piwko (GE Energy, USA), M. Milligan (NREL, USA)

### **New Algorithm for Islanding Detection of Wind Turbines Driven DFIG**

J. Mirzaei (Monenco Consulting Engineering, Iran), H. Kazemi Kargar (Shahid Beheshti University, Iran)

### **Electrolysis for Integration of Renewable Electricity and Routes towards Sustainable Fuels**

M. Mogensen, F. Allebrod, J. R. Bowen, C. Chatzichristodoulou, M. Chen, S. D. Ebbesen, C. Graves, J. Hallinder, A. Hauch, P. V. Hendriksen, P. Holtappels, J. V. T. Høgh, S. H. Jensen, A. Lapina, P. L. Møllerup, X. Sun (Risø DTU, Denmark)

### **Day Ahead Forecast of Wind Power through Optimal Application of Multivariate Analyzing Methods**

A. Arnoldt, P. Bretschneider (Fraunhofer IOSB-AST, Germany)

### **Development of a Flexible Measurement System for Offshore Wind Farm Applications**

L. Kocewiak, I. Arana, J. Hjerrild, T. Sørensen (DONG Energy, Denmark), C. L. Bak (Aalborg University, Denmark), J. Holbøll (DTU, Denmark)

### **Topology and Technology Survey on Medium Voltage Power Converters for Large Wind Turbines**

M. Szttykiel, R. Teodorescu, S. Munk-Nielsen (Aalborg University, Denmark), P. Rodriguez (TU of Catalonia, Spain), L. Helle (Vestas, Denmark), C. Busca (Aalborg University, Denmark)

### **Analysis of the Statistics of Wind Power Gradients at Off-shore and On-shore Wind Installations**

H. G. Beyer (University of Agder, Norway)

### **Market and Wind Integration in the North and Baltic Seas - Potential for Merchant Transmission Investment**

J. Egerer (TU Berlin, Germany), F. Kunz (TU Dresden, Germany)

### **Press-pack IGBTs: a Reliable Solution for Medium Voltage Multi-Megawatt Wind Turbine Power Converters**

C. Busca, R. Teodorescu, F. Blaabjerg, S. Munk-Nielsen (Aalborg University, Denmark), P. Rodriguez (TU of Catalonia, Spain), L. Helle, T. Abeyasekera (Vestas, Denmark), M. Szttykiel (Aalborg University, Denmark)

### **Grid-Connection of Offshore Wind Farms Using VSC-HVDC Systems**

X. Fu, L.-A. Dessaint (École de Technologie Supérieure, Canada), R. Gagnon (IREQ/Hydro-Québec, Canada)

### **Optimal Combination of Storage and Balancing in a 100% Renewable European Power System**

M. G. Rasmussen, G. B. Andresen (Aarhus University, Denmark), D. Heide (Johann-Wolfgang-Goethe University Frankfurt, Germany), M. Greiner (Aarhus University, Denmark)

### **Wind Farm Operation Planning Using Optimal Pitch Angle Pattern (OPAP)**

N. Moskalenko, K. Rudion (Otto-von-Guericke University Magdeburg, Germany)



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P. Braun, M. Swierczynski, F. Blaabjerg (Aalborg University, Denmark), P. Rodriguez (TU of Catalonia, Spain), R. Teodorescu (Aalborg University, Denmark)

**Dampening Variation in the Northern European Wind Energy Output – Influence of Geographical Location**

L. Reichenberg, F. Johnsson, M. Odenberger (Chalmers TU, Sweden)

**Probabilistic Aspects of Harmonic Emission of Large Offshore Wind Farms**

C. F. Jensen (Energinet.dk, Denmark), C. L. Bak (Aalborg University, Denmark), J. Hjerrild, L. Kocewiak (Dong Energy, Denmark), K. K. Berthelsen (Aalborg University, Denmark)

**Integration of Large Scale Wind Power**

Troels Davidsen (Inopower, Denmark)

**Harmonic Analysis Experience from a Wind Farm Substation Project in Sweden**

C. Yu, N. Ullah, J. Höglund, G. Pinares (STRI, Sweden), N. Willemsen, M. Holmberg (ABB, Sweden)