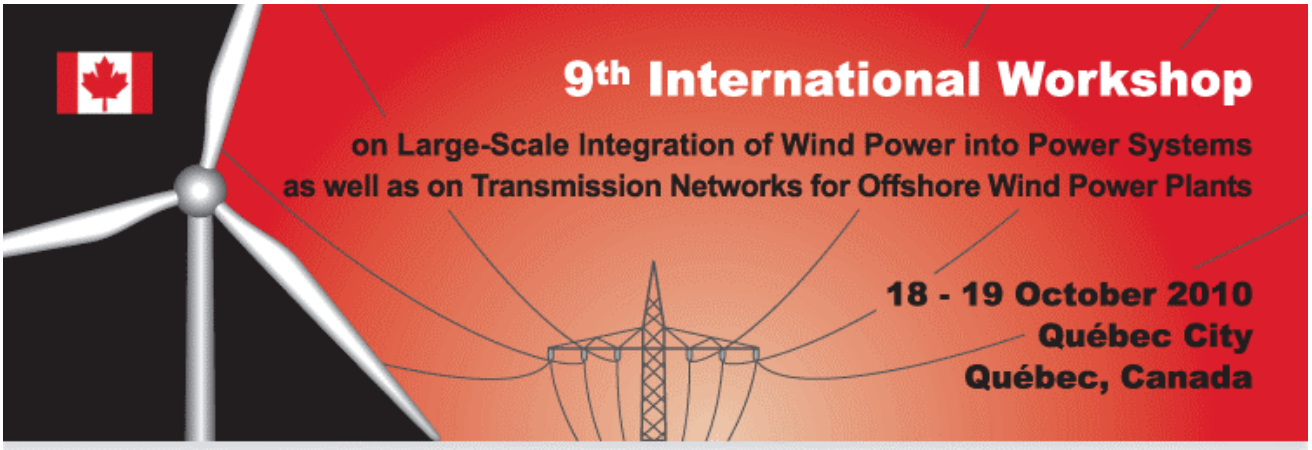

Preliminary Workshop Program

The 9th Workshop is sponsored by:

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Sat 16 Oct	Sun 17 Oct	Monday 18 Oct			Tuesday 19 Oct		
Tutorials		**8:00 - 9:00**					
		Hall area / Foyer Registration					
09:00-13:00		**9:00 – 11:00**			**08:30-10:40**		
		Ballroom			**Room Suzor-Coté**	**Room Krieghoff**	**Room Borduas**
		Welcome and Session 1 Keynote Session & Panel			Session 5a Frequency Control	Session 5b Methodologies to Estimate Wind Power Impacts on Power Systems; Summaries from IEAWIND Collaboration	Session 5c HVDC
		11:00 – 11:25			**10:40 – 11:00**		
		Coffee Break			Coffee Break		
		11:25 – 13:00			**11:00 – 13:00**		
		Room Suzor-Coté	**Room Krieghoff**	**Room Borduas**	**Room Suzor-Coté**	**Room Krieghoff**	**Room Borduas**
		Session 2a European Grid Integration Studies	Session 2b Modeling	Session 2c Wind Forecasting	Session 6a Grid Codes and System Impact Studies	Session 6b Modeling and Validation	Session 6c Regulations, Markets and Offshore Wind Energy
13:00 – 14:00 Lunch		**13:00 – 14:00** Lunch			**13:00 – 14:00** Lunch		
14:00-18:00		**14:00 – 15:40**			**14:00 – 15:40**		
		Room Suzor-Coté	**Room Krieghoff**	**Room Borduas**	**Room Suzor-Coté**	**Room Krieghoff**	**Room Borduas**
		Session 3a North American Grid Integration Studies	Session 3b Voltage Stability and Control	Session 3c Grid Codes and Impact Studies	Session 7a Integration Issues	Session 7b Wind Turbine Control System	Session 7c Energy Management and IT Solutions
		15:40 – 16:00 Coffee Break & Poster Session			**15:40 – 16:00** Coffee Break & Poster Session		
		16:00 - 18:10	**16:00 - 18:20**	**16:00 – 18:20**	**16:00 – 17:00**		
		Room Suzor-Coté	**Room Krieghoff**	**Room Borduas**	**Ballroom**		
		Session 4a Canadian University Research(WESNet)	Session 4b Operation and Dispatch	Session 4c Offshore Wind Power Plants	Session 8 Closing Session – Podium discussions		
	17:00 - 20:00 **Bar area** Reception, **Registration** & Snack	**19:00** **Workshop Dinner**					

Sunday 17 October 2010

17:00 – 20:00 Registration

Monday 18 October 2010

08:00 – 09:00 Registration

09:00 – 09:20 Opening

09:00 – 09:10 Welcome and introduction, Thomas Ackermann

09:10 – 09:15 Structure of the workshop

09:15 – 11:00 Session 1: Keynote Session & Panel

09:15 – 10:35 Presentations (20 minutes each):

- **Wind Power in Quebec and the Research Challenges,** G. Lantagne, (IREQ Hydro-Québec, Canada) – Introduction
- **Alberta Wind Integration: Status and Outlook,** J. Kehler, K. Aksomitis, J. Duchesne (Alberta Electric System Operator, Canada)
- **Overview of the New England Wind Integration Study and Selected Results,** J.R. Norden, W. Henson (ISO New England, USA)
- **CanWEA Pan-Canadian Wind Integration Study**, M. Tremblay (GL Garrad Hassan, Canada), P. Gardner (GL Garrad Hassan, UK), D. Price, D. Le (GL Garrad Hassan, USA) **(Paper_w007)**

10:35 – 11:00 Discussions, discussion leader: Thomas Ackermann (Energynautics, Germany)

11:00 – 11:25 Coffee break

11:25 – 13:00 Session 2a: European Grid Integration Studies

11:25 – 12:45 Presentations (20 minutes each):

- **European Wind Integration Study (EWIS) – Towards a Successful Integration of Wind power into European Electricity Grids,** W. Winter, K. Kolharkar (Transpower, Germany), L. Fischer (Vattenfall, Germany), D. Klaar (Tennet TSO, the Netherlands), O. Alonso (REE, Spain), H. Vanderbroucke (Elia, Belgium), L. Dale (National Grid, UK), U. Maarit (Nordel, Finland) **(Paper_040)**
- **Large Scale Wind Power Integration from a European Point of View. Spanish TSO -REE- Studies in the Context of EWIS Project,** A. Diaz, S. Martínez, E. Prieto (REE, Spain) **(Paper_w124)**
- **Operational Experience of Extreme Wind Penetrations,** A. Estanqueiro (INETI/LNEG, Portugal), C. Mateus (Meteorological Institute, Portugal), R. Pestana (REN, Portugal) **(Paper_w159)**
- **Maximising the real time system penetration of windfarms on the Ireland and Northern Ireland power system,** J. O'Sullivan (EirGrid, Ireland), A. Kennedy (SONI, UK), J. Boemer, K. Burges (Ecofys, Germany), S. Stapleton (Siemens, UK), A. Mullane (Ecar, Ireland), J. Dillon (EirGrid, Ireland), D. Lewis (SONI, UK) **(Paper_w152)**

12:45 – 13:00 Discussions, discussion leader: Antje G. Orths (Energinet.dk, Denmark)

11:25 – 13:00 Session 2b: Modeling

11:25 – 12:45 Presentations (20 minutes each):

- **Generic Aerodynamic Model for Simulation of Variable Speed Wind Turbines,** J. Fortmann (REpower Systems, Germany) **(Paper_049)**
- **Generic Simulation Model for DFIG and Full Size Converter based Wind Turbines,** J. Fortmann (REpower, Germany), S. Engelhardt, J. Kretschmann (Woodward SEG, Germany), C. Feltes (University Duisburg-Essen, Germany), M. Janßen (Converteam, Germany), T. Neumann, I. Erlich (University Duisburg-Essen, Germany) **(Paper_w129)**
- **System Inertia and Wind Power – Impacts and Options for Maintaining System Robustness,** K. Burges, J. Boemer (Ecofys, Germany) **(Paper_w155)**
- **Large-Scale Real-Time Simulation of Wind Power Plants into Hydro-Québec Power System,** R. Gagnon, G. Turmel, C. Larose, J. Brochu, G. Sybille (IREQ/Hydro-Québec, Canada), M. Fecteau (Hydro-Québec, Canada) **(Paper_039)**

12:45 – 13:00 Discussions, discussion leader: Nicholas Miller (GE Energy, USA)

11:25 – 13:00 Session 2c: Wind Forecasting

11:25 – 12:45 Presentations (16 minutes each):

- **Influence of Wind Energy Forecast in Deterministic and Probabilistic Sizing of Reserves,** A. Gil, M. de la Torre, T. Domínguez, R. Rivas (REE, Spain) **(Paper_w091)**
- **Ramp Event Forecasting - Practical Experiences in the USA and Australia,** M. Lange, U. Focken, A. Lenz (energy & meteo systems, Germany) **(Paper_w064)**
- **Enhancing Ramp Detection and Prediction Quality in a Wind Power Forecasting System,** C. Collier (GL Garrad Hassan, USA) **(Paper_029)**
- **Wind and Load Forecast Error Model for Multiple Geographically Distributed Forecasts,** Y. Makarov, J. Reyes-Spindola, N. Samaan, R. Diao, R. Hafen (Pacific Northwest National Laboratory, USA) **(Paper_w151)**
- **High-resolution Historical Wind Power Time Series Simulation Using a State-of-the-art NWP Model and On-site Calibration,** J. Choisnard (Hydro-Québec, Canada), M. Roch, M. Desgagné, M. Charron (Environment Canada, Canada), S. Antic, J. Bourret (Hydro-Québec, Canada) **(Paper_w098)**

12:45 – 13:00 Discussions, discussion leader: Gregor Giebel (Risø DTU, Denmark)

13:00 – 14:00 Lunch

14:00 – 15:40 Session 3a: North American Grid Integration Studies

14:00 – 15:20 Presentations (20 minutes each):

- **Large Scale Wind Interconnection Studies at Manitoba Hydro,** D. Jacobson (Manitoba Hydro, Canada), R. Ostash (TransGrid Solutions, Canada), B. Bagen, P. Wang, S. Shelemy (Manitoba Hydro, Canada) **(Paper_w139)**
- **Value Based Transmission Development for Eastern Wind Integration and Transmission Study with Regional Scenario Analysis,** L. Hecker, D. Osborn, J. Lawhorn (Midwest ISO, USA) **(Paper_022)**
- **Benefit of Regional Energy Balancing Service on Wind Integration in the Western Interconnection of the United States,** M. Milligan, B. Kirby, J. King (NREL, USA), S. Beuning (Xcel Energy, USA) **(Paper_w100)**
- **Analyzing of Balancing Authorities Cooperation Methods with High Variable Generation Penetration,** Y. V. Makarov, N. Zhou, P. Etingov, N. Samaan, J. Ma, R. Diao, R. Guttromson (Pacific Northwest National Laboratory, USA) **(Paper_036)**

15:20 – 15:40 Discussions, discussion leader: Maurice Huneault (IREQ/Hydro-Québec, Canada)

14:00 – 15:40 Session 3b: Voltage Stability and Control

14:00 – 15:20 Presentations (20 minutes each):

- **Voltage and Reactive Power Control in WPPs: Solutions Adopted and Lessons Learned from Three International Experiences,** G. Quiñonez-Varela, P. Lorenzo-Sotelo, O. Alonso-Sadaba, T. Arlabán-Gabeiras, L. Solano-Lopez, E. Giraut-Ruso (Acciona, Spain), I. Chocarro-Aguirrebengoa (Acciona, USA), P. Duddy (Acciona, Australia), J. Ruiz-Guillén, I. Rebollo-Rico (Acciona Energía, Spain) **(Paper_w015)**
- **Power System Dynamic Voltage Stability Analysis for Integration of Large Scale Wind Parks,** L. Cai, J. Fortmann, R. Bluhm (Repower, Germany), I. Erlich (University of Duisburg-Essen, Germany) **(Paper_w061)**
- **Risk of Temporary Over-Voltage and High-Voltage Fault-Ride-Through of Large Wind Power Plants,** V. Akhmatov, B. Gellert (Energinet.dk, Denmark), T. McDermott (MelTran, USA), W. Wiechowski (WTW Power Solutions, Poland) **(Paper_w111)**
- **Analysis of Reactive Compensation Design for the Competitive Renewable Energy Zones Transmission Plan in Texas,** W. Lasher, C. Carter (ERCOT, USA), J. Daniel, R. Koessler, D. Martin, W. Wong (ABB, USA) **(Paper_w106)**

15:20 – 15:40 Discussions, discussion leader: Brendan Kirby (NREL, USA)

14:00 – 15:40 Session 3c: Grid Codes and Impact Studies

14:00 – 15:20 Presentations (20 minutes each):

- **European Grid Code Development – the Road towards Structural Harmonization,** F. Van Hulle (EWEA, Belgium), P. Christensen (Vestas, Denmark), S. Seman (ABB, Finland), V. Schulz (Nordex, Germany) **(Paper_050)**
- **Delivering Grid Code Compliant Wind Farms for the Australian Market,** S. Bolik (REpower UK, UK), K. Summers (Pacific Hydro, Australia) **(Paper_w115)**
- **Evaluating the Capacity Credit of Wind Generation in Québec,** L. Bernier, A. Sennoun (Hydro-Québec, Canada) **(Paper_w056)**
- **Impact of Interconnection Requirements on Wind Plant Reactive Compensation System Design,** E. Camm, S. Williams (S&C Electric Company, USA) **(Paper_w145)**

15:20 – 15:40 Discussions, discussion leader: Neil Kirby (ALSTOM Grid, USA)

15:40 – 16:00 Coffee break

16:00 – 18:10 Session 4a: Canadian University Research (WESNet)

16:00 – 17:40 Presentations (20 minutes each):

- **Overview of Canadian Wind Research - WESNet and Wind Integration as DG's,** L. Chang (University of New Brunswick, Canada) **(Paper_034)**
- **Wind Production in Cold Climates: the Canadian R&D activities,** C. Masson (ETS, Canada) **(Paper_044)**
- **The Wind Engineering, Energy and Environment (WindEEE) Dome and a new generation of Wind Engineering facilities,** H. Hangan (University of Western Ontario, Canada) **(Paper_033)**
- **Power-Flow Analysis of Large Wind Power Plant Collector Systems with Remote Voltage Control Capability,** M. Z. Kamh, R. Iravani (University of Toronto, Canada) **(Poster_w006)**
- **Review of the Impacts of Intermittent Wind Power Integration into Electricity Systems: Technical Problems and Proposed Solutions,** H. Ibrahim, C. Arbez (Wind Energy TechnoCentre, Canada), A. Ilinca (Université du Québec à Rimouski, Canada), D. Rousse (École de Technologie Supérieure, Canada), M. Ghandour (Lebanese University, Lebanon), M. Dimitrova, D. Boulay, M. Adegnon (Wind Energy TechnoCentre, Canada) **(Poster_w154)**

17:40 – 18:10 Discussions, discussion leader: Liuchen Chang (University of New Brunswick, Canada)

16:00 – 18:20 Session 4b: Operation and Dispatch

16:00 – 18:00 Presentations (20 minutes each):

- **Incorporating Wind Generation Forecast Uncertainty into Power System Operation, Dispatch, and Unit Commitment Procedures,** Y. Makarov, P. Etingov, Z. Huang, J. Ma, K. Subbarao (Pacific Northwest National Laboratory, USA) **(Paper_w147)**
- **Advanced Unit Commitment Strategies for the US Eastern Interconnection,** E. Ela (NREL, USA), P. Meibom (Risø DTU, Denmark), R. Barth (University of Stuttgart, Germany), A. Tuohy (University College Dublin, Ireland), M. Milligan (NREL, USA) **(Paper_w041)**
- **Providing Minute-to-Minute Regulation from Wind Plants,** B. Kirby, M. Milligan, E. Ela (NREL, USA) **(Paper_w101)**
- **Dispatch Optimization Model with Network Constraints for the Analysis of Large-scale Integration of Wind Power in Europe Based on the UCTE-STUM Dataset,** C. Nabe, G. Papaefthymiou, K. Burges (Ecofys, Germany) **(Paper_w123)**
- **Computation of Dynamic Operating Balancing Reserve for Wind Power Integration for the Time-Horizon of 1-48 Hours,** N. Menemenlis, M. Huneault (IREQ/Hydro-Québec, Canada), A. Robitaille (Hydro-Québec, Canada) **(Paper_w157)**
- **Wind Generation Effects on Thermal Unit Commitment,** C. Otton (Transpower New Zealand, New Zealand) **(Paper_w017)**

18:00 – 18:20 Discussions, discussion leader: Lawrence Jones (ALSTOM Grid, USA)

16:00 – 18:20 Session 4c: Offshore Wind Power Plants

16:00 – 18:00 Presentations (20 minutes each):

- **Comparison of Alternative Offshore Wind Farms and HVDC Systems**, M. Bruns (University of Dresden, Germany), P. Lilje, M. Pöller (DIgSILENT, Germany), A. Basteck (Voith Turbo Wind, Germany) **(Paper_041)**
- **Transient Study for a Fully Compensated Export Cable in Large Offshore Wind Farms,** I. Arana, D. Johnsen (DONG Energy, Denmark), J. Holbøll (DTU, Denmark) **(Paper_w016)**
- **Transient Recovery Voltages in Offshore Wind Farms,** R. King (Cardiff University, UK), L. Yao, H. Kang, J.-L. Rasolonjanahary (ALSTOM Grid, UK), N. Jenkins (Cardiff University, UK) **(Paper_w113)**
- **Typical Wind Fluctuations and the Resulting Power Infeed of Offshore Wind Power Plants - Statistic Approach Supported by Measurement,** T. Ahndorf, R. Witzmann (TU Munich, Germany) **(Paper_w160)**
- **Offshore Cable Installation,** Å. Larsson, O. Unosson (Vattenfall, Sweden) **(Paper_w068)**
- **A New Connection Method to Connect an Offshore Wind Park to an Onshore Electricity Grid: The Belwind Project,** K. Van Brusselen (CG Holdings Belgium, Belgium) **(Paper_w125)**

18:00 – 18:20 Discussions, discussion leader: Mark O'Malley (University College Dublin, Ireland)

19:00 Conference Dinner

Tuesday 19 October 2010

08:30 – 10:40 Session 5a: Frequency Control

08:30 – 10:20 Presentations (18 minutes each):

- **Frequency Control in Power Systems with High Wind Power Penetration,** G. C. Tarnowski (DTU/ Vestas Wind Systems, Denmark), P.Kjær (Vestas Wind Systems, Denmark), J. Østergaard (DTU, Denmark), P. Sørensen (Risø DTU, Denmark) **(Paper_w096)**
- **Fast Simulation of Wind Generation for Frequency Stability Analysis in Island Power Systems,** J. Conroy (EirGrid, Ireland) **(Paper_016)**
- **Frequency Control in Québec with DFIG wind turbines,** M. Dernbach, D. Bagusche, S. Schrader (REpower, Germany) **(Paper_w092)**
- **Impacts of Frequency Responsive Wind Plant Controls on Grid Performance,** N. Miller, K. Clark, M. Shao (GE Energy, USA), **(Paper_w156)**
- **Wind Integration and AGC Frequency Dynamics Simulations Using Quasi Steady-State Approximation,** S. Lebeau (Hydro-Québec, Canada), N. Qako (IREQ/Hydro-Québec, Canada), T. Van Cutsem (University of Liège, Belgium) **(Paper_w008)**
- **Enhanced Design of a Deloaded Wind Turbine Controller for Frequency Regulation Participation,** Y. Wang, X. Guillaud (University Lille Nord, France), J. Duval (EDF, France), B. François (University Lille Nord, France) **(Paper_w090)**

10:20 – 10:40 Discussions, discussion leader: Alain Forcione (IREQ/Hydro-Québec, Canada)

08:30 – 10:40 Session 5b: Methodologies to Estimate Wind Power Impacts on Power Systems, Summaries from IEAWIND Collaboration

08:30 – 10:10 Presentations (20 minutes each):

- **Introduction to Wind Integration Activities of Task 25,** Hannele Holttinen, Operating Agent Task25, VTT, Finland
- **Transmission Planning for Wind Power, Status and Prospects,** J. C. Smith (UWIG, USA), D. Osborn (MISO, USA), R. Zavadil (Enernex, USA), W. Lasher (ERCOT, USA), E. Gómez-Lázaro (University of Castilla-La Mancha, Spain), T. Trötscher, J. Tande, M. Korpås (SINTEF, Norway), F. Van Hulle (EWEA, Belgium), A. Estanqueiro (INETI, Portugal), L. Dale (National Grid, UK), H. Holttinen (VTT, Finland) **(Paper_024)**
- **Operating Reserves and Wind Power Integration: An International Comparison,** M. Milligan, P. Donohoo, D. Lew, E. Ela, B. Kirby (NREL, USA), H. Holttinen (VTT, Finland), E. Lannoye, D. Flynn, M. O'Malley (University College Dublin, Ireland), N. Miller (GE Energy, USA), P. Eriksen, A. Gøttig (Energinet.dk, Denmark), B. Rawn, J. Frunt, W. Kling, M. Gibescu (TU Delft, the Netherlands), E. Gómez-Lázaro (Universityof Castilla-La Mancha, Spain), A. Robitaille, I. Kamwa (IREQ/Hydro-Québec, Canada) **(Paper_025)**
- **Impact of Wind Power on the Unit Commitment and Power System Operations,** J. Kiviluoma (VTT, Finland), M. O'Malley, A. Tuohy (University College Dublin, Ireland), M. Milligan (NREL, USA), B. Lange (Fraunhofer IWES, Germany), H. Holttinen (VTT, Finland), M. Gibescu (TU Delft, the Netherlands), P. Meibom (Risø DTU, Denmark), A. Vigueras-Rodríguez, E. Gómez-Lázaro (University of Castilla-La Mancha, Spain) **(Paper_026)**
- **Capacity Value of Wind Power - Summary,** M. O'Malley (University College Dublin, Ireland), M. Milligan (NREL, USA), H. Holttinen (VTT, Finland), C. Dent (Durham University, UK), A. Keane (University College Dublin, Ireland) **(Paper_027)**

10:10 – 10:40 Discussions, discussion leader: Hannele Holttinen (VTT, Finland)

08:30 – 10:40 Session 5c: HVDC

08:30 – 10:10 Presentations (20 minutes each):

- **Analysis of Operational Strategies for Multi-Terminal VSC HVDC Systems,** K. Rudion (Otto-von-Guericke-University Magdeburg, Germany), H. Abildgaard, A. Orths (Energinet.dk, Denmark), Z. Styczynski (Otto-von-Guericke-University Magdeburg, Germany) **(Paper_w081)**
- **Control of Offshore Wind Farms with HVDC Grid Connection,** S. Weigel, B. Weise, M. Pöller (DIgSILENT, Germany) **(Paper_w127)**
- **Control of Multi-Ternminal VSC-HVDC for Wind Power Integration Using the Voltage-Margin Method,** C. Ismunandar, A. van der Meer, M. Gibescu, R. Hendriks (TU Delft, the Netherlands), W. Kling (TU Delft/Eindhoven University of Technology, the Netherlands) **(Paper_w066)**
- **DC Connection Strategies for Large-scale Wind Farms,** J. Pan, L. Qi (ABB Corporate Research US, USA), J. Li (North Carolina State University, USA), M. Reza, K. Srivastava (ABB Corporate Research Sweden, Sweden) **(Paper_w133)**
- **Design and Operation of an Offshore Node connected to Wind Parks, Oil Platforms as well as a multi-terminal HVDC Grid,** Ø. Rui, J. Thon (Statnett SF, Norway), H. Sand (Solvina, Sweden), J. Waalmann, O. Bjerknes (Aker Solutions, Norway), K. Karijord (Statnett SF, Norway) **(Paper_w035)**

10:10 – 10:40 Discussions, discussion leader: Peter W. Christensen (Vestas, Denmark)

10:40 – 11:00 Coffee break

11:00 – 13:00 Session 6a: Grid Codes and System Impact Studies

11:00 – 12:40 Presentations (20 minutes each):

- **Integration of Wind in the Energy Mix: Preliminary Results from Experience in Quebec**, D. Faghani, A. El Kasmi, B. Aït-Driss (GL Garrad Hassan, Canada) **(Paper_015)**
- **A New Simulation Approach for the Assessment of Wind Integration Impacts on System Operations ,** M. de Montigny, A. Heniche, I. Kamwa (Hydro-Québec, Canada), R. Sauriol, R. Mailhot, D. Lefebvre (Hydro-Québec, Canada) **(Paper_w162)**
- **Modelling of the Irish Power System with High Wind Energy Penetration and Large Scale Pumped Hydro Energy Storage Deployment,** P. Deane, E.J. McKeogh, B.P. Ó Gallachóir (University College Cork, Ireland) **(Paper_w009)**
- **The Role of Wind Power in the Future European Power System and its Impact on Grid Expansion,** E. Tröster, R. Kuwahata T. Ackermann (Energynautics, Germany) **(Paper_043)**
- **North-East Germany, One of the Most Challenging Regions of the World for the Grid Integration of Renewable Energies,** H. Schwarz (Brandenburg University of Technology/BTU, Germany) **(Paper_002)**

12:40 – 13:00 Discussions, discussion leader: Ana Estanqueiro (INETI, Portugal)

11:00 – 13:00 Session 6b: Modeling and Validation

11:00 – 12:40 Presentations (20 minutes each):

- **Validation of Type 4 Wind Turbine Generic Simulation Model by Full-Scale Test,** S. Seman, J. Simolin, J.-P. Matsinen, J. Niiranen (ABB, Finland) **(Paper_046)**
- **Evaluation of Wind Energy Converter Behaviour during Network-Faults - Limitations of Low Voltage Ride Through Tests and Interpretation of the Test-Results,** A. Beekmann (Enercon, Germany), V. Diedrichs (University of Applied Sciences Wilhelmshaven, Germany), S. Wachtel (Enercon, Germany) **(Paper_w071)**
- **Voltage Control in a Wind Farm,** M. Mata Dumenjó, J. Carulla Piera, J. Sanchez Navarro, V. Casadevall Benet (ALSTOM, Spain) **(Paper_w119)**
- **Status and Development of Voltage Dip Tests in Europe,** M. Ibsch, K. Nohme (GL Garrad Hassan, Germany) **(Paper_w158)**
- **Assessment of ENERCON WEC Grid Performance Based on Hydro-Quebec System Requirements: a Cooperation between ENERCON and Hydro-Quebec,** M. Fecteau, C.-E. Langlois (Hydro-Québec, Canada), J. Marques, I. Jaskulski, Â. Mendonça (Enercon, Germany), **(Paper_009)**

12:40 – 13:00 Discussions, discussion leader: Jens Boemer (Ecofys, Germany)

11:00 – 13:00 Session 6c: Regulations, Markets and Offshore Wind Energy

11:00 – 12:20 Presentations (20 minutes each):

- **Offshore Transnational Grids in Europe: The North-Sea Transnational Grid Research Project in Relation to Other Research Initiatives,** A. van der Meer, R. Teixeira Pinto, M. Gibescu, P. Bauer (TU Delft, the Netherlands), J. Pierik, F. Nieuwenhout (Energy Research Centre of the Netherlands, the Netherlands), R. Hendriks(TU Delft, the Netherlands), W. Kling (TU Delft/Eindhoven University of Technology, the Netherlands), G. van Kuik (TU Delft, the Netherlands) **(Paper_w055)**
- **Scenarios for a North Sea Supergrid: Technical Feasibility of HVDC Connections and their Economic Impact on the Riparian Power Markets,** M. Bettzüge, B. Burstedde (University of Cologne, Germany), C. Linnemann, A. Moser (Aachen University, Germany), T. Panke (University of Cologne, Germany), H. Schuster (Aachen University, Germany) **(Paper_w095)**
- **Market-based Transmission Planning Considering Large-Scale Wind Power,** Y. Gu, J. McCalley (Iowa State University, USA) **(Paper_w097)**
- **The Impact of Wind Curtailment on the Profitability of selected Wind Sites,** C. Golling (University of Cologne, Germany) **(Paper_w067)**

12:20 – 13:00 Discussions, discussion leader: Frans Van Hulle (EWEA, Belgium)

13:00 – 14:00 Lunch

14:00 – 15:40 Session 7a: Integration Issues

14:00 – 15:20 Presentations (20 minutes each):

- **Stochastic Power System Operation,** M. Power (University College Dublin, Ireland) **(Paper_038)**
- **Sub-Synchronous Interactions with Wind Farms Connected Near Series Compensated AC Lines,** A. Jindal, G. Irvin, D. Woodford (Electranix, Canada) **(Paper_w093)**
- **Multi-Terminal Differential Relaying as a Practical Solution for Multi-Ended Line Protection for Onshore Wind Farms,** J. Niejahr (Siemens, Canada), A. Struecker, S. Musunuri (Siemens, Germany) **(Paper_w012)**
- **Wind Power Plant Short-Circuit Current Contribution for Different Fault and Wind Turbine Topologies,** V. Gevorgian, E. Muljadi (NREL, USA) **(Paper_w029)**

15:20 – 15:40 Discussions, discussion leader: Kate Summers (Pacific Hydro, Australia)

14:00 – 15:40 Session 7b: Wind Turbine Control System

14:00 – 15:20 Presentations (20 minutes each):

- **Wind Power Plant Control - An Overview,** M. Altin, R. Teodorescu, B. Bak-Jensen (Aalborg University, Denmark), P. Rodriguez (TU of Catalonia, Spain), F. Iov, P. Kjær (Vestas, Denmark) **(Paper_w135)**
- **A Review of the State of the Art in Control of Variable-Speed Wind Turbines,** Ö. Göksu, R. Teodorescu (Aalborg University, Denmark), P. Rodriguez (TU of Catalonia, Spain), L. Helle (Vestas, Denmark) **(Paper_w138)**
- **Implementation of a Wind Farm Turbine Control System with Short-Term Grid Faults Management,** F. Marra, T. Rasmussen, R. Garcia-Valle (DTU, Denmark) **(Paper_w072)**
- **Various Options for Optimized Integration of Wind Energy Converters with FACTS Capabilities into Power Systems,** M. Fischer (Enercon, Canada), M. Schellschmidt (Enercon, Germany), S. Adloff (Enercon, Germany) **(Paper_w070)**

15:20 – 15:40 Discussions, discussion leader: Jens Fortmann (REpower, Germany)

14:00 – 15:40 Session 7c: Energy Management and IT Solutions

14:00 – 15:20 Presentations (20 minutes each):

- **Extension of Contingency Analysis to Wind Power,** A. Timbus, M. Larsson, C. Franke (ABB Switzerland), V. Brandwajn, K. Moslehi (ABB, USA) **(Paper_w034)**
- **Integration of Wind Farms into Existing IT Infrastructures for Process Control,** K. Sharifabadi, A. Barstad (Statkraft Energy, Norway) **(Paper_w117)**
- **Trends in SCADA Solutions Applied to Wind Energy Integration,** R. Eichler (Siemens, Germany), M. Lorimer (Siemens, UK), M. Romero Velazquez (Siemens, Spain) **(Paper_w018)**
- **Market Potential of Demand Response Options for Wind Integration in Germany,** M. Klobasa (Fraunhofer ISI, Germany), J. Bümmerstede, U. Focken (Energy & Meteo Systems, Germany) **(Paper_w023)**

15:20 – 15:40 Discussions, discussion leader: Eckehard Tröster (Energynautics, Germany)

15:40 – 16:00 Coffee break

16:00 – 17:00 Session 8: Podium Discussions

16:00 – 16:10 Intro: **Continental Scale Wind Integration Studies: What Have We Learned and Where Are We Going**

16:10 – 17:00 Podium discussions:

- Participants: Hannele Holttinen (VTT, Finland), Nicholas Miller (GE Energy, USA), Antje Orths (Energinet.dk, Denmark), F. Van Hulle (EWEA, Belgium), R. Zavadil (Enernex, USA)

Discussion leader: Charles Smith (UWIG, USA)

17:00 – 17:05 Closing remarks

Poster Session

Wind Resource and Plant Output Data Sets for Wind Integration Studies
J. Frank, J. Manobianco, C. Alonge, M. Brower (AWS Truepower, USA)

Optimal Allocation of Reactive Power Resources to Minimize Losses and Maintain System Security
E. Vittal (University College Dublin, Ireland), L. Meegahapola (Queen's University Belfast, UK), D. Flynn, A. Keane (University College Dublin, Ireland)

Application of Data Mining Methods for Power Forecast of Wind Power Plants
A. Arnoldt, S. König (Fraunhofer IOSB-AST, Germany), R. Mikut (Karlsruhe Institute of Technology/KIT, Germany), P. Bretschneider (Fraunhofer IOSB-AST, Germany)

Reliability Assessment of Wind Farm-connected Grids using Monte-Carlo Testing
J. Bélanger (Opal-RT Technologies, Canada), J.-N. Paquin (BBA, Canada), C. Dufour (Opal-RT Technologies, Canada)

Validation of Boundary-Layer Winds from WRF Mesoscale Forecasts with Applications to Wind Energy Forecasting
C. Draxl, A. Hahmann, A. Peña, J. Nissen, G. Giebel (Risø DTU, Denmark)

Simulating Offshore Wind Power Variability over Power Systems Areas
N. Cutululis, P. Sørensen (Risø DTU, Denmark)

Substation to Substation (ss2ss) GOOSE Exchange for Critical Relay Operations
J. Niejahr (Siemens Canada, Canada), N. Schuster, M. Spangler (Siemens, Germany)

Experience Analyzing Wind Data for Large-Scale Integration
Z. Gao, R. Dai, L. Freeman, N. Miller, M. Shao (GE Energy Consulting, USA)

Integration of Wind Power in Reserve Calculation and Monitoring
A. Timbus, C. Franke, M. Larsson (ABB, Switzerland), J. Eriksson (ABB, Sweden)

Facilitating the Connection of Wind-based Generators through Power System Real-Time Thermal Ratings
S. Jupe, M. Bartlett, K. Jackson (Parsons Brinckerhoff, UK), P. Taylor (Durham University, UK)

Frequency Response Variation of two Offshore Wind Park Transformers with different Tap Changer Positions
I. Arana, T. Sørensen (DONG Energy, Denmark), J. Holbøll (DTU, Denmark)

100% Renewable Electric Supply and Transition Analysis
S. Galbete, M. Sotes, O. Alonso (Acciona, Spain)

Dynamic Modeling of GigaWatt Level Wind Farm Clusters for System Studies
C. Yue, X. Yang, H. Xie (ABB China, China), J. Pan (ABB US, USA), K. Srivastava, M. Reza (ABB Sweden, Sweden)

Poster Session as of 15 September, 2010

Analysis of the Voltage Control Capability of Energy Harvesting Networks
P. Cuffe, P. Smith, A. Keane (University College Dublin, Ireland)

How Much Super Grids Could Decrease Wind Power Variability?
J. Kiviluoma (VTT, Finland), X. Lu (Harvard University, USA)

Contribution of Demand-Side to Primary Frequency Control in High Wind Energy Penetration Power Systems
J. Villena-Lapaz, A. Vigueras-Rodríguez, E. Gómez-Lázaro (University of Castilla-La Mancha, Spain), I. Muñoz-Benavente, A. Molina-García (Technical University of Cartagena, Spain), D. Kirschen (University of Manchester, UK)

Regulation Strategies for Wind Power Fluctuations Depending on Demand in Spain
S. Martín-Martínez, A. Vigueras-Rodríguez E. Gómez-Lázaro (University Castilla-La Mancha, Spain), J. A. Fuentes, A. Molina-García (Technical University of Cartagena, Spain)

Utilizing Reanalysis and Synthesis Datasets in Wind Resource Characterization for Large-Scale Wind Integration
W. Henson (ISO New England, USA), J. McGowan, J. Manwell (University of Massachusetts, USA)

CoST Of Wind - Appropriate Connection Selection Tool for Offshore Wind Farms
H. Ergun, D. Van Hertem, R. Belmans (ESAT/KU Leuven, Belgium)

Impact of Real Case Transmission Systems Constraints on Wind Power Operation
F. Vallée, J. Lobry, O. Deblecker (University of Mons, Belgium)

Modal Analysis of Large Scale Integration of Wind Parks into Power Systems - The Impact of Wind Park Voltage Control on Power Oscillation Damping Behavior
L. Cai, J. Fortmann (REpower, Germany), I. Erlich (University Duisburg-Essen, Germany)

Electromagnetic Validation of Fault-Ride Through Capabilities of Wind Turbines
G. Rogdakis, R. Garcia-Valle (DTU, Denmark), I. Arana (DONG Energy, Denmark), R. Sharma (DTU, Denmark), K. H. Jensen (Siemens Wind Power, Denmark)

EMT Validation of Fault-Ride-Through Capabilities of Wind Turbines Induction Generators with Full-Rating Converter
J. Liu, R. Garcia-Valle, I. Arana, R. Sharma (DTU, Denmark), K. H. Jensen (Siemens Wind Power, Denmark)

Impact of Renewable Energy Integration on Reserves in an Island Power System: A Probabilistic Approach
H. Bayem, J. Duval (EDF R&D, France)

Imbalance Cost Optimization in Balance Circle included Wind Generation using Wind Power Forecasting and Uncertainty Evaluation
L. Varga (E.ON Hungária, Hungary)

Optimal Joint Operation of Wind Generation and Compressed Air Energy Storage Systems Under Resource and Price Uncertainty
G. Doluweera, W. Rosehart (University of Calgary, Canada)

Strategies for Reactive Power Control in Wind Farms with STATCOM
F. Díaz González (IREC, Spain), M. Martínez-Rojas (CITCEA-UPC, Spain), A. Sumper (IREC/CITCEA-UPC, Spain), O. Gomis-Bellmunt (CITCEA-UPC, Spain)

Considerations in Interconnecting IPPs into the Power Transmission Network
H. Zhang, D. Wong, R. Boulton, E. Torres, W. Kwasnicki (AltaLink, Canada), D. Shield (Alberta Electric System Operator, Canada)

WT Modelling with DFIG for Transient Analysis Focusing in UMEC Model of Power Transformer
A. Pujante, E. Gómez-Lázaro (University Castilla-La Mancha, Spain), J. Fuentes-Moreno (Technical University of Cartagena, Spain), A. Vigueras-Rodríguez (University Castilla-La Mancha, Spain), A. Molina-García (Technical University of Cartagena, Spain)

Generic Solutions for Substation Automation in Wind Energy Applications
J. Heckel (Siemens, Germany), J. Niejahr (Siemens Canada, Canada)

Adaptation of 12-bus System for Wind Power Integration Studies
Adamczyk, R. Teodorescu (Aalborg University, Denmark), P. Rodriguez (University of Catalonia, Spain)

Transient Stability and Control of Wind Turbine Generation Based on Hamiltonian Surface Shaping and Power Flow Control
D. Wilson, R. Robinett III (Sandia, USA)