

19th Wind Integration Workshop

International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants

11 - 12 November 2020

Germany



PRELIMINARY AGENDA AS OF 30 SEPTEMBER 2020

Important: This preliminary program is subject to changes. It is strongly recommended to check back regularly.

WORKSHOP AMBASSADORS



ORGANIZER



WIND INTEGRATION WORKSHOP

WEDNESDAY 11 NOVEMBER 2020				THURSDAY 12 NOVEMBER 2020			
Wind Workshop Day 1				Wind Workshop Day 2			
09:00 – 11:00	WELCOME & SESSION 1: KEYNOTE SESSION			9:00 – 10:45	A	B	C
					SESSION 5A: ANCILLARY SERVICES ASPECTS	SESSION 5B: POWER QUALITY ASPECTS	SESSION 5C: TBA
BREAK (20 MIN)				BREAK (30MIN)			
11:20 – 13:00	A	B	C	11:15 – 13:00	A	B	C
	SESSION 2A: GRID FORMING ASPECTS I	SESSION 2B: WIND POWER MODELLING	SESSION 2C: GERMAN EXPERIENCE		SESSION 6A: IEA WIND TASK 36 / FORECASTING	SESSION 6B: GRID CODE TESTING	SESSION 6C: DECARBONIZATION OF ENERGY SECTORS
BREAK 13:00 – 14:00				BREAK 13:00 – 14:00			
14:00 – 15:45	A	B	C	14:00 – 15:45	A	B	C
	SESSION 3A: TESTING GRID FORMING CONVERTERS	SESSION 3B: FREQUENCY AND BALANCING ASPECTS	SESSION 3C: POWER SYSTEM ISSUES I		SESSION 7A: IEA WIND TASKS 25, 26, AND 37	SESSION 7B: SYNCHRONOUS CONDENSER ASPECTS (TBC)	SESSION 7C: SYSTEM RESTORATION
BREAK (25 MIN)				BREAK (15 MIN)			
16:10 – 18:20	A	B	C	16:00 – 17:00	SESSION 8: CLOSING SESSION – PODIUM DISCUSSION		
	SESSION 4A: GRID FORMING ASPECTS II	SESSION 4B: POWER SYSTEM ISSUES II	SESSION 4C: GRID CODE ASPECTS				
18:30							

09:00 C. Europe // 03:00 New York // 05:00 Rio de Janeiro // 08:00 London // 13:30 New Delhi // 16:00 Peking // 17:00 Tokio

09:00 – 09:10 Welcome

SESSION 1 – KEYNOTE SESSION

> Session Chair T. Ackermann (Energynautics, Germany)

09:10 – 10:30 Presentations (20min. each)

- **TBA**
Autor (Company, country) (Submission-ID WIW20-xyz)
- **Enhancing Electricity Security in Evolving System** (TBC)
P. Vithayasrichareon (IEA, France)
- **TBA**
Autor (Company, country) (Submission-ID WIW20-xyz)
- **European Connection Network Codes – ENTSO-E’s Views on Important Amendment Needs**
R. Pfeiffer (Amprion, Germany), J. Sprooten (Elia System Operator, Belgium), R. Wilson (National Grid ESO, United Kingdom), I. Theologitis (ENTSO-E, Belgium) (Submission-ID WIW20-96)

10:30 – 11:00 Discussions

11:00 – 11:20 BREAK

11:20 C. Europe // 05:20 New York // 07:20 Rio de Janeiro // 10:20 London // 15:50 New Delhi // 18:20 Peking // 19:20 Tokio

11:20 – 13:00 SESSION 2A: GRID FORMING ASPECTS I

> Session Chair TBA

11:20 – 12:40 Presentations (20 min. each)

- **An Investigation Case for a Stable Power System with up to 100% Inverter Based Generation with Grid Forming Control**
P. Marinakis (HVDC Technologies, United Kingdom | Huddersfield University, United Kingdom), N. Schofield (Huddersfield University, United Kingdom) (Submission-ID WIW20-87)
- **Definition of Minimum Requirements for Grid-Forming Control**
J. Lehner (TransnetBW, Germany) (Submission-ID WIW20-81)
- **Impedance Response Comparison of Grid-Forming and Grid-Following Type III Wind Turbines**
S. Shah, V. Gevorgian (NREL, United States) (Submission-ID WIW20-138)
- **Instability Phenomena in Interconnected Power Systems Caused by Current-Limitation of Grid-Forming Converters**
C. Schöll, H. Lens (University of Stuttgart - IFK, Germany) (Submission-ID WIW20-59)

12:40– 13:00 Discussions

11:20 – 13:00	SESSION 2B: WIND POWER MODELLING
> Session Chair	TBA
11:20 – 12:40	Presentations (20 min. each)
•	Comparison of Different HVDC-Based Grid-Connection Systems for Offshore Windfarms Utilizing an FPGA-Based Real-Time Cluster S. Khan, P. Borowski, T. Jersch, G. Quistorf (Fraunhofer Institute for Wind Energy Systems IWES, Germany), R. Bartelt, C. Heising (Avasition, Germany) (Submission-ID WIW20-123)
•	Stability Analysis of Grid-Supporting Control of Type 4 Wind Energy Plants M. Gierschner (University of Rostock, Germany) (Submission-ID WIW20-41)
•	Sensitivities of the Regionalized European Wind Onshore Model C. Fiedler, T. Schmid (Forschungsstelle für Energiewirtschaft e.V., Germany) (Submission-ID WIW20-67)
•	Simplified Waveform Modeling of a Six-Pulse Line-Commutated Bridge Converter for Multirate RMS Simulations of Power Systems with Wind Power Plants M. Borodulin (KIIP Consulting, United States) (Submission-ID WIW20-23)
12:40– 13:00	Discussions

11:20 – 13:00	SESSION 2C: GERMAN EXPERIENCE
> Session Chair	TBA
11:20 – 12:50	Presentations (18 min. each)
•	Direct Control of Wind Energy Plants by a Transmission System Operator M. Orlishausen, M. Thiele (TenneT TSO, Germany), N. Klein (Energy & Meteo Systems, Germany), H. Großer (ARGE Netz, Germany) (Submission-ID WIW20-114)
•	Congestion Management and its Interdependency with the Energy System in Germany - an Empirical Analysis A. Ostermann (Research Center for Energy Economics (FfE), Germany), S. Köppl, S. Fattler (Research Center for Energy Economics (FfE) TU Munich, Germany) (Submission-ID WIW20-42)
•	Forecasting Latent Components of Vertical Power Flows at Transmission Grid Nodes D. Beinert, A. Braun (Fraunhofer Institute for Energy Economics and Energy System Technology IEE, Germany) (Submission-ID WIW20-78)
•	Importance of Storage Power Plants (SPP) in Large-scale Renewable Energy Integration N. Ahmed, H. Weber (University of Rostock, Germany) (Submission-ID WIW20-79)
•	Site Quality Evaluation of Wind Farms in Germany F. Kalverkamp, J. Bünger, S. Ledwon (FGH GmbH, Germany) (Submission-ID WIW20-70)
12:50– 13:00	Discussions

13:00 – 14:00 BREAK

14:00 – 15:45 **SESSION 3A: TESTING GRID FORMING CONVERTERS**
 > Session Chair Sönke Rogalla (Fraunhofer ISE, Germany) - TBC

14:00 – 15:20 **Presentations (20 min. each)**

- **Testing Characteristics of GFC: Specification of GFC and Definition of GFC Behavior**
 M. Kersic (BELECTRIC, Germany), R. Denninger (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany), A. Dyško, A. Egea Alvarez (University of Strathclyde, United Kingdom), P. Ernst (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany), Q. Hong (University of Strathclyde, United Kingdom), K. Jalili (GE Renewable Energy, Germany), H. Lens (University of Stuttgart (IFK), Germany), E. Lewis (Energy Storage Consulting Eric, United Kingdom), T. Müller (BELECTRIC, Germany), S. Reichert, S. Rogalla (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany), A. J. Roscoe (Siemens-Gamesa Renewable Energy, United Kingdom), T. Schaupp (KACO new energy, Germany), C. Schöll (University of Stuttgart (IFK), Germany), R. Singer (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany) (Submission-ID WIW20-115)
- **Testing Characteristics of GFC: Voltage Source Properties and Contribution to Power Quality**
 S. Reichert, S. Rogalla, R. Denninger (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany), K. Jalili (GE Renewable Energy, Germany) (Submission-ID WIW20-116)
- **Testing Characteristics of GFC: Inertial Response**
 A. Egea Alvarez, Q. Hong, A. Dysko (Department of Electronic and Electrical Engineering, United Kingdom), A. J. Roscoe (Siemens-Gamesa Renewable Energy, United Kingdom), R. Singer, P. Ernst (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany) (Submission-ID WIW20-117)
- **Testing Characteristics of GFC: Overload Behavior and Response to Grid Faults**
 R. Singer, P. Ernst, R. Denninger (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany), H. Lens, C. Schöll (University of Stuttgart (IFK), Germany), K. Jalili (GE Renewable Energy, Germany) (Submission-ID WIW20-118)

15:20 – 15:45 **Discussions**

14:00 – 15:45 **SESSION 3B: FREQUENCY AND BALANCING ASPECTS**
 > Session Chair TBA

14:00 – 15:30 **Presentations (18 min. each)**

- **Parameter Identification of Frequency Response Model and Frequency Response Assessment**
 D. Zografos, M. Ghandhari (KTH, Sweden), R. Eriksson (Svenska kraftnät, Sweden) (Submission-ID WIW20-2)
- **Comparison of the frequency support of centralized and distributed inverter based generation**
 A. Pfendler, M. Coumont, S. Choudhury, J. Hanson (TU Darmstadt (E5), Germany) (Submission-ID WIW20-76)
- **A Study of Power-Frequency Dynamics in Isolated Power Networks with 100% Converter-Interfaced Generation**
 R. Musca (University of Palermo, Italy), K. Kouzelis (NEPLAN, Switzerland) (Submission-ID WIW20-73)
- **Recommendations for Balancing Requirements for Future North Sea Countries towards 2050**
 K. Das, P. Kanellas, M. Koivisto, J. P. Murcia Leon, P. Sørensen (DTU Wind Energy, Denmark), J. G. Bermudez (DTU Management, Denmark) (Submission-ID WIW20-86)
- **Challenges of Modelling Equivalent Active Distribution Grids under Consideration of Grid Forming Inverters**
 J. Ungerland, P. Pant (Fraunhofer Institute for Solar Energy Systems, Germany) (Submission-ID WIW20-35)

15:30 – 15:45 **Discussions**

14:00 – 15:45 **SESSION 3C: POWER SYSTEM ISSUES I**
 > Session Chair TBA

- 14:00 – 15:30** **Presentations (18 min. each)**
- **EMT and RMS Analysis of a Two-Area System with Wind Power Generation**
 A. Clark, M. Ghandhari (KTH Royal Institute of Technology, Sweden), P. Mitra (Hitachi-ABB Power Grids, Sweden), N. Johansson (Hitachi-ABB Power Grids Research, Sweden) ([Submission-ID WIW20-60](#))
 - **Transient Stability analysis of a Virtual synchronous generator and synchronous generator with analytical equations**
 L. Salagamsetty, L. Cai (University of Rostock, Germany) ([Submission-ID WIW20-71](#))
 - **Eigenvalue stability analysis of DFIG based Dig SILENT PowerFactory wind energy converter model using MATLAB**
 H. U. Rehman, U. Ritschel (University of Rostock, Germany) ([Submission-ID WIW20-1](#))
 - **Probabilistic Estimation of Wind Generating Resources based on the Spatio-Temporal Penetration Scenarios for Power Grid Expansion**
 G. Kim, J. Hur (Ewha Womans University, Republic of South Korea, S. Jung, J. Lee (Korea Electric Power Corporation, Republic of South Korea) ([Submission-ID WIW20-85](#))
 - **Study of the Modeling Requirements for the Evaluation of the Impact of Inverter-based Resources on Power Swing Blocking Element through a New Integrated Model**
 I. Kocar, M. Zhao, A. Haddadi (Polytechnique Montreal, Canada), E. Farantatos (EPRI, United States), U. Karaagac (The Hong Kong Polytechnique, Hong Kong) ([Submission-ID WIW20-97](#))
- 15:30 – 15:45** **Discussions**

15:45 – 16:10 **BREAK**

16:10 C. Europe // 10:10 New York // 12:10 Rio de Janeiro // 15:10 London // 20:40 New Delhi // 23:10 Peking // 00:10 Tokio

16:10 – 18:20 **SESSION 4A: GRID FORMING ASPECTS II**
 > Session Chair TBA

- 16:10 – 17:40** **Presentations (18 min. each)**
- **Extended Matching Control for Grid-Forming Control of Grid-Side Inverters of Full-Scale Converter-Based Wind Energy Converters**
 W. Schulze, R. Echte, P. Weber, M. Suriyah, T. Leibfried (Karlsruhe Institute of Technology – KIT (IEH), Germany) ([Submission-ID WIW20-21](#))
 - **Investigation of Grid-Forming Control Strategies for Dynamic Grid Changes on a Wind Turbine Model**
 R. Basiliou, T. Jersch, G. Quistorf (Fraunhofer-Institute for Wind Energy Systems IWES, Germany), N. Schäkel (Leibniz University Hannover, Germany) ([Submission-ID WIW20-122](#))
 - **Influence of the frequency support provided by a grid-forming control-based wind turbine on the loading of its mechanical system**
 A. Avazov (University of Lille, France | KU Leuven (ESAT), Belgium), X. Guillaud, F. Colas (University of Lille, France), J. Beerten (KU Leuven (ESAT), Belgium) ([Submission-ID WIW20-80](#))
 - **Practical Experience of Providing Enhanced Grid Forming Services from an Onshore Wind Park**
 A. Roscoe, D. Elliott, T. Kneuppel, P. Brogan (Siemens Gamesa Renewable Energy, United Kingdom), I. Gutierrez, P. Crolla (ScottishPower Renewables, United Kingdom) ([Submission-ID WIW20-57](#))
 - **A Developer’s Perspective on the implementation of Testing Enhanced Grid Forming Services from an Onshore Wind Park**
 P. Crolla, I. Gutierrez (ScottishPower Renewables, United Kingdom), P. Brogan, A. Roscoe, D. Elliott, T. Kneuppel (Siemens Gamesa Renewable Energy, United Kingdom) ([Submission-ID WIW20-64](#))
 - **Effect of Phase Locked Loop on Dynamic Performance of Grid Forming Converter**
 Z. Zhang, R. Schuerhuber, L. Fickert, K. Friedl (Institute of Electrical Power Systems, Austria), G. Chen, Y. Zhang (Shanghai Dianji University, China), F. Wang (Xi’an Jiaotong University, China) ([Submission-ID WIW20-16](#))
- 18:00 – 18:20** **Discussions**

16:10 – 18:20	SESSION 4B: POWER SYSTEM ISSUES II
> Session Chair	TBA
16:10 – 18:00	Presentations (18 min. each)
•	Overview, Status and Outline of Stability Analysis in Converter-based Power Systems Ł. Kocewiak (Ørsted Offshore, Denmark), J. B. Kwon (Energinet, Denmark), M. Larsson (Hitachi ABB Power Grids, Switzerland), X. Wang (Aalborg University, Denmark), Y. Sun (Shell, Netherlands), R. Blasco-Gimenez (Universitat Politècnica de València, Spain), (Submission-ID WIW20-137)
•	ERCOT Interconnection Inertia Analysis 2013-2020 J. Matevosyan (ERCOT, United States) (Submission-ID WIW20-27)
•	Challenges and Solutions for Integration of Wind Power in Weak Grid Areas with High Inverter Penetration T. Lund, G. K. Andersen (Vestas Wind Systems, Denmark) (Submission-ID WIW20-84)
•	Extension of Emergency Power Supply via Public Medium-Voltage Grids with Support of Decentralized Energy Supply in German Distribution Grids B. Hahn, D. Buurma (Nordex Group, Germany), T. Christ, T. Schmidt (Westnetz, Germany) (Submission-ID WIW20-65)
•	Short Circuit Model Parameterization of Wind Turbines and HVDCs for System Level Short Circuit Calculation J. B. Kwon, J. Glasdam, K. Abildgaard, C. Flytkjær (Energinet.dk, Denmark) (Submission-ID WIW20-29)
•	Delivery of Frequency Support and Black Start Services from Wind Power Combined with Battery Energy Storage M. P. Sidoroff Gryning (Ørsted, Denmark) (Submission-ID WIW20-146)
18:00 – 18:20	Discussions

16:10 – 18:20	SESSION 4C: GRID CODE ASPECTS
> Session Chair	TBA
16:10 – 18:00	Presentations (18 min. each)
•	RfG Implementation in Europe - the Whole Picture B. Schowe-von Der Brelie, S. M. Ali, E. Makki (FGH, Germany) (Submission-ID WIW20-134)
•	First Experimental Impedance Measurement of SG DD-167 Variable-Speed Direct-Drive Wind Turbine by Power Electronic Grid Simulator of Fraunhofer IWES DyNaLab S. Azarain, G. Quistorf, T. Jersch (Fraunhofer - IWES, Germany), E. Guest, F. Martin (Siemens Gamesa Renewable Energy, Denmark), T. Siepker (Siemens Gamesa Renewable Energy, Germany) (Submission-ID WIW20-14)
•	Comparison of Different OVRT Test Benches in the Context of Realistic Overvoltage Events S. Eyhorn, S. Kaiser, S. Rogalla (Fraunhofer Institute for Solar Energy Systems ISE, Germany) (Submission-ID WIW20-111)
•	High Voltage Ride Through, challenges of a 66 kV FRT Test Equipment R. Klosse (EESyst, Germany), G. Krause, S. Heinecke (R&D Test Systems, Denmark) (Submission-ID WIW20-130)
•	Experimental Validation of Current Limitation Methods for Grid Forming Inverters F. Rauscher, T. Sauer, B. Engel (TU Braunschweig – elenia Institute for High Voltage Technology and Power Systems, Germany) (Submission-ID WIW20-113)
•	OVRT - Comparison of Worldwide Grid Codes S. Eichner (Fraunhofer ISE, Germany) (Submission-ID WIW20-147)
18:00 – 18:20	Discussions

09:00 C. Europe // 03:00 New York // 05:00 Rio de Janeiro // 08:00 London // 13:30 New Delhi // 16:00 Peking // 17:00 Tokio

09:00 – 10:45 SESSION 5A: ANCILLARY SERVICES ASPECTS

> Session Chair TBA

09:00 – 10:30 Presentations (18 min. each)

- **Procuring Ancillary Services Efficiently – a Critical Success Factor During Power System Transformation?**
K. Burges (RE-xpertise Berlin, Germany), C. Wagner, M. Greve (ef.Ruhr Dortmund, Germany), I. Schlecht (neon neue energieökonomik Berlin, Germany), G. Blumberg, M. Bucksteeg, A. Schinke-Nendza (University of Duisburg-Essen Essen, Germany), W. Lehnert (Beck ([Submission-ID WIW20-66](#)))
- **Provision of FCR Reserve by Wind Power Plants: Capability and Performance Assessment Based on Experimental Results**
V. Gomes (ENERCON, France), L. Holicki, M. Letzel (WRD Management Support, Germany), Y. Wang, A. Breton (EDF R&D, France) ([Submission-ID WIW20-32](#))
- **Enhancing Grid Frequency Stability with Wind Power: Irish Case Study Using a New Closed Loop Simulation Environment.**
W. Schoot, W. De Boer, E. Bossanyi (DNV GL, Netherlands) ([Submission-ID WIW20-4](#))
- **Providing Ancillary Services by a Hybrid Technology of Synchronous Condenser (SC) and Battery Energy Storage System (BESS) in Renewable Energy Dominated Grids**
K. Vatta Kkuni, M. Nuhic, G. Yang (Technical University of Denmark, Denmark), J. Ramachandran (National Grid ESO UK, United Kingdom) ([Submission-ID WIW20-133](#))
- **The „SysAnDUK“-Project: Ancillary Services Provided by Distributed Generators to Support Network Operators in Critical Situations and During System Restoration**
H. Becker, S. Stock (Fraunhofer Institute for Energy Economics and Energy System Technology (IEE), Germany), J. Brombach (I4E - Innovation for ENERCON, Germany) ([Submission-ID WIW20-75](#))

10:30 – 10:45 Discussions

09:00 – 10:45 SESSION 5B: POWER QUALITY ASPECTS

> Session Chair TBA

09:00 – 10:30 Presentations (18 min. each)

- **Development of a Harmonic Analysis Model for a Meshed Transmission Grid with Multiple Harmonic Emission Sources**
V. Akhmatov, C. Skovgaard Hansen, T. Jakobsen (Energinet, Denmark) ([Submission-ID WIW20-39](#))
- **Deterministic and Stochastic Assessment of Harmonic Summation in Wind Power Plants**
M. Eltouki (Ørsted, Denmark) ([Submission-ID WIW20-125](#))
- **Analysis of Effects of Grid-Forming Inverters on Power Quality using Inverter Output Impedance Spectroscopy**
S. Reichert, B. Stickan (Fraunhofer Institute for Solar Energy Systems (ISE), Germany) ([Submission-ID WIW20-95](#))
- **Frequency Coupling in Multi-frequency Modelling of Wind Turbines**
B. Nouri, P. Sørensen (DTU Wind Energy, Denmark), L. Kocewiak (Ørsted Wind Power, Denmark), V. Gevorgian (National Renewable Energy Laboratory – NREL, United States) ([Submission-ID WIW20-45](#))
- **Assessment Process for Design Specification of FACTS Device and Filters to Meet Grid Code Requirements**
R. Haraguchi, T. Yoshihara, N. Kusuno, M. Nakatani, K. Tomiyasu (Hitachi, Japan) ([Submission-ID WIW20-8](#))

10:30 – 10:45 Discussions

09:00 – 10:45	SESSION 5C: TBA
> Session Chair	TBA
09:00 – 10:20	Presentations (20 min. each)
<ul style="list-style-type: none"> • Findings from the Recent EU SET Wind Workshop: Beyond LCOE K. Dykes, L. Kitzing, C. Pons-Seres De Brauwer, M. Andersson (DTU Wind Energy, Denmark), H. Canet (TU Munich, Germany) (Submission-ID WIW20-142) • Next Steps in Economical Connection and International Integration of Offshore Wind Energy in the North Sea D. Mende, Y. Harms, P. Härtel, F. Frischmuth, D. S. Stock (Fraunhofer IEE, Germany), M. Herrmann, L. Hofmann (Leibniz University Hannover, Germany), M. Valois, A. Bley, P. Hahn (University of Kassel, Germany), J. Jurczyk, C. Rathke (TenneT TSO, Germany) (Submission-ID WIW20-40) • FarmConnors Market Showcases for Wind Farm Control K. Kölle (SINTEF Energy Research, Norway), T. Göçmen, K. Das, M. J. Koivisto, J. P. Murcia Leon, P. Kanellas (Technical University of Denmark, Denmark), I. Eguinoa (CENER, Spain), M. Smailes (ORE Catapult, United Kingdom) (Submission-ID WIW20-25) • ERAS Reanalysis for Long Term Understanding of Offshore Wind Generation L. Hayes, M. Stocks (Australian National University, Australia) (Submission-ID WIW20-88) 	
10:20 – 10:45	Discussions

10:45 – 11:15 BREAK

11:15 C. Europe // 05:15 New York // 07:15 Rio de Janeiro // 10:15 London // 15:45 New Delhi // 18:15 Peking // 19:15 Tokio

11:15 – 13:00	SESSION 6A: IEA WIND TASK 36: RAISING THE BAR ON INFORMATION TRANSPARENCY AND RECOMMENDED PRACTICES FOR WIND POWER FORECASTING
> Session Chair	TBA
11:15 – 12:45	Presentations (18 min. each)
<ul style="list-style-type: none"> • IEA Wind Task 36 Forecasting – An Overview G. Giebel (DTU Wind Energy, Denmark), W. Shaw (PNNL, United States), H. Frank (Deutscher Wetterdienst, Germany), C. Draxl (NREL, United States), J. Zack (UL Renewables, United States), P. Pinson (DTU Elektro, Denmark), C. Möhrle (WEPROG, Denmark), R. J. Bessa (INESC TEC, Portugal), G. Kariniotakis (Mines ParisTech, France) (Submission-ID WIW20-128) • Validation of Numerical Model Improvements through Public Data Sets and Code C. Draxl, J. Lee (National Renewable Energy Laboratory – NREL, United States), W. Shaw, L. Berg (Pacific Northwest National Laboratory, United States) (Submission-ID WIW20-124) • IEA Wind Task 36: Practical Application Examples from the Recommended Practices for Forecast Solution Selection J. Zack (AWS Truepower, United States), C. Möhrle (WEPROG, Denmark) (Submission-ID WIW20-108) • Wind Power Forecasting Data Definitions and Exchange Standards – An Approach for a Recommended Practice Built Upon International Standards and an Eye Towards the Future J. Lerner, M. Westenholz (ENFOR, Denmark) (Submission-ID WIW20-126) • IEA Wind Task 36: Insight on Human Decision-making from Probabilistic Forecast Games C. Möhrle (WEPROG, Denmark), N. Fleischhut (Max-Planck Institute for Human Development, Germany), R. Bessa (INESCTEC, Portugal) (Submission-ID WIW20-98) 	
12:45 – 13:00	Discussions

11:15 – 13:00	SESSION 6B: GRID CODE TESTING
> Session Chair	TBA
11:15 – 12:45	Presentations (18 min. each)
•	<p>Spanish Technical Standard for Generation Compliance (NTS) according to EU Regulation 2016/631 S. Martinez-Villanueva, C. Longás-Viejo, L. Coronado-Hernández, R. Rivas-Saiz (RED ELECTRICA DE ESPAÑA – REE, Spain), D. Davi-Arderius (ENDESA, Spain), J. L. Borrego-Nadal (ENAC, Spain) (Submission-ID WIW20-18)</p>
•	<p>Evaluation of Grid Compliance Testing of Test Benches and the Need for Standardization of Grid Simulator Testing T. Jersch (Fraunhofer IWES, Germany) (Submission-ID WIW20-94)</p>
•	<p>Demystifying Wind Turbine Testing, Future Trends and the link to Simulation Model Validation F. Martin, P. Ghimire (Siemens Gamesa Renewable Energy, Denmark) (Submission-ID WIW20-93)</p>
•	<p>3FRT Tests Considering Time to Market Requirements R. Klosse (EESyst, Germany), F. Santjer, S. Tentzerakis, J. Dirksen (UL International, Germany) (Submission-ID WIW20-129)</p>
•	<p>Validation of the IEC 61400-27 Model Parameterized According to the Adwen AD8 S. Frahm (Fraunhofer IWES, Germany), F. Jiménez Buendía (Siemens Gamesa Renewable Energy, Spain) (Submission-ID WIW20-46)</p>
12:45 – 13:00	Discussions

11:15 – 13:00	SESSION 6C: DECARBONIZATION OF ENERGY SECTORS
> Session Chair	TBA
11:15 – 12:45	Presentations (18 min. each)
•	<p>Integration of Renewable Energies through the Production of Hydrogen under Investigation of Disruptive Developments in Investment Costs: A Techno-economic Evaluation S. Pichlmaier (Forschungsstelle für Energiewirtschaft e. V. (FFe), Germany), T. Hübner (Forschungsgesellschaft für Energiewirtschaft mbH (FFe GmbH), Germany) (Submission-ID WIW20-103)</p>
•	<p>Experiences in Planning Carbon-free Systems S. Pedder, V. Duboviks (Power Economics - Europe, United Kingdom), S. T. Manz, J. Macdowell (Power Economics, United States) (Submission-ID WIW20-112)</p>
•	<p>100% Renewable Electricity for Japan C. Cheng, L. Hayes, M. Stocks, B. Lu, A. Blakers, D. Silalahi, A. Nadolny (Australian National University, Australia) (Submission-ID WIW20-83)</p>
•	<p>Recovery Plan for Resilient and De-carbonised Society with/after Covid-19 - Analysis on Future Demand, Renewables and E-mobility in Japan using TIMES Model Y. Yasuda (Kyoto University, Japan), H. Hamasaki (Deloitte Tohmatsu Consulting, Japan) (Submission-ID WIW20-11)</p>
•	<p>The Contribution of Pumped-Storage power to a successful Energy Transition M. Qudaih, B. Engel (elenia Institute for High Voltage Technology and Power Systems, Germany) (Submission-ID WIW20-69)</p>
12:45 – 13:00	Discussions

13:00 – 14:00 BREAK

14:00 – 15:45	SESSION 7A BY IEA WIND TASKS 25, 26, AND 37: GRAND CHALLENGES IN THE SCIENCE OF WIND ENERGY: GRID AND SYSTEMS INTEGRATION
> Session Chair	Hannele Holttinen (Operating Agent of Task 25)
14:00 – 15:15	Presentations (10-15 min. each)
Grand Challenges for Grid integration R&D	
<ul style="list-style-type: none"> • Introduction to IEA Wind TCP Results of IEA Wind TCP Workshop on a Grand Vision for Wind Energy Technology O. Carlson (Chalmers University, Sweden) • Grid Parts / Recent Work on Systems Engineering/Integration K. Dykes (DTU, Denmark) • Wind Power Plant Controls, Converter-Dominated Electric Grid; Integrated Data and Modeling Computational Methods for System Analysis and Operation O. Carlson (Chalmers University, Sweden) 	
Toward 100% Renewable Energy: R&D Needs, Challenges and First Recommendations for Study Methodology	
<ul style="list-style-type: none"> • Toward 100% Renewable Energy Pathways: Key Research Needs – ESIG report J. C. Smith (ESIG, USA)/M. O'Malley (Ireland) • Addressing Technical Challenges in 100% Variable Inverter-Based Renewable Energy Power Systems / First Recommendations for Studying and Modelling a Towards 100% Variable Generation Energy System – Task 25 articles H. Holttinen (Operating Agent of Task 25) 	
15:15 – 15:45	Discussions

14:00 – 15:45	SESSION 7B: SYNCHRONOUS CONDENSER ASPECTS (TITLE TBC)
> Session Chair	TBA
14:00 – 15:20	Presentations (20 min. each)
<ul style="list-style-type: none"> • Synchronous Condensers in Future High Percentage Renewable Generation Grids N. Schofield, P. Marinakis (University of Huddersfield, United Kingdom) (Submission-ID WIW20-141) • Transient and Small-signal Stability Considerations for Synchronous Condensers in High Inverter Systems N. Miller (HickoryLedge LLC, United States) (Submission-ID WIW20-109) • Dynamic Capabilities of Distributed Reactive Power Sources R. Grab, S. Eichner, S. Rogalla (Fraunhofer ISE, Germany), H. Koeppel, B. Engel (TU Braunschweig, Germany) (Submission-ID WIW20-44) • Dynamic Voltage Control Using Reactive Power in Storage Power Plant V. Vernekar, M. Toepfer, H. Weber (University of Rostock, Germany) (Submission-ID WIW20-119) 	
15:20 – 15:45	Discussions

14:00 – 15:45	SESSION 7C: SYSTEM RESTORATION
> Session Chair	TBA
14:00 – 15:30	Presentations (18 min. each)
•	<p>Challenges of Future Distribution Systems with a Large Share of RES – A Review A. Baviskar, A. Hansen, K. Das, M. Koivisto (Denmark Technical University, Denmark) (Submission-ID WIW20-56)</p> <p>• Concept of a Decision Support System’s User Interface for the Purpose of System Restoration Controlling a Technical Virtual Power Plant J. Schuett, H. Becker, J. Koch, R. Fritz, D. You (Fraunhofer IEE, Germany) (Submission-ID WIW20-68)</p> <p>• Challenges and Possible Solutions in Integrating Black Start into Offshore Wind Farms D. Pagnani (Ørsted Wind Power, Denmark Aalborg University, Denmark), Ł. Kocewiak, J. Hjerrild (Ørsted Wind Power, Denmark), F. Blaabjerg, C. L. Bak (Aalborg University, Denmark) (Submission-ID WIW20-15)</p> <p>• Black Start of Offshore Wind-Farm Connected to DRU-MMC based HVDC System Q. A. Latif, L. Cai (University of Rostock, Germany) (Submission-ID WIW20-144)</p> <p>• Application of Phase Shifting Transformer (PST) for Blackstart and Stable Operation of Offshore Wind Farm with Diode-Rectifier Unit HVDC link L. Cai (University of Rostock, Germany), X. Meng (SEWPG European Innovation Center Aps, Denmark), Q. A. Latif, H.-G. Eckel, H. Weber (University of Rostock, Germany) (Submission-ID WIW20-127)</p>
15:30 – 15:45	Discussions

15:45 – 16:00 BREAK

16:00 C. Europe // 10:00 New York // 12:00 Rio de Janeiro // 15:00 London // 20:30 New Delhi // 23:00 Peking // 00:00 Tokio

16:00 – 17:00	SESSION 8 – CLOSING SESSION – PANEL DISCUSSION
> Session Chair	TBA
16:00 – 16:50	
	<p>Title TBA</p> <p>Panelists: - TBA</p>
16:50– 17:00	Closure

POSTER PRESENTATIONS

- **Dynamic Versus Steady-State Operation Modelling of Power-Biomass to Liquid Fuels Processes : A Techno-Economic Assessment**
O. Ibrahim (The German Aerospace Center (DLR), Germany | TU Berlin, Germany) ([Submission-ID WIW20-30](#))
- **Challenges in RMS Dynamic Simulation of Large Power Systems with High Wind Penetration**
M. Borodulin (KIIP Consulting, United States) ([Submission-ID WIW20-22](#))
- **Reasonable Values of Numerical Integration Time Step for Simulation of Wind Power Plants with Different RMS Dynamic Programs**
M. Borodulin (KIIP Consulting, United States) ([Submission-ID WIW20-31](#))
- **Options to Define “design years” to be Used for Sizing Highly Wind Power Based Supply Systems**
H. G. Beyer (University of the Faroe Islands, Faeroe Islands) ([Submission-ID WIW20-92](#))