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TIMETABLE 3rd INTERNATIONAL HYBRID POWER SYSTEMS WORKSHOP

TUESDAY, 8 MAY 2018		WEDNESDAY, 9 MAY 2018	
Hybrid Power Systems Workshop Day 1		Hybrid Power Systems Workshop Day 2	
08:00 – 09:00	GRAN PELINOR FOYER		
	REGISTRATION		
09:00 – 09:10	GRAN PELINOR 1 – 3		
	OPENING: WELCOME AND INTRODUCTION		
09:10 – 10:50	GRAN PELINOR 1 – 3	08:30 – 10:30	GRAN PELINOR 1+2
	SESSION 1: KEYNOTE SESSION – CANARY ISLANDS EXPERIENCE		SESSION 5A: MODELLING ISSUES
	COFFEE BREAK (30MIN) & POSTER SESSION		COFFEE BREAK (30MIN) & POSTER SESSION
11:20 – 13:00	GRAN PELINOR 1+2	11:00 – 12:40	GRAN PELINOR 1+2
	SESSION 2A: PROJECT EXPERIENCE I		SESSION 6A: FORECASTING & INTEGRATION ISSUES
	GRAN PELINOR 3		GRAN PELINOR 3
	SESSION 2B: SIMULATION TOOLS		SESSION 6B: SYSTEM DESIGN ASPECTS II
	PHOTO SESSION & LUNCH (1H)		LUNCH (1H)
14:00 – 15:40	GRAN PELINOR 1+2	13:40 – 15:40	GRAN PELINOR 1+2
	SESSION 3A: STORAGE ISSUES		SESSION 7A: STABILITY ISSUES
	GRAN PELINOR 3		GRAN PELINOR 3
	SESSION 3B: SYSTEM CONTROL ASPECTS		SESSION 7B: MICRO GRID DESIGN ASPECTS
	COFFEE BREAK (20MIN) & POSTER SESSION		COFFEE BREAK (20 MIN) & POSTER SESSION
16:00 – 18:00	GRAN PELINOR 1+2	16:00– 17:00	GRAN PELINOR 1 – 3
	SESSION 4A: PROJECT EXPERIENCE II		SESSION 8: CLOSING SESSION
	GRAN PELINOR 3		
	SESSION 4B: ECONOMIC ISSUES		
19:30	WORKSHOP DINNER		

08:00 – 09:00 Registration

09:00 – 09:10 Welcome

09:10 – 10:50	SESSION 1 – KEYNOTE SESSION: CANARY ISLANDS EXPERIENCE
> Session Chair	Thomas Ackermann (Energynautics, Germany)
09:10 – 10:30	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Towards a New Energy Model: Challenges and Solutions to Enable Large RES Penetration in the Canary Islands' Isolated Power Systems. P. Santos, R. Corujo, F. Figueras (Red Eléctrica de España [REE], Spain) (Submission-ID 48) • Gorona del Viento Wind-Hydro Power Plant – Results, Improvement Actuations and Next Steps A. Marrero Quevedo, E. J. Medina Domínguez, J. M. de León Izquier (Technological Institute of the Canary Islands [ITC], Spain), R. Corujo de León, P. Santos Arozarena (Red Eléctrica de España [REE], Spain), J. Gil Moreno, A. Castañeda Quintero (Gorona del Viento El Hierro, Spain), J. González Hernández (University of Las Palmas de Gran Canaria [ULPGC], Spain) (Submission-ID 36) • The Hybrid Power Plant in El Hierro Island: Facts and Challenges from the Wind Farm Perspective N. Taveira, J. Palomares, E. Quitmann (ENERCON, Germany), A. Castañeda, J. Gil (Gorona del Viento El Hierro, Spain) (Submission-ID 46) • Renewable Energy Challenges and Mobility Solutions in Tenerife M. Cendagorta-Galarza (ITER, Spain)
10:30 – 10:50	Discussions

10:50 – 11:20 COFFEE BREAK & POSTER SESSION

11:20 – 13:00	SESSION 2A – PROJECT EXPERIENCE I
> Session Chair	J. Charles Smith (ESIG, USA)
11:20 – 12:40	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Dynamic Study of Bonaire Island Power System: Model Validation and Project Experience Y. Sun (Eindhoven University of Technology DNV GL, Netherlands), W. Kuijpers (DNV GL, Netherlands), E. de Jong (Eindhoven University of Technology DNV GL, Netherlands), H. Pustjens (DNV GL, Netherlands) (Submission-ID 16) • Bonaire's Wind-Diesel Hybrid Power Plant – One-Time-Only or Trend-Setting Project? M. Raila, T. Meyers (MAN Diesel & Turbo SE, Germany) (Submission-ID 84) • Towards 100% Renewables in the Faroe Islands: Wind and Energy Storage Integration T. Nielsen (Electrical Power Company [Elfelagið] SEV, Faroe Islands), D. McMullin, B. Lenz, D. Gamboa (ENERCON, Germany) (Submission-ID 71) • Return of Experience on Renewable Energy Integration in Islands and Remote Locations Worldwide E. Vales (Vergnet, France) (Submission-ID 23)
12:40 – 13:00	Discussions

11:20 – 13:00	SESSION 2B – SIMULATION TOOLS
> Session Chair	Bismark Singh (Sandia National Labs, USA)
11:20 – 12:40	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Sizing and Optimization of Hybrid Mini-Grids with <i>micrOgrids</i> – an Open-Source Modelling Tool S. Berendes, P. Bertheau, P. Blechinger (Reiner Lemoine Institut, Germany) (Submission-ID 62) • Simplified Frequency Stability Tool for Isolated Systems: aDin F. Rodríguez-Bobada, C. Izquierdo, J. Soto, R. Rivas, P. Santos, R. Corujo (Red Eléctrica de España [REE], Spain) (Submission-ID 39) • Microgrid Optimisation with the Energy Storage Integration Tool N. Francis, A. Nikolopoulou, J. van der Burgt, R. Scharrenberg (DNV GL, Netherlands) (Submission-ID 37) • A Tool for Optimal Operation and Design of Batteries and its Applications to Self-Consumption J. M. Fernández-de-Bobadilla, E. Lobato, L. Sigrist, (University Pontificia Comillas, Spain), A. González (Gas Natural Fenosa, Spain) (Submission-ID 60)
12:40 – 13:00	Discussions

13:00 – 14:00 PHOTO SESSION & LUNCH BREAK

14:00 – 15:40	SESSION 3A – STORAGE ISSUES
> Session Chair	Stefano Massucco (University of Genova, Italy)
14:00 – 15:00	Presentations (20 min. each)
	<ul style="list-style-type: none"> • To Shift or not to Shift? An Energy Storage Analysis from Hawaii D. Stenlik, M. Richwine, C. Cox (GE Power, USA) (Submission-ID 24) • Battery Energy Storage Solution – Enhancing the Operational Flexibility of Flexible Combined Cycle Industrial Gas Turbines U. Fuchs, S. Alwers (Siemens, Germany) (Submission-ID 8) • Potential of a PCM-Based Storage Concept Combined with an Electric Heat Pump A. Benzarti, M. Hamilius S. Roehrenbeck, W. H. Wellssow (University of Kaiserslautern, Germany) (Submission-ID 11)
15:00 – 15:20	Discussions

14:00 – 15:40	SESSION 3B – SYSTEM CONTROL ASPECTS
> Session Chair	Eckard Quitmann (Enercon, Germany)
14:00 – 15:20	Presentations (16 min. each)
	<ul style="list-style-type: none"> • Hybrid Utility-Scale PV-Wind-Storage Plants for Dispatchability and Reliability Services in Island Grids V. Gevorgian (NREL, USA), M. Morjaria (First Solar, USA), R. Burra (GE Global Research, USA) (Submission-ID 10) • Test Scenarios and Test Results for the Qualification of PV-Diesel Power Systems and Hybrid Controllers F. Niedermeyer, G. Arnold (Fraunhofer Institute for Energy Economics and Energy System Technology IEE, Germany) (Submission-ID 31) • Vestas Power Plant Solutions Integrating Wind, Solar PV and Energy Storage L. Petersen (Vestas Wind Systems Aalborg University, Denmark), B. Hesselbæk, A. Martinez, R. M. Borsotti-Andruszkiewicz, G. C. Tarnowski (Vestas Wind Systems, Denmark), N. Steggel, D. Osmond (Windlab Limited, Australia) (Submission-ID 78) • Smart Renewable Hubs: Multi-Hybridization to Achieve High RE Penetration in Island Grids J. Servert, E. Cerrajero, F. J. Comas (Investigación, Desarrollo e Innovación Energética [IDIE], Spain), A. R. Rocha, J. M. Estebaranz, R. Durán (Cobra Instalaciones y Servicios, Spain), E. Stavropoulou, M. Kourasi, P. Markopoulos (Hellenic Electricity Distribution Network Operator [HEDNO], Greece), A. Dimeas, R. Gogou (National Technical University of Athens [NTUA], Greece) (Submission-ID 76) • Energy Management System for Islanded Microgrids Comprising PV Systems, Diesel Generators, Energy Storage Systems: Validation in a Laboratory Environment. J.-A. Vidal-Clos, E. Bullich Massagué, M. Aragües-Peñalba, G. Vinyals-Canal, C. Chillón-Antón, E. Prieto-Araujo, O. Gomis-Bellmunt (Polytechnical University of Catalonia – CITCEA-UPC, Spain) (Submission-ID 28)
15:20 – 15:40	Discussions

15:40 – 16:00 COFFEE BREAK & POSTER SESSION

16:00 – 18:00	SESSION 4A – PROJECT EXPERIENCE II
> Session Chair	João Peças Lopes (INESC TEC - FEUP, Portugal)
16:00 – 17:40	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Achieving an Annual Wind Penetration of 20% on an Islanded Distribution Network K. Pierros (ENERCON UK, United Kingdom), N. Coote (Scottish and Southern Electricity Networks, United Kingdom) (Submission-ID 44) • PV Integration Studies for Tropical Island Power Systems P. Schierhorn, T. Ackermann (Submission-ID 102) • 12 Years of Residential ‘Off-Grid’ PV Hybrid System Operation and Evolution in Nemiah Valley, Canada A. Swingler (University of Prince Edward Island, Canada), G. Colgate (Xeni Gwet’in First Nation, Canada) (Submission-ID 93) • Mini-Grids with Distributed Energy Generation and Frequency Control – Six Years of Operational Experience of a Pilot Project in Switzerland N. Zuchuat, P. Muñoz Picos (Studer Innotec, Switzerland) (Submission-ID 86) • Quality Control Applied to the Photovoltaic Systems of the Galapagos Islands: the Case of Baltra and Santa Cruz A. A. Eras-Almeida, M.-Á. Egado-Aguilera (Polytechnical University of Madrid, Spain) (Submission-ID 87)
17:40 – 18:00	Discussions

16:00 – 17:40	SESSION 4B – ECONOMIC ISSUES
> Session Chair	Vlad Duboviks (GE Power, United Kingdom)
16:00 – 17:20	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Economic Impact on Hybrid Systems on Islands P. Kunze, C. Tsakiroglou, T. Althaus (OneShore, Germany) (Submission-ID 101) • Reducing Energy Costs and Environmental Impacts of Off-Grid Mines H. Bitaraf (ABB, USA), B. Buchholz (ABB, Germany) (Submission-ID 7) • How product and Service Innovations are Leading to Disruptions of Traditional Distribution Utility Business Models: Implications for Micro-Grids and Isolated Systems F. Sioshansi (Menlo Energy Economies, USA) (Submission-ID 13) • Technical and Economic Assessment for Hybrid PV Mini-Grid Projects – Optimized Layout and Sizing of Off-Grid Power Plant for SKA1-Low Radio Telescope L. Millet, J. Wüllner, M. Vetter (Fraunhofer ISE, Germany), A. Schinckel (CSIRO Astronomy and Space Science, Australia) (Submission-ID 14)
17:20 – 17:40	Discussions

19:30 Dinner

WEDNESDAY, 9 MAY 2018

08:30 – 10:30	SESSION 5A – MODELLING ISSUES
> Session Chair	Eckehard Tröster (Energynautics, Germany)
08:30 – 10:10	Presentations (20 min. each)
	<ul style="list-style-type: none"> • An Adaptive Model with Joint Chance Constraints for a Hybrid Wind-Conventional Generator System B. Singh (Sandia National Labs, USA), D. Morton (Northwestern University, USA), S. Santoso (University of Texas at Austin, USA) (Submission-ID 74) • Assessment of Control Strategies Performance in Stand-alone PV-Diesel System: Simulation and Experimental Test T. P. Do, G. A. Koucoi, F. Bourry (National Institute of Solar Energy [INES], French Alternative Energies Atomic Energy Commission, France), X. Le Pivert (SteadySun Savoie Technolac, France) (Submission-ID 57) • Modelling of a Large Number of Electric Vehicles (EVs) in the All-Island Ireland Energy System V. Duboviks, S. Pedder (GE Power, United Kingdom) (Submission-ID 5) • Contrastive Techno-Economic Analysis Concept for Off-Grid Hybrid Renewable Electricity Systems – Based on Comparative Case Studies within Canada and Uganda M. M. Elkadragy, M. Baumann (Karlsruhe Institute of Technology (KIT), Germany), N. Moore (University of Waterloo, Canada) M. Weil, N. Lemmert, M. Hiller (Karlsruhe Institute of Technology (KIT), Germany) (Submission-ID 12) • Modelling Retrofitting Options for Autonomous Island Power Systems to Maximize Penetration of Variable Renewable Electricity M. Knopp (Technical University of Braunschweig, Germany), C. Menke (Trier University of Applied Sciences, Germany) (Submission-ID 99)
10:10 – 10:30	Discussions

08:45 – 10:30 **SESSION 5B – SYSTEM DESIGN ASPECTS I**
> **Session Chair** **Helge Urdal (Urdal Power Solutions, United Kingdom)**

08:45 – 10:05 **Presentations (20 min. each)**

- **Ensuring Reliable Power for Commercial and Industrial (C&I) Sites**
H. Bitaraf (ABB, USA), B. Buchholz (ABB, Germany) ([Submission-ID 6](#))
- **Load Management for Hybrid Energy Systems**
M. Gast, C. Krause, E. Breukelman (Phoenix Contact Electronics, Germany) ([Submission-ID 45](#))
- **Optimal and Modular Configuration of Wind Integrated Hybrid Power Plants for Off-Grid Systems**
L. Petersen (Aalborg University | Vestas Wind Systems, Denmark), F. Iov (Aalborg University, Denmark), G. C. Tarnowski, C. E. Carrejo (Vestas Wind Systems, Denmark) ([Submission-ID 35](#))
- **EnerKite - Airborne Wind Energy and Storage systems for Off-grid and Mobile End-uses**
A. Bormann, J. Beland, M. Kompen, M. Ranneberg, A. Candade (EnerKíte GmbH, Germany) ([Submission-ID 94](#))

10:05 – 10:30 **Discussions**

10:30 – 11:00 **COFFEE BREAK & POSTER SESSION**

11:00 – 12:40 **SESSION 6A – FORECASTING & INTEGRATION ISSUES**
> **Session Chair** **Andrew Swingler (University of Prince Edward Island, Canada)**

11:00 – 12:20 **Presentations (20 min. each)**

- **Sky-Imager Forecasting for Improved Management of a Hybrid Photovoltaic-Diesel System**
O. Liandrat, A. Braun, É. Buessler, M. Lafuma, S. Cros (Reuniwatt SAS, France), André Gomez (JA Delmas Caterpillar, France), L.-É. Boudreault (Reuniwatt SAS, France) ([Submission-ID 49](#))
- **Evaluation of the Impact of Intra-Day Distributed PV and Wind Generation Forecasts on Decision-making in the Operations of an Island Grid System**
J. Zack (AWS Truepower, USA), R. Kaneshiro, L. Dangelmaier (Hawaii Electric Light Company, USA) ([Submission-ID 56](#))
- **Potential for Interconnection of Isolated Power Systems with ENTSO-E Network - Example of Cyprus Power System**
A. Vovk (ENTSO-E, Belgium), G. Ashikalis, C. Chadjilaou, C. Kokkinos, G. Christofi (Cyprus Transmission System Operator, Cyprus), Z. Achilleides, S. Papadouris (Cyprus Transmission System Owner, Cyprus) ([Submission-ID 97](#))
- **Interaction Analysis in Islanded Power Systems with HVDC Interconnections**
C. Collados-Rodríguez, E. Prieto-Araujo, M. Cheah-Mane, R. Ferrer-San-José, O. Gomis-Bellmunt (CITCEA-UPC, Spain), S. Sanz, C. Longás, A. Cerdón, L. Coronado (REE, Spain) ([Submission-ID 58](#))

12:20 – 12:40 **Discussions**

11:00 – 12:30 **SESSION 6B – SYSTEM DESIGN ASPECTS II**
> **Session Chair** **W.H. Wellssow (Technical University Kaiserslautern, Germany)**

11:00 – 12:00 **Presentations (20 min. each)**

- **Impacts of the Implementation of Hybrid Systems with High Renewable Penetration on the Operation of Thermal Units in Isolated Grids**
T. Althaus, P. Kunze, C. Tsakiroglou, M. Helmy (OneShore Energy, Germany) ([Submission-ID 64](#))
- **Design and Implementation of a Hybrid Power Plant Controller**
A. G. Raducu, N. Styliaras, J. Funkquist, C. Ionita, (Vattenfall, Sweden) ([Submission-ID 30](#))
- **Using Embedded Renewable Generation to Stabilize Rural Distribution Networks**
N. Fischer, S. Nowaczyk (ABO Wind, Germany) ([Submission-ID 88](#))

12:00 – 12:30 **Discussions**

12:30 – 13:40 **LUNCH BREAK**

13:40 – 15:40	SESSION 7A – STABILITY ISSUES
> Session Chair	Thomas Ackermann (Energynautics, Germany)
13:40 – 15:20	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Stability Challenges & Solutions for Power Systems Operating Close to 100% Penetration of Power Electronic Interfaced Power Sources H. Urdal (Urdal Power Solutions, United Kingdom), R. Ierna (National Grid, United Kingdom), A. J. Roscoe (University of Strathclyde, United Kingdom) (Submission-ID 96) • The Need of Synchronous Inertia in Autonomous Power Systems with Increasing Shares of Renewables P. P. Beires, C. L. Moreira, J. Peças Lopes (University of Porto – INESC TEC, Portugal), A. G. Figueira (EEM – Empresa de Electricidade da Madeira, Portugal) (Submission-ID 27) • European Power System 2040: Completing the Map – System Dynamics and Operational Challenges ENTSOE-Drafting Team Planning Standards (DTPS), D. Powell (ENTSO-E, Belgium) (Submission-ID 100) • Adaptive Droop Control for Frequency Regulation in Microgrid with Renewables and Electric Vehicles J. Qi, T. Tsuji (Yokohama National University, Japan) (Submission-ID 70) • Li-ion Batteries for Providing Virtual Inertia L. Beushausen (Technical University of Clausthal, Germany), J. Gollenstede, F. Deblon, R. Bengler, H.-P. Beck (Clausthal University of Technology, Germany) (Submission-ID 59)
15:20 – 15:40	Discussions

13:40 – 15:40	SESSION 7B – MICRO GRID DESIGN ASPECTS
> Session Chair	Oriol Gomis Bellmunt (CITCEA-UPC, Spain)
13:40 – 15:20	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Framework Design for Smart Micro-Grids N. Martensen, D. Masendorf, P. Gambín Belinchón (Energynautics, Germany), S. Al-Agtash, M. Alhashem, M. Batarseh (German Jordanian University, Jordan), B. Azzopardi, R. Mikalauskiene (Malta College of Arts, Science and Technology [MCAST], Malta), A. C.Tsolakis, A. D. Bintoudi, D. Tzovaras (Information Technologies Institute, Greece), A. Önen (Abdullah Gul University, Turkey), J. L. Martinez-Ramos (University of Seville, Spain), M. Khat, L. Ghomri (ENP d'ORAN, Algeria), L. Hadjidemetriou (University of Cyprus, Cyprus), N. Fragale (GeoSYS, Malta), N. Borg, (Electronic Systems Design, Malta) (Submission-ID 47) • Design of a Low Voltage DC Microgrid Based on Renewable Energy to be Applied in Communities where Grid Connection is not Available R. Padrós-Valls, E. Iraola de Acevedo, E. Prieto-Araujo (CITCEA-UPC, Spain), O. Gomis-Bellmunt (CITCEA-UPC, Spain) (Submission-ID 63) • Results for a MV-Hybrid-Microgrid Test Campaign in the MW-Range M. Bader, R. Singer, C. Siedle (Fraunhofer ISE, Germany) (Submission-ID 61) • DSO Microgrid in Southern Sweden D. Panic (E.ON SE, Sweden), M. Hirst (E.ON UK, United Kingdom) (Submission-ID 98) • Development of 600V Industrial DC Microgrid for Highly Automated Manufacturing Applications: Factory and Laboratory Infrastructure Experience A. Senfelds, A. Avotins, L. Ribickis, P. Apse-Apsitis (Riga Technical University, Latvia) (Submission-ID 52)
15:20 – 15:40	Discussions

15:40 – 16:00 COFFEE BREAK & POSTER SESSION

16:00 – 17:00	SESSION 8 – CLOSING SESSION
> Session Chair	Eckard Quitmann (Enercon, Germany)
16:00 – 17:00	Panel discussion
Challenges of Hybrid Systems	
Panelists:	
-	João Peças Lopes (INESC TEC, Portugal)
-	Terji Nielsen (Electrical Power Company SEV, Faroe Islands)
-	Michael Raïla (MAN Diesel & Turbo SE, Germany)
-	Matthew Richwine (GE Energy Consulting, USA)
-	Éric Vales (Vergnet, France)

POSTER PRESENTATIONS

- **Local Energy Autarky with Decentralized Smart Grid Systems using EV Charging Management**
R. Uhlig, M. Stötzel, M. Zdrallek (University of Wuppertal, Germany) ([Submission-ID 26](#))
- **Characterization Methods for the State of Charge Estimation of Lithium-ion Batteries**
F. Conte, S. Massucco, M. Saviozzi, F. Silvestro (University of Genoa, Italy), S. Grillo (Politecnico di Milano, Italy) ([Submission-ID 34](#))
- **Modelling of Large Size Electrolyzer for Electrical Grid Stability Studies in Real Time Digital Simulation**
P. Ayivor, J. Torres (Delft University of Technology, Netherlands), M.A.M.M.van der Meijden (Delft University of Technology, Netherlands | TenneT TSO, Netherlands), R. van der Pluijm, B. Stouwie (EnergyStock, Netherlands) ([Submission-ID 54](#))
- **Unified Gas and Electricity Distribution Grid Control**
J. Benthin, A. Heyer (Gas- und Wärme-Institut Essen, Germany), B. Dahlmann, J. Garzón Real, M. Zdrallek (University of Wuppertal [BUW], Germany), J. Hüttenrauch (DBI - Gastechnologisches Institut, Germany), K. Peters (Westnetz, Germany) ([Submission-ID 65](#))
- **Smoothing Effect of the Power Fluctuation in Large Scale Mega Solar and Wind Turbine Hybrid Power Plant**
K. Yaguchi, Y. Murakami (Toshiba, Japan), K. Yabui, Y. Kamata (Toshiba Energy Systems & Solutions, Japan), M. Ono, Y. Onoue (Chubu Electric Power, Japan) ([Submission-ID 82](#))
- **Building Energy Supply with Hydrogen**
A. Herrmann; J. Schumann; H. Krause (TU Bergakademie Freiberg, Germany), N. Klüber (Fraunhofer IMWS, Germany) ([Submission-ID 91](#))
- **Promoting Renewable Energies in Tourism: An actor-based SWOT-Analysis**
L. Müller, B. Rothstein (HTWG, Germany) ([Submission-ID 103](#))
- **Cheaper and Cleaner Energy for Islands and Isolated Grids**
T. Walter, J. Gebauer (Easy Smart Grid, Germany) ([Submission-ID 104](#))