



PRELIMINARY PROGRAM AS OF 21 MAY 2019

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TIMETABLE 4TH INTERNATIONAL HYBRID POWER SYSTEMS WORKSHOP

WEDNESDAY, 22 MAY 2019				THURSDAY, 23 MAY 2019	
Hybrid Workshop Day 1				Hybrid Workshop Day 2	
08:00 – 09:00	FOYER				
	REGISTRATION				
09:00 – 09:25	ROOM MINOS				
	OPENING: Welcome and Introduction				
09:25 – 11:00	ROOM MINOS			09:00 – 10:40	ROOM MINOS
	SESSION 1: KEYNOTE SESSION				SESSION 5A: Project Experience 4
COFFEE BREAK (30 MIN)				COFFEE BREAK (30 MIN)	
11:30 – 13:10	ROOM MINOS	ROOM LEDA	ROOM ARIADNE	11:10 – 12:50	ROOM MINOS
	SESSION 2A: Project Experience 1: Greece	SESSION 2B: Economic Evaluation and Regulations of Hybrid Systems	SESSION 2C: Hybrid System Technologies		SESSION 6A: Project Experience 5
13:10 – 14:10 LUNCH				12:50 – 13:00 GROUP PHOTO // 13:00 – 13:50 LUNCH	
14:10 – 15:50	ROOM MINOS	ROOM LEDA	ROOM ARIADNE	13:50 – 14:50	ROOM MINOS
	SESSION 3A: Project Experience 2	SESSION 3B: Modelling and Simulation 1	SESSION 3C: Energy Management Systems		SESSION 7A: Design Aspects
COFFEE BREAK (25 MIN)				COFFEE BREAK (20 MIN)	
16:15 – 18:10	ROOM MINOS	ROOM LEDA	ROOM ARIADNE	15:10 – 16:10	ROOM MINOS
	SESSION 4A: Project Experience 3: Around the World	SESSION 4B: Control and Simulation	SESSION 4C: Forecasting Issues		SESSION 8: CLOSING SESSION – PANEL DISCUSSION
18:15 – 18:45	ROOM MINOS				
	r.e.think ENERGY DIALOGUE				
20:00	WORKSHOP DINNER			09:30	24 MAY 2019 – STUDY TRIP

08:00 – 09:00 **Registration**

09:00 – 09:25 **Welcome, Thomas Ackermann (Energynautics, Germany)**

09:25 – 11:00 **SESSION 1 – KEYNOTE SESSION**

> Session Chair **Philipp Kunze (BayWa r.e. Solar Projects, Germany)**

09:25 – 10:45 **Presentations (20 min. each)**

- **The Energy Transition of the Greek Non-Interconnected Islands**
Dimitris Tsekeris (Special Advisor Energy & RES at Ministry of Energy & Environment, Greece) ([Submission-ID 88](#))
- **IPTO: ISLANDS INTERCONNECTION STRATEGY 2019-2030**
Achilleas Tsitsimelis (ADMIE-Transmission System Operator for the Hellenic Electricity Transmission System, Greece)
- **The Electrical Systems of the Greek Non Interconnected Islands**
Eirini Stavropoulou (Director Islands Network Operation Department, DEDDIE- Hellenic Electricity Distribution Network Operator, Greece) ([Submission-ID 87](#))
- **Crete Power System**
Antiopi Gigantidou (Head of Dispatching Center Operation Sector, Islands Network Operation Department, HEDNO – Hellenic Electricity Distribution Network Operator, Greece) ([Submission-ID 79](#))

10:45 – 11:00 **Discussions**

11:00 – 11:30 **COFFEE BREAK**

11:30 – 13:10 **SESSION 2A – PROJECT EXPERIENCE 1: GREECE**

> Session Chair **Ulrich Laumanns (GIZ, Greece)**

11:30 – 12:50 **Presentations (20 min. each)**

- **Turning Crete into an Energy Independent Island**
D. Katsaprakakis, I. Antonakakis, I. Dakanali, D. Christakis (Hellenic Mediterranean University, Greece) ([Submission-ID 9](#))
- **Operation of a Hybrid Power Station in an Isolated Power System: The Case of Samos Island**
N. Bouzounierakis, Y. Katsigiannis, E. Karapidakis (Hellenic Mediterranean University, Greece) ([Submission-ID 75](#))
- **Quantification of Capacity Credit of Additional Photovoltaics Installations on the Island of Crete**
K. Fiorentzis, A. Tsikalakis, E. Karapidakis (Hellenic Mediterranean University, Greece)
([Submission-ID 71](#))
- **Early-Operation Evidence and Lessons Learnt from the First-ever Battery-based Hybrid Power Station in Greece on the Island of Tilos**
D. Zafirakis (University of West Attica, Greece) ([Submission-ID 73](#))

12:50 – 13:10 **Discussions**

11:30 – 13:10	SESSION 2B – ECONOMIC EVALUATION AND REGULATIONS OF HYBRID SYSTEMS
> Session Chair	Thomas Ackermann (Energynautics, Germany)
11:30 – 12:50	Presentations (20 min. each)
	<ul style="list-style-type: none"> • The Impact of Falling Storage Prices on Least Cost Hybrid System Design P. Lilienthal (HOMER Energy, USA) (Submission-ID 61) • The Least-Cost Path to a 100% Renewable Electricity Sector in the Faroe Islands H. M. Tróndheim (Electrical Power Company SEV University of the Faroe Islands, Faeroe Islands Aalborg University, Denmark), T. Nielsen (Electrical Power Company SEV, Faeroe Islands), B. A. Niclasen (University of the Faroe Islands, Faeroe Islands), C. L. Bak, F. F. Da Silva (Aalborg University, Denmark) (Submission-ID 56) • Innovation, Sustainability and New Regulatory Approaches to Hybrid Power Systems A. Gentzoglani (University of Sherbrooke Business School, Canada) (Submission-ID 72) • Advantages of Modifying the BDEW Traffic Light Concept for Local Flexibility Markets S. Pack, K. Kotthaus, J. Hermanns, B. Dahlmann M. Zdrallek (University of Wuppertal, Germany), S. Raczka (SPIE SAG, Germany), F. Schweiger (E-Werk Schweiger, Germany) (Submission-ID 20)
12:50 – 13:10	Discussions

11:30 – 12:50	SESSION 2C – HYBRID SYSTEM TECHNOLOGIES
> Session Chair	Tom Acker (Northern Arizona University, USA)
11:30 – 12:30	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Inrush Currents: One Less Thing to Worry About V. Gomes (ENERCON, France), P. Dill (Wobben Research and Development, Germany), E. Quitmann (ENERCON, Germany) (Submission-ID 83) • Integrated Renewable Hybrid Energy Systems – Coupling of Different Energy Streams for Industrial and Private Applications J. Badedá, J. Gerstner, J. Wirtz (ABO Wind, Germany) (Submission-ID 41) • Lessons Learnt from the Deployment and Operation of Large-Scale Battery Storage and Control Systems in Island Grids with high RE penetration: The Samoan Case Studies E. Galinas (Tesla, Netherlands) (Submission-ID 92)
12:30 – 12:50	Discussions

13:10 – 14:10 LUNCH BREAK

14:10 – 15:50	SESSION 3A – PROJECT EXPERIENCE 2
> Session Chair	Dimitrios Katsaprakakis (Hellenic Mediterranean University, Greece)
14:10 – 15:30	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Exploring the Viability of Hybrid Wind-Solar Power Plants V. Klonari, D. Fraile (WindEurope, Belgium), R. Rossi, M. Schmela (SolarPower Europe, Belgium) (Submission-ID 63) • An Analysis of Large RES Penetration Impact on Traditional System Operation at the Canary Islands Isolated Power Systems: Future Trends and Contingency Measures. J. J. Pérez González, P. Santos Arozarena, R. Corujo de León (REE, Spain) (Submission-ID 14) • Experiences with Large Grid-Forming Inverters on Various Island and Microgrid Projects O. Schömann, T. Bülo, C. Hardt, R. Hesse, A. Falk, P. R. Stankat (SMA Solar Technology, Germany), H. Sadri, W. Krüger (SMA Sunbelt Energy, Germany) (Submission-ID 17) • Renewables and Energy Storage Solutions in Mining N. Iliadis (EnerCoRD, Greece)
15:30 – 15:50	Discussions

14:10 – 15:50	SESSION 3B – MODELLING AND SIMULATION 1
> Session Chair	Peter-Philipp Schierhorn (Energynautics, Germany)
14:10 – 15:30	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Operation of a Greek Island Power Grid under Various Simulated Scenarios of Combined RES and Battery Based Storage Systems J. Nikolettatos (C.R.E.S. – Centre for Renewable Energy Sources and Saving, Greece) (Submission-ID 39) • Active Power Sharing in Microgrids Using Multiple Grid-Forming Inverters N. Martensen, D. Masendorf, P. Gambín Belinchón (Energynautics, Germany), J. L. Martinez-Ramos (University of Seville, Spain), S. Al-Agtash, A. Khalifeh (German Jordanian University, Jordan), M. Khiat, L. Ghomri (ENP d'ORAN, Algeria), B. Azzopardi, R. Mikalauskiene (Malta College of Arts, Science and Technology [MCAST]), Malta, L. Hadjidemetriou (University of Cyprus, Cyprus), A. C. Tsolakis, A. D. Bintoudi, D. Tzovaras (Center for Research and Technology Hellas / Information Technologies Institute, Greece), N. Fragale (GeoSYS, Malta), A. Önen (Abdullah Gul University, Turkey), N. Borg (Electronic Systems Design, Malta) (Submission-ID 55) • Optimal Design of a Renewable Energy System for an Off-Grid Desalination Facility on the Navajo Nation in the United States D. Xu (Xi'an University of Science and Technology, China), T. Acker (Northern Arizona University, USA) (Submission-ID 76) • Transient Stability of Hybrid Stand-alone Microgrids Considering the DC-Side of Photovoltaics K. Veerashekar, A. Bichmaier, M. Luther (University Erlangen-Nuremberg, Germany) (Submission-ID 22)
15:30 – 15:50	Discussions

14:10 – 15:50	SESSION 3C – ENERGY MANAGEMENT SYSTEMS
> Session Chair	Katherine Dykes (DTU Wind Energy, Denmark)
14:10 – 15:30	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Three-phase Active and Reactive Power Control in Home Energy Management System B. V. Rao, F. Kupzog (AIT – Austrian Institute of Technology, Austria), M. Kozek (Vienna University of Technology, Austria) (Submission-ID 13) • Application of the Open Source Energy Management System OpenEMS in Hybrid Power Systems N. Reiners, Ll. Millet Biosca (Fraunhofer ISE, Germany) (Submission-ID 70) • Improving Energy Efficiency with Smart Control Technology – Case Studies and Lessons Learnt P. Piclova (ComAp, Czech Republic) (Submission-ID 74) • Improving the Integration of Renewables with Energy Storage in Islands G. Schelling (ABB Switzerland) (Submission-ID 89)
15:30 – 15:50	Discussions

15:50 – 16:15 COFFEE BREAK

16:15 – 18:10	SESSION 4A – PROJECT EXPERIENCE 3: AROUND THE WORLD
> Session Chair	J. Charles Smith (ESIG, USA)
16:15 – 17:55	Presentations (20 min. each)
	<ul style="list-style-type: none"> • High Penetration of PV in Tropical Island Systems – Experiences from Indonesia P.-P. Schierhorn, A. Vieira Turnell, D. Masendorf, T. Ackermann (Energynautics, Germany) (Submission-ID 84) • Practical Experiences from Project Development of Utility-Scale Solar and Storage Projects for Weak Grid Applications P. Hussinger, M. Dennenmoser, Z. Al-Jallad, T. Althaus, M. Helmy, P. Kunze (BayWa r.e., Germany) (Submission-ID 82) • Siemens Gamesa Hybrid Technology Applied to Greek Islands D. Perez de Larraya (Siemens Gamesa Renewable Energy, Spain) (Submission-ID 19) • The importance of Future-Proofing ESS Investments G. Ramzeyer (Wärtsilä, Finland) (Submission-ID 93) • Offgrid Microgrids High Penetration Renewable and Storage Solutions N. Iliadis (EnerCoRD, Greece), S. Tselepis (EU 's Technical Assistance Facility (TAF) for the Sustainable Energy for All (SE4ALL) initiative Central and Western Africa, Greece)
17:55 – 18:10	Discussions

16:15 – 18:10	SESSION 4B – CONTROL AND SIMULATION
> Session Chair	Vahan Gevorgian (NREL, USA)
16:15 – 17:50	Presentations (18 min. each)
	<ul style="list-style-type: none"> • Planning Tool for Non-Interconnected Islands G. Asimakopoulou, A. Dimeas, N. Hatziargyriou, G. Milionis, G. Tekelis, N. Korres (NTUA, Greece), E. Stavropoulou, A. Reppas, T. Patsaka (HEDNO, Greece) (Submission-ID 69) • Research Opportunities in the Physical Design Optimization of Hybrid Power Plants K. Dykes (NREL, USA), J. King, N. DiOrio (NREL, USA) (Submission-ID 57) • Online Optimization and Control for Renewable Hybrid Power Plants C. Ionita, A. G. Raducu, N. Styliaras, J. Funkquist (Vattenfall R&D, Denmark) (Submission-ID 27) • Intelligent, Data-driven, and Grid-stabilizing Energy Management Platform – Developing a Pilot for Industrial Application M. Raila, W. Noll, M. Akram, J.-C. Mejia (MAN Energy Solutions, Germany), S. Berger, T. Kreuzer, C. Olenberger (Fraunhofer FIT University of Augsburg, Germany), M. Stark, F. Häglsperger, P. Lehner (XITASO, Germany), B. Haeckel (Fraunhofer FIT University of Augsburg, Germany) (Submission-ID 60) • Model Predictive Control for Electric Heat Pumps based on a Multi-Objective Optimization A. Benzarti, S. Roehrenbeck, W. H. Wellssow (TU Kaiserslautern, Germany) (Submission-ID 15) • FLASH Talk (5mins): Optimal Battery Storage Sizing for Residential Buildings with Photovoltaic Systems under Consideration of Generic Load and Feed-in Time Series B. Uhlemeyer, J. Garzón-Real, H. Schroeder, A. Hobert, M. Zdrallek (University of Wuppertal, Germany) (Submission-ID 11)
17:50 – 18:10	Discussions

16:15 – 18:10	SESSION 4C – FORECASTING ISSUES
> Session Chair	Thorsten Althaus (BayWa r.e., Germany)
16:15 – 17:55	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Maximization of the Value of Intra-Day Wind and Solar Forecasts for an Island Grid System via Customized Forecasts and Evaluation Metrics J. W. Zack (AWS Truepower, USA), R. Kaneshiro, L. Dangelmaier (Hawaii Electric Light Company, Hawaii) (Submission-ID 45) • Evaluation of the Impact of Intra-Day and Extended PV and Wind Generation Forecasts on Decisionmaking in the Planning and Operations of the Jamaica Public Service Grid System J. W. Zack (AWS Truepower, USA), D. Richards, D. Reid, Y. Wheatle (Jamaica Public Service [JPS], Jamaica) (Submission-ID 30) • Distributed Wind Resource Assessment Using Computational Modelling for Off-Grid, Kilowatt-Size Wind Turbines T. Acker, A. Mullen, J. Sandoval, J. Alvarez Guerrero, (Northern Arizona University, USA) (Submission-ID 77) • Market-Oriented Dispatch Strategies for Wind-Storage Configurations Using Day-Ahead Forecasting Signals D. Zafirakis, G. Tzanes, J. Kaldellis (University of West Attica, Greece) (Submission-ID 59) • Fuel Saving Assessment from a Simulated Hybrid Photovoltaic-Diesel System Using Forecasts-Integrated Control from a Sky Imager L.-E. Boudreault, O. Liandrat, J. Pottier, É. Buessler, S. Cros, N. Schmutz (Reuniwatt SAS, France) (Submission-ID 42)
17:55 – 18:10	Discussions

18:15 – 18:45	r.e.think ENERGY DIALOGUE
> Session Chair	Philipp Kunze (BayWa r.e. Solar Projects, Germany)
	<ul style="list-style-type: none"> • Panel discussion with different stakeholders in hybrid projects <ul style="list-style-type: none"> → How can we overcome conflicts of interests and differences in expectations? → What is needed to develop a joint vision and good collaboration for a successful project execution? → Expectations, limitations, motivations? <p>Panelists</p> <ul style="list-style-type: none"> - Eirini Stavropoulou (Hellenic Electricity Distribution Network Operator – HEDNO, Greece) - Dimitris Zafirakis (University of West Attica, Greece) - Eckard Quitmann (Enercon, Germany)

20:00 Workshop Dinner (to be booked separately)

09:00 – 10:40	SESSION 5A – PROJECT EXPERIENCE 4
> Session Chair	Paulina Asbeck (Vattenfall, Germany)
09:00 – 10:20	Presentations (20 min. each)
	<ul style="list-style-type: none"> • soFLEX'hy: EDF Hydro-PV-Virtual Power Plant Demonstrator L. Delaluque, J.-F. Balmitgere (EDF – Hydro Engineering Center, France) (Submission-ID 24) • Medium Voltage Microgrid Islanding – A part of the Nice Smart Valley Project P. Boos, G. Diquerreau, G. Rocchia, E. Hestin (SOCOME, France) (Submission-ID 65) • Solutions for VRE Integration in Developing Countries P.-P. Schierhorn, T. Ackermann (Energynautics, Germany) (Submission-ID 85) • Distributed New Energy Micro-grid Absorption Pilot Project in Northeast China Power Grid H. Zhang, J. Zhang, Q. Li, S. Du (Northeast Branch of State Grid Corporation of China, China), C. Cui, P. Ye (Shenyang Institute of Engineering, China) (Submission-ID 16)
10:20 – 10:40	Discussions

09:00 – 10:40	SESSION 5B – HIGH SHARE INVERTER BASED SYSTEMS
> Session Chair	Victor Gomes (ENERCON, France)
09:00 – 10:20	Presentations (20 min. each)
	<ul style="list-style-type: none"> • High Penetration of Inverter Based Generation in the Power System: A Discussion on Stability Challenges and a Roadmap for R&D M. Ndreko, C. Petino, W. Winter (TenneT TSO, Germany) (Submission-ID 36) • The Need for Additional Inertia in the European Power System until 2050 and the Contribution of Wind Power C. Agathokleous, J. Ehnberg (Chalmers University of Technology, Sweden) (Submission-ID 18) • Frequency Provision with Low-Inertia Hybrid Power Plants: Identifying Gaps in the Standards D. Vázquez Pombo, F. Iov (Aalborg University, Denmark) (Submission-ID 10) • Experimental Validation of a Power Electronics Dominated Microgrid: A Study Case of an Offshore Wind Powered Water Injection Process A. Fabian Perez, Y. Sun (DNV GL, Netherlands) (Submission-ID 54)
10:20 – 10:40	Discussions

10:40 – 11:10 COFFEE BREAK

11:10 – 12:50	SESSION 6A – PROJECT EXPERIENCE 5
> Session Chair	Nils Reiners (Fraunhofer ISE, Germany)
11:10 – 12:30	Presentations (20 min. each)
	<ul style="list-style-type: none"> • Introducing the Clean Energy for EU Islands Secretariat S. De Clercq (Clean Energy for EU Islands Secretariat 3E, Belgium), A. Woyte (3E, Belgium, Belgium), G. Piccolo (Climate Alliance, Germany) (Submission-ID 46) • Interconnection Requirements for Renewable Generation and Energy Storage in Island Systems: Puerto Rico Example V. Gevorgian, M. Baggu (NREL, USA), D. Ton (U.S. Department of Energy, USA) (Submission-ID 6) • Load Profile Reconstitution for the Design of Hybrid Systems – Application for Rural Electrification Projects in Mini-Grid Environments F. Botreau (Tractebel Engineering, Germany) (Submission-ID 62) • Aggregation & Optimization of Behind-the-Meter Loads, Distributed Generation & Storage as Virtual Micro-Grids F. Sioshansi (Menlo Energy Economics, USA) (Submission-ID 12)
12:30 – 12:50	Discussions

11:10 – 12:50 **SESSION 6B – MODELLING AND SIMULATION 2**
> Session Chair **Nis Martensen (Energynautics, Germany)**

11:10 – 12:30 **Presentations (20 min. each)**

- **Feasibility Analysis of Smart Renewable Hubs in EU Islands**
J. M. Estebarez, D. Pereira, A. R. Rocha (Cobra Instalaciones y Servicios, Spain), R. Gkogkou, G. Asimakopoulou, A. L. Dimeas, N. D. Hatziaargyriou, **G. Milionis** (National Technical University of Athens – NTUA, Greece), P. Markopoulos, M. Kourasi, E. Stavropoulou (Hellenic Electricity Distribution Network Operator – HEDNO, Greece), J. Servert, E. Cerrajero, D. Lopez (IDIE, Spain) ([Submission-ID 58](#))
- **Power-Flow-Constrained Asset Optimization for Off-Grid Power Systems Using Selected Open-Source Frameworks**
S. Auer, J. Liße, S. R. Mandham, C. Horn (elena international, Germany) ([Submission-ID 29](#))
- **Decentralized Secondary Frequency Control in an Optimized Diesel PV Hybrid System**
A. Vieira Turnell, **P.-P. Schierhorn**, D. Masendorf (Energynautics, Germany), K. Morozovska (KTH, Sweden) ([Submission-ID 86](#))
- **Methodological Framework for Stability Analysis, Control Design and Verification in Hybrid Power Plants**
L. Petersen (Aalborg University, Denmark | Vestas Wind Systems, Denmark), F. Iov (Aalborg University, Denmark), G. C. Tarnowski, K. B. Raghuchandra (Vestas Wind Systems, Aarhus, Denmark) ([Submission-ID 38](#))

12:30 – 12:50 **Discussions**

12:50 – 13:00 **GROUP PHOTO**

13:00 – 13:50 **LUNCH BREAK**

13:50 – 14:50 **SESSION 7A – DESIGN ASPECTS**
> Session Chair **Jimmy Ehnberg (Chalmers University of Technology, Sweden)**

13:50 – 14:30 **Presentations (20 min. each)**

- **Mini-Grids as Valuable Parts of Larger Grids**
P. Nørgaard, T. Cronin (DTU, Denmark) ([Submission-ID 21](#))
- **Technical Connection Requirements and Compliance Assessment in Hybrid Power Systems**
T. Xanthos, F. Kalverkamp, C. Scheefer, B. Schowe-von der Brelie (FGH Zertifizierungsgesellschaft mbH, Germany) ([Submission-ID 67](#))

14:30 – 14:50 **Discussions**

13:50 – 14:50 **SESSION 7B – HYBRID POWER PLANTS**
> Session Chair **Mohamed Helmy (BayWa r.e., Germany)**

13:50 – 14:30 **Presentations (20 min. each)**

- **How Wind, Solar, Storage as an Integrated Renewable Hybrid Solution Can Reliably Match Load Requirements**
A. Wulff (GE Renewable Energy, France) ([Submission-ID 5](#))
- **Enhanced Features of Wind-Based Hybrid Power Plants**
K. Das, A. D. Hansen, D. Vangari, M. Koivisto, P. E. Sørensen (DTU, Denmark), M. Altin (Izmir Institute of Technology, Turkey) ([Submission-ID 40](#))

14:30 – 14:50 **Discussions**

14:50 – 15:10 **COFFEE BREAK**

15:10 – 16:10	SESSION 8 – CLOSING SESSION
> Session Chair	Nick Miller (HickoryLedge, USA)
15:10 – 15:40	Panel discussion
Hybrid Power SYSTEMS – What is needed for the future	
Panelists:	
<ul style="list-style-type: none"> - Thomas Ackermann (Energynautics, Germany) - Katherine Dykes (DTU, Denmark) - Vahan Gevorgian (NREL, USA) - Philipp Kunze (BayWa r.e., Germany) 	
More TBA	
15:40 – 16:10	Discussions