



PROGRAM

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TIMETABLE SOLAR INTEGRATION WORKSHOP

Sunday, 20 Oct. 2013		Monday, 21 October 2013		Tuesday, 22 October 2013						
Tutorials		Solar Workshop Day 1		Solar Workshop Day 2						
		08:00 – 09:00	Foyer C 1 st floor	08:00 – 09:40	Room Bartholomew	Room Harpley				
			Registration		SESSION 5a: International Market Issues	SESSION 5b: PV Modeling				
		09:00 – 09:10	Room Bartholomew & Harpley	09:00 – 11:10	<i>Coffee Break</i> 09:40 – 10:00					
			OPENING: Welcome and Introduction							
		09:10 – 10:50	Room Bartholomew & Harpley	10:00 – 11:10	Room Bartholomew	Room Harpley	10:00 – 11:10	Room Bartholomew	Room Harpley	
			SESSION 1: Keynote Session		SESSION 6a: Solar Forecasting II	SESSION 6b: Future European Power System with a High Share of Renewables				
				<i>Coffee Break & Poster Session</i> 10:50 – 11:20				<i>Coffee Break</i> 11:10 – 11:30		
11:20 – 13:00	Room Bartholomew	Room Harpley	11:30 – 12:15	Room Bartholomew & Harpley		SESSION 7: Closing Session - Podium Discussions				
	SESSION 2a: Experiences with Large-Scale Integration of Solar Power into Power Systems	SESSION 2b: Solar Power and Storage								
		<i>Lunch 13:00 – 14:00</i> (Atrium -2)				<i>Lunch 12:15 – 13:15</i> (Atrium -2)				
13:00 – 17:00	Room Prescott 1 st floor	Room Bartholomew	Room Harpley	13:00 – 17:20	Room Trinity		12th Wind Integration Workshop Day 1			
	Solar Tutorials	SESSION 3a: PV and Distribution Grids	SESSION 3b: Power System Operation Issues					13:00 – 17:00	Room Bartholomew & Harpley	
		<i>Coffee Break & Poster Session</i> 15:40 – 16:00								
		Room Bartholomew	Room Harpley					Room Bartholomew & Harpley		
	SESSION 4a: PV and Smart Grids	SESSION 4b: Solar Forecasting I	First European PV GRID Forum							
		Restaurant at Grange Tower Bridge Hotel								
		Solar Dinner								

MONDAY, 21 OCTOBER 2013

- 08:00 – 09:00 Registration
09:00 – 09:10 Opening: Welcome and Introduction, Thomas Ackermann

09:10 – 10:50	SESSION 1: KEYNOTE SESSION
> Session Chair	Thomas Ackermann (Energynautics, Germany)
09:10 – 10:30	Presentations (20 min. each):
	<ul style="list-style-type: none">• TBA TBA• PV Positioning as a Major Player in the Electricity Sector - Market and Technology Trends F. Thies (EPIA, Belgium) (SIW13-1045)• PV Evolution and Coming Challenges from a German TSO Perspective A. J. Gesino (TenneT TSO, Germany)• Italian experience with PV integration R. Lama (Enel Distribution, Italy)
10:30 – 10:50	Discussions

- 10:50 – 11:20 Coffee Break & Poster Session

11:20 – 13:00	SESSION 2A: EXPERIENCES WITH LARGE-SCALE INTEGRATION OF SOLAR POWER INTO POWER SYSTEMS
> Session Chair	TBA!
11:20 – 12:40	Presentations (16 min. each):
	<ul style="list-style-type: none">• Evaluation of Technical Solutions for a Large Scale Integration of PV in European Distribution Grids M. Vandenberg, V. Helmbrecht, D. Craciun (DERlab, Germany), H. Loew (BSW, Germany), R. Lama (Enel Distribution, Italy), R. Hermes (RWE Deutschland, Germany), M. Reking, G. Concas (EPIA, Belgium), P. M. Sonvilla (Eclareon, Germany) (SIW13-1035)• Inverter-Based Voltage Control with Reactive Power: Large-Scale Deployment Results C. Dierckxsens, K. De Brabandere, O. Gammoh, (3E, Belgium), B. Bletterie (AIT, Austria), W. Deprez (Infrax, Belgium), Y. T. Fawzy (SMA Solar Technology, Germany), B. Uljanić, B. Blažič, (University of Ljubljana, Slovenia), A. Woyte (3E, Belgium) (SIW13-1026)• Examining the Development of Non-Controllable Photovoltaic and Decentralized Generation Capacity in the Context of Balancing the German Power System K. Burges, M. Doering, R. Kuwahata, G. Papaefthymiou, (Ecofys Germany, Germany) (SIW13-1089)• Solar Power and the Future of the Grid A. Galiteva (Renewables 100 Policy Institute, USA) (SIW13-1051)• Costs and Benefits of Fossil-Fueled Plant Flexibility D. Lew, G. Brinkman, G. Stark (NREL, USA), G. Jordan, S. Venkataraman (GE Energy, USA), N. Kumar, S. Lefton (Intertek-APTECH, USA) (SIW13-1047)
12:40 – 13:00	Discussions

11:20 – 13:00 **SESSION 2B: SOLAR POWER AND STORAGE**
> Session Chair TBA!

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

- **Evaluating the Benefits of Storage in Low Voltage Distribution Systems with High PV Penetration**
J.-D. Schmidt, E. Tröster (Energynautics, Germany) (SIW13-1093)
- **Domestic Photovoltaic Systems, Battery Storage, and the Economic Impact of Time-of-use Electricity Pricing**
E. McKenna, M. Thomson (Loughborough University, United Kingdom) (SIW13-1010)
- **Increasing the Share of PV by a Factor of 2-3 over the Self-use Limit Through Urban Electricity-to-thermal Conversion Schemes**
P. Lund, J. Mikkola (Aalto University, Finland) (SIW13-1046)
- **Modelling Concentrating Solar Power with Thermal Energy Storage for Integration Studies**
M. Hummon, P. Denholm, J. Jorgenson, M. Mehos (NREL, USA) (SIW13-1037)

12:40 – 13:00 **Discussions**

13:00 – 14:00 **Lunch Break**

14:00 – 15:40 **SESSION 3A: PV AND DISTRIBUTION GRIDS**
> Session Chair TBA!

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

- **The Impact of Low Voltage Disconnection of Distributed PV on Bulk Electricity System Reliability**
A. Tuohy, A. Gaikwad, J. Taylor, D. Brooks (Electric Power Research Institute, USA) (SIW13-1030)
- **Meeting Utility Step Voltage Change Requirements by Providing Precise Voltage Control for a PV Plant on a Distribution Feeder**
J. Diaz de Leon II (AMSC, USA), B. L. Agrawal (Arizona Public Service, USA) (SIW13-1012)
- **Technical Assessment of On-Load Tap-Changers in Flemish LV Distribution Grids**
N. Efkarpidis, C. Gonzalez, T. Wijnhoven, D. Van Dommelen, T. De Rybel, J. Driesen (KU Leuven, Belgium) (SIW13-1013)
- **Probabilistic Tool Based on Smart Meters Data to Evaluate the Impact of Distributed Photovoltaic Generation on Voltage Profiles in LV Grids**
V. Klonari, F. Vallée (University of Mons, Belgium), O. Durieux (ORES, Belgium), J. Lobry (University of Mons, Belgium) (SIW13-1004)

15:20 – 15:40 **Discussions**

14:00 – 15:40 **SESSION 3B: POWER SYSTEM OPERATION ISSUES**
> Session Chair TBA!

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

- **Pool of Photovoltaic Systems Delivering Control Reserve**
M. Jansen, M. Speckmann (Fraunhofer IWES, Germany), A. von Harpe, M. Hahler (Enerparc, Germany) (SIW13-1000)
- **Primary Frequency Control through Grid Connected Photovoltaic Active Generator**
A. N. Azmi, M. Kolhe (University of Agder, Norway) (SIW13-1077)
- **PV Generation Capacity Reserve for Intermittency Mitigation and Revenue Maximization**
K. Papastergiou (Formerly ABB Corporate Research, Sweden), N. Efkarpidis (ABB Corporate Research, Sweden) (SIW13-1042)
- **Variability Analysis and Cycling Impacts of Solar PV in the Southwest United States**
A. Tuohy, E. Lannoye (EPRI, Ireland), C. Hansen (Sandia National Laboratories, USA), N. Troy (Electroroute Market Access, Ireland) (SIW13-1027)

15:20 – 15:40 **Discussions**

15:40 – 16:00 Coffee Break & Poster Session

16:00 – 17:20	SESSION 4A: PV AND SMART GRIDS
> Session Chair	TBA!
16:00 – 17:00	Presentations (20 min. each):
	<ul style="list-style-type: none">• Active Distribution System Management J. Alvarez Fernandez (Eurelectric, Belgium), J. Tello Guijarro (Gas Natural Fenosa, Spain), P. Mandatova (Eurelectric, Belgium), D. Treballe (Gas Natural Fenosa, Spain) (SIW13-1091)• Assessing the Potential Role of Large-Scale PV Generation and Electric Vehicles in Future Low-Carbon Electricity Industries P. Vithayasrichareon, G. Mills, I MacGill (University of New South Wales, Australia) (SIW13-1058)• A New Measurement Technology for Solar Integration from the U.S.A. ARPA-E Program A. McEachern (Power Standards Lab, USA) (SIW13-1076)
17:00 – 17:20	Discussions

16:00 – 17:20	SESSION 4B: SOLAR FORECASTING I
> Session Chair	TBA
16:00 – 17:05	Presentations (16 min. each):
	<ul style="list-style-type: none">• Synthetic High-Frequency Solar Photovoltaic Data to Meet Grid Compliance J. D. Frank, P. Beaucage, M. C. Brower, M. Grammatico (AWS Truepower, United States) (SIW13-1088)• Downscaling Solar Power Output to 4-Seconds for Use in Integration Studies M. Hummon, A. Weekley, K. Searight, K. Clark (NREL, USA) (SIW13-1038)• PV Forecasting Confidence Intervals for Reserve Planning and System Operation P. Kreutzkamp, O. Gammoh, K. De Brabandere (3E, Belgium), M. Rekingier (EPIA, Belgium) (SIW13-1034)• Cross-Correlation of Photovoltaic Output Fluctuation in Power System Operation for Large-Scale Photovoltaic Integration Y. Ikeda (Kyoto University, Japan), K. Ogimoto (University of Tokyo, Japan) (SIW13-1023)
17:05 – 17:20	Discussions

19:00 Solar Workshop Conference Dinner

TUESDAY, 22 OCTOBER 2013

08:00 – 9:40	SESSION 5A: INTERNATIONAL MARKET ISSUES
> Session Chair	TBA!
08:00 – 9:20	Presentations (20 min. each):
	<ul style="list-style-type: none">• The Market Value of Solar PV L. Hirth (Vattenfall, Germany) (SIW13-1066)• Solar Integration in Australia's Electricity Market J. Gilmore, B. Vanderwaal, I. Rose (ROAM Consulting, Australia) (SIW13-1021)• 100% Renewables in Australia - Will a Capacity Market be Required? J. Riesz, I. MacGill (University of New south Wales, Australia) (SIW13-1020)• Optimized Residential Loads Scheduling Based on Dynamic Pricing of Electricity: A Simulation Study C. Ogwumike, A. Modibbo, M. Denai (Teesside University, United Kingdom) (SIW13-1069)
09:20 – 9:40	Discussions

08:00 – 9:40 **SESSION 5B: PV MODELING**
> Session Chair TBA!

08:00 – 9:20 **Presentations (20 min. each):**

- **PV Modelling for Generation Adequacy Studies**
J. Usaola, V. Ramírez-Jusdado (Universidad Carlos III, Spain), T. Gafurov, M. Prodanovic (IMDEA Eney, Spain) (SIW13-1014)
- **Measurement Based PV Inverter Modelling and Verification**
Z. Fan, T. Gehlhaar (Germanischer Lloyd, Germany), J. Huang, M. Liu (CEPRI, China) (SIW13-1001)
- **Quasi Steady-State Modelling of Low-Voltage Connected Photovoltaic Systems for Analysing Distribution Feeder Behaviour During Faults**
B. G. Rawn (KU Leuven, Belgium), S. Torres Romo (Prolec GE, Mexico), M. Gibescu, M. van der Meijden (Delft University of Technology, the Netherlands) (SIW13-1063)
- **Active Power Reserves Evaluation in Large Scale PVPPs**
B.-I. Crăciun, T. Kerekes, D. Sera, R. Teodorescu (Aalborg University, Denmark), U. D. Annakkage (University of Manitoba, Canada) (SIW13-1078)

09:20 – 9:40 **Discussions**

9:40 – 10:00 **Coffee Break**

10:00 – 11:10 **SESSION 6A: SOLAR FORCASTING II**
> Session Chair TBA!

10:00 – 10:50 **Presentations (16 min. each):**

- **Metrics for Evaluating the Accuracy of Solar Power Forecasting**
J. Zhang, B.-M. Hodge, A. Florita (NREL, USA), S. Lu, H. F. Hamann (IBM TJ Watson Research Center, USA), V. Banunarayanan (U.S. Department of Energy) (SIW13-1036)
- **Towards a Multi-time-scale Integrated Solar Forecast System**
P. Beaucage, J. D. Freedman (AWS Truepower, USA), J. Zack (MESO, USA), J. Kleissl, B. Urquhart, I. Gohari (UC San Diego, USA), A. Kankiewicz (Clean Power Research, USA) (SIW13-1075)
- **Farm-scale Operational Solar Power Forecasting: Assessment of Hybrid Physical and Numerical Forecasting Methodologies**
S. Siblot, B. Graff, A. Falgon, A. Ben Daoud, G. Bontron (Compagnie Nationale du Rhône, France) (SIW13-1056)

10:50 – 11:10 **Discussions**

10:00 – 11:10 **SESSION 6B: FUTURE EUROPEAN POWER SYSTEM WITH HIGH SHARE RENEWABLES**
> Session Chair TBA

10:00 – 10:50 **Presentations (16 min. each):**

- **Overview Over the Regulatory Approaches for the Integration of Solar Power in Europe**
D. Fouquet, J. V. Nysten (Becker Büttner Held, Belgium) (SIW13-1008)
- **Quantifying the Cost of Integrating Photovoltaics into the Future European Union Electricity System**
D. Pudjianto, P. Djapic, J. Dragovic, G. Strbac (Imperial College London, United Kingdom) (SIW13-1040)
- **Transmission Network Loading in Europe with High Shares of Renewables**
T. Brown (Energynautics) (SIW13-1094)

10:50 – 11:10 **Discussions**

11:10 – 11:30 Coffee Break

11:30 – 12:15	SESSION 7: CLOSING SESSION-PODIUM DISCUSSIONS
> Session Chair	TBA
11:30 – 12:10	
<ul style="list-style-type: none">• Podium discussions	
Participants: TBA	
12:10 – 12:15	Closing Remarks

12:15-13:15 Lunch

13:00 Start Wind Integration Workshop

13:00 Start of the First European PV GRID Forum

CONFIRMED POSTER PRESENTATIONS

- **Development of a Tool for Prediction of the PV Electricity Production Based on Optical-thermal Model**
G. Caruso (Altran Research, France), V. Bourdin (LIMSI-CNRS, France), P. Hoang, V. Archambault (Altran Research, France) [\(SIW13-1007\)](#)
- **Analysis of Correlation Between Wind Generation and Potential PV Generation in Northern Poland**
M. Bajor (Institute of Power Engineering Gdansk, Poland) [\(SIW13-1022\)](#)
- **A Demonstrative Example of Photovoltaic Integration into Industrial Parks: Endering European Project**
A. Molina-García (Polytechnical University of Cartagena, Spain), J. M. Paredes (Technologic Centre for Energy and Environment, Spain), T. García-Egea (Catholic University San Antonio, Spain), R. Martínez-Sánchez (External technical consultant - COII Region of Murcia, Spain) [\(SIW13-1025\)](#)
- **A Solar and Wind Integrated Forecast Tool (SWIFT) Designed for the Management of Renewable Energy Variability on Island Grid Systems**
J. W. Zack, J. D. Freedman (AWS Truepower, USA), D. Nakafuji (Hawaiian Electric Company, USA) [\(SIW13-1032\)](#)
- **Power Flow Efficiency of a DC Distribution Grid - A test case with a High Penetration of Renewable Energy Resources in Different Operational Modes**
T. D. Mai, J. Tant, J. Driesen (KU Leuven, Belgium) [\(SIW13-1043\)](#)
- **Study on Gray-box Modelling and Parameter Identification of Grid-connected PV Inverter**
L.-N. Qu (China Electric Power Research Institute CEPRI, China), L. Yin (Ningxia Electric Power Company, China), M.-M. Sun (China Electric Power Research Institute CEPRI, China), R.-Y. Huang (Ningxia Electric Power Company, China) [\(SIW13-1044\)](#)
- **Customer Behavior Model for Load Adjustment and Tariff Forming**
S. Pflugradt, A. Arnoldt, O. Warweg, P. Bretschneider (Fraunhofer IOSB-AST, Germany) [\(SIW13-1062\)](#)
- **Statistical Assessment of the Impact of the Power Dependence Structure on the ESS Requirements of Islanded Microgrids**
G. Díaz, J. Coto, J. Gómez-Aleixandre, A. Diez (University of Oviedo, Spain) [\(SIW13-1070\)](#)
- **Opportunities for Large Scale Solar Photovoltaic Systems in Swedish Multi-family Housing**
N. Sommerfeldt (KTH, Sweden) [\(SIW13-1074\)](#)
- **Response of Low Voltage Networks with High Penetration of Photovoltaic Systems to Transmission Network Faults**
J. C. Boemer, K. Skaloumpakas, M. Gibescu, M. A.M.M. van der Meijden (Delft University of Technology, the Netherlands), W. L. Kling (Eindhoven University of Technology, the Netherlands) [\(SIW13-1081\)](#)
- **Lead-acid Battery Degradation Mechanisms in PV Systems**
W. Merrouche (CDER, Algeria), M. Kasser (ENP, Algeria), M. Trari (USTHB, Algeria), N. Achaibou, B. Bouzidi (CDER, Algeria) [\(SIW13-1082\)](#)
- **Decoupling and Control of Real and Reactive Power in Grid-Connected Photovoltaic Power System**
T. Allaoui (University of Tiaret, Algeria), M. Denaï (Teesside University, United Kingdom) [\(SIW13-1083\)](#)
- **Assumptions and Approximations Typically Applied in Modelling LV Networks with high Penetrations of Low Carbon Technologies**
A. J. Urquhart, M. Thomson (Loughborough University, United Kingdom) [\(SIW13-1092\)](#)