3rd Solar Integration Workshop
International Workshop on Integration of Solar Power into Power Systems

21 - 22 October 2013 | London, UK
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Session 1: Keynote Session

09:00 – 10:50 / 21 October 2013 / Room Bartholomew&Harpley / Session chair: Thomas Ackermann (Energynautics, Germany)

TBA

PV Positioning as a Major Player in the Electricity Sector - Market and Technology Trends
F. Thies (EPIA, Belgium)

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)

Session 2A: Experiences with Large-scale Integration of Solar Power into Power Systems

11:20 – 13:00 / 21 October 2013 / Room Bartholomew / Session chair: Charles Smith (UVIG, USA)

Evaluation of Technical Solutions for a Large Scale Integration of PV in European Distribution Grids
M. Vandenbergh, V. Helmbrecht, D. Craiciun (DERlab, Germany), H. Loew (BSW, Germany), R. Lama (Enel Distribution, Italy), R. Hermes (RWE Deutschland, Germany), M. Rekinger, G. Concas (EPIA, Belgium), P. M. Sonvilla (Eclareon, Germany)

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. Užjanić, B. Blažič (University of Ljubljana, Slovenia), A. Woyte (3E, Belgium)

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)

Solar Power and the Future of the Grid
A. Galiteva (Renewables 100 Policy Institute, USA)

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)

Session 2B: Solar Power and Storage

11:20 – 13:00 / 21 October 2013 / Room Harpley / Session chair: Julio Usaola (University Carlos III, Spain)

Evaluating the Benefits of Storage in Low Voltage Distribution Systems with High PV Penetration
J.-D. Schmidt, E. Tröster (Energynautics, Germany)

Domestic Photovoltaic Systems, Battery Storage, and the Economic Impact of Time-of-use Electricity Pricing
E. McKenna, M. Thomson (Loughborough University, United Kingdom)

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)

Modelling Concentrating Solar Power with Thermal Energy Storage for Integration Studies
M. Hummon, P. Dentholm, J. Jorgenson, M. Mehos (NREL, USA)
Session 3A: PV and Distribution Grids

14:00 – 15:40 / 21 October 2013 / Room Bartholomew / Session chair: Jens Bömer
(TU Delft, the Netherlands)

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)

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)

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)

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)

Session 3B: Power System Operation Issues

14:00 – 15:40 / 21 October 2013 / Room Harpley / Session chair: Helge Urdal
(National Grid, United Kingdom)

Pool of Photovoltaic Systems Delivering Control Reserve
M. Jansen, M. Speckmann (Fraunhofer IWES, Germany), A. von Harpe, M. Hahler (Enerparc, Germany)

Primary Frequency Control through Grid Connected Photovoltaic Active Generator
A. N. Azmi, M. Kolhe (University of Agder, Norway)

PV Generation Capacity Reserve for Intermittency Mitigation and Revenue Maximization
K. Papastergiou (Formerly ABB Corporate Research, Sweden), N. Efkarpidis (ABB Corporate Research, Sweden)

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)

Session 4A: PV and Smart Grids

16:00 – 17:20 / 21 October 2013 / Room Bartholomew / Session chair: Nis Martensen
(Energynautics, Germany)

Active Distribution System Management
J. Alvarez Fernandez (Eurelectric, Belgium), J. Tello Guijarro (Gas Natural Fenosa, Spain), P. Mandatova (Eurelectric, Belgium), D. Trebolle (Gas Natural Fenosa, Spain)

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)

A New Measurement Technology for Solar Integration from the U.S.A. ARPA-E Program
A. McEachern (Power Standards Lab, USA)
Session 4B: Solar Forecasting I
16:00 - 17:20 / 21 October 2013 / Room Harpley / Session chair: TBA

Synthetic High-Frequency Solar Photovoltaic Data to Meet Grid Compliance
J. D. Frank, P. Beaucage, M. C. Brower, M. Grammatico (AWS Truepower, United States)

Downscaling Solar Power Output to 4-Seconds for Use in Integration Studies
M. Hummon, A. Weekley, K. Searight, K. Clark (NREL, USA)

PV Forecasting Confidence Intervals for Reserve Planning and System Operation
P. Kreutzkamp, O. Gammoh, K. De Brabandere (3E, Belgium), M. Rekinger (EPIA, Belgium)

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)

Session 5A: International Market Issues
08:00 - 09:40 / 22 October 2013 / Room Bartholomew / Session chair: Eoghan McKenna
(Loughborough University, United Kingdom)

The Market Value of Solar PV
L. Hirth (Vattenfall, Germany)

Solar Integration in Australia's Electricity Market
J. Gilmore, B. Vanderwaal, I. Rose (ROAM Consulting, Australia)

100% Renewables in Australia - Will a Capacity Market be Required?
J. Riesz, I. MacGill (University of New south Wales, Australia)

Optimized Residential Loads Scheduling Based on Dynamic Pricing of Electricity: A Simulation Study
C. Ogwumike, A. Modibbo, M. Denai (Teesside University, United Kingdom)

Session 5B: PV Modelling
08:00 - 09:40 / 22 October 2013 / Room Harpley / Session chair: TBA

PV Modelling for Generation Adequacy Studies
J. Usaola, V. Ramirez-Jusdado (Universidad Carlos III, Spain), T. Gafurov, M. Prodanovic (IMDEA Energy, Spain)

Measurement Based PV Inverter Modelling and Verification
Z. Fan, T. Gehilhaar (Germanischer Lloyd, Germany), J. Huang, M. Liu (CEPRI, China)

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 Roma (Prolec GE, Mexico), M. Gibescu, M. van der Meijden (TU Delft, the Netherlands)

Active Power Reserves Evaluation in Large Scale PVPPs
B.-l. Craciun, T. Kerekes, D. Sera, R. Teodorescu (Aalborg University, Denmark), U. D. Annakkage (University of Manitoba, Canada)
Session 6A: Solar Forecasting II

10:00 – 11:10 / 22 October 2013 / Room Bartholomew / Session chair: Marissa Hummon (NREL, USA)

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)

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)

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)

Session 6B: Future European Power System with High Share Renewables

10:00 – 11:10 / 22 October 2013 / Room Harpley / Session chair: Phil Lawton (National Grid, United Kingdom)

Overview Over the Regulatory Approaches for the Integration of Solar Power in Europe
D. Fouquet, J. V. Nysten (Becker Büttner Held, Belgium)

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)

Transmission Network Loading in Europe with High Shares of Renewables
T. Brown (Energynautics)

Session 7: Closing Session - Podiums Discussions

11:30 – 12:15 / 22 October 2013 / Room Bartholomew & Harpley / Session chair: TBA

Podium discussions - Participants:

The contributions and discussions of this session are not part of the proceedings.

Poster Session Papers

Workshop Participants