

# 11<sup>th</sup> Solar & Storage Integration Workshop

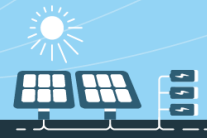
International Workshop on Integration  
of Solar Power and Storage  
into Power Systems

VIRTUAL  
&  
ON-SITE!

28 SEP 2021

 BERLIN  
GERMANY

organized by **energynautics**



## PRELIMINARY PROGRAM AS OF 27 SEPTEMBER 2021

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

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# TIMETABLE 11<sup>TH</sup> SOLAR & STORAGE INTEGRATION WORKSHOP

TUESDAY, 28 SEPTEMBER 2021	
SOLAR & STORAGE INTEGRATION WORKSHOP	
08:00 – 09:00	FOYER
	REGISTRATION
09:00 – 09:20	MOA 5
	OPENING: WELCOME AND INTRODUCTION
09:20 – 11:00	MOA 5
	SESSION 1: KEYNOTE SESSION
COFFEE BREAK (20 MIN)	
11:20 – 13:00	MOA 5
	SESSION 2A: PV AS AN ANCILLARY SERVICE PROVIDER – LABORATORY AND FIELD EXPERIENCES FROM DIFFERENT IEA PVPS COUNTRIES
	MOA 4
	SESSION 2B: ENERGY TRANSITION ASPECTS
LUNCH (60 MIN)	
14:00 – 16:00	MOA 5
	SESSION 3A: GRID FORMING ASPECTS
	MOA 4
	SESSION 3B: INNOVATIONS AND REGULATIONS
COFFEE BREAK (15MIN)	
16:15 – 18:00	MOA 5
	SESSION 4A: POWER SYSTEM ISSUES
	MOA 4
	SESSION 4B: FORECASTING AS WELL AS SYSTEM ASPECTS
18:00-18:45	MOA 5
	SESSION 5 PODIUM DISCUSSION & CLOSURE
18:45	NETWORKING RECEPTION (MOA BAR)

## TUESDAY, 28 SEPTEMBER 2021

### 08:00 – 09:00 On-site Check- in and Registration

All times in the session tables show Central European Summer Times (CEST), the ruby stripes show the starting times of the sessions in additional time zones.

03:00 New York | 04:00 Rio de Janeiro | 08:00 London | 12:30 New Delhi | 14:00 Jakarta | 15:00 Beijing | 16:00 Tokyo | 17:00 Sydney

### 09:00 – 09:20 Welcome

#### 09:20 – 11:00 SESSION 1 – KEYNOTE SESSION

03:20 New York | 04:20 Rio de Janeiro | 08:20 London | 12:50 New Delhi | 14:20 Jakarta | 15:20 Beijing | 16:20 Tokyo | 17:20 Sydney

> Session Chair Thomas Ackermann (Energynautics, Germany)

#### 09:20 – 10:00 Presentations (20 min. each)

- **Connecting the Dots: Distribution Grid Investments to Power the Energy Transition**  
P. Wilczek (Eurelectric, Belgium)
- **Efficiency in Renewables-BESS Hybrid Systems O&M**  
G. Schelling (Hitachi ABB Powergrids, Switzerland) (Submission-ID SIW21-122)
- **Challenges and Opportunities for the Decarbonisation of Power Systems - France, India and Thailand Case Studies**  
C. Hart (IEA, France)

#### 10:20 – 11:00 Discussions

### 11:00 – 11:20 COFFEE BREAK

#### 11:20 – 13:00 SESSION 2A – PV AS AN ANCILLARY SERVICE PROVIDER – LABORATORY AND FIELD EXPERIENCES FROM DIFFERENT IEA PVPS COUNTRIES

05:20 New York | 06:20 Rio de Janeiro | 10:20 London | 14:50 New Delhi | 16:20 Jakarta | 17:20 Beijing | 18:20 Tokyo | 19:20 Sydney

> Session Chair Roland Bründlinger (AIT Austrian Institute of Technology, Austria)

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

- **PV as an Ancillary Service Provider – Laboratory and Field Experiences from IEA PVPS Countries**  
M. Kraiczy, S. Siegl, J. Schütt, G. Arnold, S. Wende von Berg, D. Mende, M. Braun (Fraunhofer IEE, Germany), R. Bründlinger (AIT Austrian Institute of Technology, Austria), G. Heilscher, S. Chen (University of Applied Sciences Ulm, Germany), M. Cauz, L. Perret (PLANAIR, Switzerland) R. Guerrero Lemus (Universidad de la Laguna, Spain), N. Lal (Australian National University, Australia), A. Knobloch, D. Premm (SMA Solar Technology, Germany), C. Bucher (Bern University of Applied Sciences, Switzerland), I. MacGill (University of New South Wales, Australia), A. Jäger-Waldau (European Commission, Joint Research Centre, Ispra, Italy), G. Adinolfi, G. Graditi (Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy) (Submission-ID SIW21-063\_1)
- **Experiences with Frequency Control Services from Wind and Solar PV in Australia**  
I. MacGill, N. Haghdadi (UNSW, Australia)
- **Power Control of Solar PV through Smart Grid Infrastructure in Germany**  
G. Heilscher (Ulm University of Applied Sciences, Germany) (Submission-ID SIW21-063\_2)
- **Case study: Insular Power Systems with Hybrid PV: Application for Ancillary Services on El Hierro**  
R. Guerrero-Lemus, D. Cañadillas, F. Boda (University of La Laguna, Spain) (Submission-ID SIW21-063\_3)

#### 12:40– 13:00 Discussions

<b>11:20 – 13:00</b>	<b>SESSION 2B: ENERGY TRANSITION ASPECTS</b>
<b>05:20 New York   06:20 Rio de Janeiro   10:20 London   14:50 New Delhi   16:20 Jakarta   17:20 Beijing   18:20 Tokyo   19:20 Sydney</b>	
<b>&gt; Session Chair</b>	<b>Peter-Philipp Schierhorn (Energynautics, Germany)</b>
<b>11:20 – 12:40</b>	<b>Presentations (20 min. each)</b>
<ul style="list-style-type: none"> <li>• <b>System Non-Synchronous Penetration (SNSP) Metric and Potential Alternatives in Low-Carbon Grids</b>  <b>J. Eggleston</b> (DigSILENT PACIFIC, Australia), A. Halley (Tasmanian Networks, Australia), P. Mancarella (University of Melbourne, Australia) (<a href="#">Submission-ID SIW21-12</a>)</li> <li>• <b>What Was the Fundamental Cause for the Long-Continued High Market Price in Japan in 2021? – Negative Impact on Japan’s Renewable Energy Policy –</b>  <b>Y. Yasuda</b> (Kyoto University, Japan), H. Matsukubo (Citizens’ Nuclear Information Center, Japan), H. Takahashi (Tsuru University, Japan), K. Oshima (Ryukoku University, Japan) (<a href="#">Submission-ID SIW21-62</a>)</li> <li>• <b>Citizens' Energy Cooperatives: Key Drivers of the Energy Transition in Baden-Wuerttemberg</b>  <b>A. Ensinger</b> (Ueberlandzentrale Woerth / I. Altheim Netz AG, Germany), D. Kern, A. Nagl (Aalen University, Germany), K. Bozem (bozem   consulting associates   munich, Germany), H.-P. Weber (OstalbBürgerEnergie eG, Germany), A. Hoch (Rottenburg University, Germany), D. K. Harrison, B. M. Wood (Glasgow Caledonian University, United Kingdom) (<a href="#">Submission-ID SIW21-11</a>)</li> <li>• <b>International Electrical Interconnection to Unlock Solar Photovoltaic Potential and Accelerate Progress towards Carbon Neutrality in Japan and South Korea</b>  <b>R. Zissler</b> (Tokyo Institute of Technology, Japan), T. Wakeyama (Kyushu University, Japan), J. S. Cross (Tokyo Institute of Technology, Japan) (<a href="#">Submission-ID SIW21-13</a>)</li> </ul>	
<b>12:40 – 13:00</b>	<b>Discussions</b>

## 13:00 – 14:00 LUNCH BREAK

<b>14:00 – 16:00</b>	<b>SESSION 3A - GRID FORMING ASPECTS</b>
<b>08:00 New York   09:00 Rio de Janeiro   13:00 London   17:30 New Delhi   19:00 Jakarta   20:00 Beijing   21:00 Tokyo   22:00 Sydney</b>	
<b>&gt; Session Chair</b>	<b>Eckehard Tröster (Energynautics, Germany)</b>
<b>14:00 – 15:40</b>	<b>Presentations (20 min. each)</b>
<ul style="list-style-type: none"> <li>• <b>Overcurrent Suppression Control for Grid Forming Inverter</b>  <b>T. Narita</b>, S. Sugimori, T. Nakajima (Tokyo City University, Japan), Y. Mitsugi, H. Hashiguchi (Toshiba Mitsubishi-Electric Industrial Systems, Japan) (<a href="#">Submission-ID SIW21-25</a>)</li> <li>• <b>Fault Operation of Grid-forming Converters with Focus on System Stability</b>  <b>N. Wiese</b> (University of Kassel, Germany), D. Duckwitz (University of Kassel   Fraunhofer IEE, Germany), M. Nuschke (Fraunhofer IEE, Germany), Y. Zhang, M. Braun (University of Kassel   Fraunhofer IEE, Germany) (<a href="#">Submission-ID SIW21-77</a>)</li> <li>• <b>Synchronous Energy Storage System with Inertia Capabilities for Angle, Voltage and Frequency Stabilization in Power Grids</b>  <b>A. Knobloch</b>, C. Hardt, A. Falk, T. Buelo, S. Scheurich, C. Khalfet, R. Hesse, T. Becker (SMA Solar Technology, Germany), R. Bhatia (SMA Solar India, India) (<a href="#">Submission-ID SIW21-68</a>)</li> <li>• <b>Cross-Current Power Control for Coordination of Multiple Grid Forming Inverters</b>  <b>S. Sugimori</b>, T. Narita, T. Nakajima (Tokyo City University, Japan), Y. Mitsugi, H. Hashiguchi (Toshiba Mitsubishi Electric Industrial Systems, Japan) (<a href="#">Submission-ID SIW21-26</a>)</li> <li>• <b>Hybridizing Synchronous Condensers with Grid Forming Batteries for PV Integration – a Solution to Enhance Grid Reliability and Resiliency</b>  <b>V. Gevorgian</b> (NREL, USA) (<a href="#">Submission-ID SIW21-95</a>)</li> </ul>	
<b>15:40 – 16:00</b>	<b>Discussions</b>

14:00 – 16:00	SESSION 3B: INNOVATIONS AND REGULATIONS
08:00 New York   09:00 Rio de Janeiro   13:00 London   17:30 New Delhi   19:00 Jakarta   20:00 Beijing   21:00 Tokyo   22:00 Sydney	
> Session Chair	Thomas Ackermann (Energynautics, Germany)
14:00 – 15:40	Presentations (20 min. each)
<ul style="list-style-type: none"> <li>• <b>A Multi-Objective Operational Strategy for a Utility-Scale PV Plus Energy Storage System</b> F. Alsaeed, M. E. Baran (North Carolina State University, USA) (Submission-ID SIW21-30)</li> <li>• <b>Supervisory Optimal Control for Photovoltaics Connected to an Electric Power Grid</b> J. Young (OptimoJoe, USA), W. Weaver (Michigan Technological University, USA), D. G. Wilson (Sandia National Laboratories, USA), R. D. Robinett III (Michigan Technological University, USA)</li> <li>• <b>Application of Dynamic Line Rating for Solar Power Integration</b> R. Kuwahata (Ampacimon, Belgium) (Submission-ID SIW21-117)</li> <li>• <b>Determination of the Voltage and Frequency Dependent Behaviour of Low Voltage Grids – Test Procedure for a Modified Mobile Generator</b> S. Seifried, T. Lechner (University of Applied Sciences Augsburg, Germany), D. Stenzel (Technical University Munich – TUM, Germany), S. Herrmann (AVS Aggregatebau, Germany), G. Kerber (University of Applied Sciences Munich, Germany), K. Schaarschmidt (LEW Verteilnetz, Germany), M. Finkel (University of Applied Sciences Augsburg, Germany), R. Witzmann (Technical University Munich – TUM, Germany) (Submission-ID SIW21-105)</li> <li>• <b>Modelling PV Self-consumption at Portfolio Level</b> S. Karalus, B. Köpfer (Fraunhofer ISE, Germany), P. Guthke (TransnetBW, Germany), S. Killinger, E. Lorenz (Fraunhofer ISE, Germany) (Submission-ID SIW21-34)</li> </ul>	
15:40 – 16:00	Discussions

## 16:00 – 16:15 COFFEE BREAK

16:15 – 18:00	SESSION 4A: POWER SYSTEM ISSUES
10:15 New York   11:15 Rio de Janeiro   15:15 London   19:45 New Delhi   21:15 Jakarta   22:15 Beijing   23:15 Tokyo   00:15 Sydney	
> Session Chair	Nis Martensen (Energynautics, Germany)
16:15 – 17:45	Presentations (18 min. each)
<ul style="list-style-type: none"> <li>• <b>Short-Circuit Analysis of Grid-Connected PV Power Plants Considering Inverter Limits and Grid Support</b> J. Song, M. Cheah-Mane, E. Prieto-Araujo, O. Gomis-Bellmunt (Polytechnical University of Catalonia – UPC, Spain) (Submission-ID SIW21-129)</li> <li>• <b>Real-Time Simulation Modeling for PV-Battery Hybrid System</b> M. Z. Che Wanik, A. P. Sanfilippo (Hamad Bin Khalifa University, Qatar) (Submission-ID SIW21-108)</li> <li>• <b>Multi Services Provided by the coordination Control of Different Storage and FACTS Devices</b> A. Kalms, F. Bouchotrouch, P. Pernaut, M. Estévez (CENER, Spain) (Submission-ID SIW21-28)</li> <li>• <b>Evaluation of Advanced Reserve Sizing Methods Based on RE Variability and Uncertainty</b> S. Miladinova, F. Bourry (Artelia, France) (Submission-ID SIW21-43)</li> <li>• <b>Hybrid-Approach for Unit Commitment Simulation combining a Fundamental Model with a Neural Network</b> H. Sommer, M. Winkelkotte, F. Bauer, P. Bretschneider (TU Ilmenau, Germany) (Submission-ID SIW21-41)</li> </ul>	
17:45 – 18:00	Discussions

16:15 – 17:45 SESSION 4B - FORECASTING AS WELL AS SYSTEM ASPECTS

10:15 New York | 11:15 Rio de Janeiro | 15:15 London | 19:45 New Delhi | 21:15 Jakarta | 22:15 Beijing | 23:15 Tokyo | 00:15 Sydney

> Session Chair Leonard Hülsmann (Energynautics, Germany)

16:15 – 17:15 Presentations (20 min. each)

- **Data Science for Next Generation Renewable Energy Forecasting – Highlight Results from the Smart4RES Project**  
G. Kariniotakis, **S. Camal**, F. Sossan (MINES ParisTech, France), B. Nouri, J. Lezaca (DLR, Germany), M. Lange (EMSYS, Germany), B. Alonzo, Q. Libois (Météo-France, France), P. Pinson (DTU, Denmark), R. Bessa, C. Goncalves (INESC TEC, Portugal) (Submission-ID SIW21-88)
- **A Methodology to Improve the Predictability of Solar Energy Generation with Confirmatory Evidence from Germany**  
**K. F. Forbes** (University College Dublin, Ireland) (Submission-ID SIW21-120)
- **Estimating the Socio-economic Drivers of Residential Photovoltaic Systems Adoption in a Swedish City**  
**U. H. Ramadhani**, B. Tsegai, C. Apelryd, S. Ekbring, J. Munkhammar, J. Widén (Uppsala University, Sweden)  
(Submission-ID SIW21-64)

17:15 – 17:45 Discussions

18:00 – 18:45 SESSION 5 – CLOSING SESSION

12:00 New York | 13:00 Rio de Janeiro | 17:00 London | 21:30 New Delhi | 23:00 Jakarta | 00:00 Beijing | 01:00 Tokyo | 02:00 Sydney

> Session Chair Roland Bründlinger (AIT, Austria)

18:00 – 18:40

- **The Role of Grid Forming Storage and PV Devices in the Future Power System**

Panelists:

- Bernd Engel (TU Braunschweig/SMA, Germany)
- Vahan Gevorgian/Shahil Shah (NREL, USA)
- Debra Lew (ESIG, USA)

18:40– 18:45 Closure

**18:45 – 20:30 Networking Reception (MOA BAR)**