

7th Solar Integration Workshop

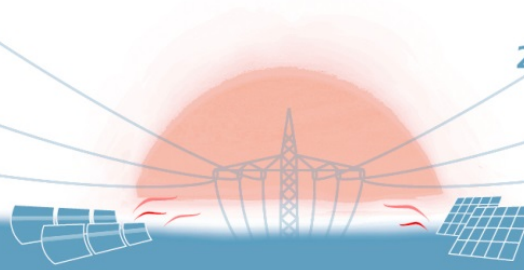
International Workshop on Integration
of Solar Power into Power Systems

24 - 25 October 2017

Berlin, Germany



with Special Topic **STORAGE**



PROGRAM

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TIMETABLE 7th SOLAR INTEGRATION WORKSHOP

TUESDAY, 24 OCTOBER 2017				WEDNESDAY, 25 OCTOBER 2017			
Solar Workshop Day 1				Solar Workshop Day 2			
08:00 – 09:00	FOYER						
	REGISTRATION						
09:00 – 09:10	ROOM XY			09:00 – 10:50	ROOM	ROOM	ROOM
	OPENING: WELCOME AND INTRODUCTION				SESSION 5A: FREQUENCY ISSUES	SESSION 5B: NORTH AMERICAN EXPERIENCE	SESSION 5C: PV AND STORAGE
09:10 – 10:50	ROOM			10:50 – 11:15	COFFEE BREAK (25MIN)		
	SESSION 1: KEYNOTE SESSION						
COFFEE BREAK (30MIN) & POSTER SESSION							
11:20 – 13:00	ROOM	ROOM	ROOM	11:15 – 12:15	ROOM		
	SESSION 2A: FORECASTING I	SESSION 2B: POWER SYSTEM ASPECTS	SESSION 2C: R&D PROJECTS		CLOSING SESSION: PODIUM DISCUSSION		
LUNCH (1H)				LUNCH (1H)			
14:00 – 15:40	ROOM	ROOM	ROOM	13:00 – 17:20	ROOM		
	SESSION 3A: FORECASTING II	SESSION 3B: PV IN DISTRI- BUTION GRIDS I	SESSION 3C: MIRCOGRIDS WITH PV		OPENING SESSION 16 TH WIND INTEGRATION WORKSHOP		
COFFEE BREAK (20MIN) & POSTER SESSION							
16:00 – 17:20	ROOM	ROOM	ROOM				
	SESSION 4A: INTERNATIONAL EXPERIENCE	SESSION 4B: PV IN DISTRI- BUTION GRIDS II	SESSION 4C: REGULATORY AND MARKET ASPECTS				
19:00	POSTER RECEPTION & NETWORKING						

TUESDAY, 24 OCTOBER 2017

08:00 – 09:00 Registration

09:00 – 09:10 Welcome

09:10 – 10:50 SESSION 1 – KEYNOTE SESSION

> Session Chair T. Ackermann (Energynautics, Germany)

09:10 – 10:30 Presentations (xy min. each)

- TBA, Tennet
- Presentation 2: TBA
- Presentation 3: TBA
- Presentation 4: TBA

10:30 – 10:50 Discussions

10:50 – 11:15 COFFEE BREAK

11:15 – 13:00 SESSION 2A – FORECASTING I

> Session Chair Name (Company, Country)

11:15 – 12:35 Presentations (16 min. each)

- **Forecasting PV/CPV at National Level – Portugal Experience**
J. A. Ribeiro Esteves, R. Pestana (REN - State Grid, Portugal) ([Submission-ID SIW17-29](#))
- **Impact of Photovoltaic Yield Forecasting on Future Power System Operations in Japan**
Y. Udagawa (University of Tokyo, Japan | KOZO KEIKAKU ENGINEERING, Japan), K. Ogimoto, J. Fonseca, (University of Tokyo, Japan), H. Ohtake (National Institute of Advanced Industrial Science and Technology, Japan), S. Fukutome (JP Business Service Corporation, Japan) ([Submission-ID SIW17-265](#))
- **Nowcasting of PV power production with high availability under consideration of roof-top PV and self-consumption**
H. Misfeld, J. Kühnert, J. Rosenkranz, U. Focken, M. Lange (energy & meteo systems, Germany) ([Submission-ID SIW17-267](#))
- **Investigating the effect of aggregation on prediction intervals in case of solar power, electricity consumption and net demand forecasting**
D. van der Meer, J. Widén, J. Munkhammar (Uppsala University, Sweden) ([Submission-ID SIW17-81](#))
- **Development of realistic demand profiles to increase PV self-consumption in households**
F. Samweber, B. Kleinertz, C. Schiffelechner (Forschungsstelle für Energiewirtschaft e.V., Germany) ([Submission-ID SIW17-170](#))

12:35 – 13:00 Discussions

11:15 – 13:00	SESSION 2B – POWER SYSTEMS ASPECTS
> Session Chair	Name (Company, Country)
11:15 – 12:35	Presentations (16 min. each)
	<ul style="list-style-type: none"> Derivation of a Q(U)-control tolerance band for inverters in order to ensure system stability M. Schoeneberger, S. Patzack, H. Vennegeerts (Forschungsgemeinschaft für elektrische Anlagen und Stromwirtschaft e.V. (FGH e.V.), Germany) (Submission-ID SIW17-264) Low Voltage Ride-through with High Current Injection A. Falk (SMA Solar Technology, Germany) (Submission-ID SIW17-310) Investigation of Impacts of Solar PV on Transmission System Voltage Stability Considering Load Characteristics and Protection B. Alghamdi (King Abdulaziz University, Saudi Arabia), T. Le, M. Alamri (Chalmers University of Technology, Sweden) (Submission-ID SIW17-218) RES integration study and secured system operation under high PV penetration in Japan K. Ogimoto (University of Tokyo, Japan), K. Asano, K. Ohbayashi (New Energy and Industrial Technology Department Organization, Japan) (Submission-ID SIW17-212) Voltage Three Phase Unbalance Mitigation by Combination of Distributed and Centralized Control of Photovoltaic H. X. Nguyen, T. Tsuji (Yokohama National University, Japan) (Submission-ID SIW17-97) Interaction analysis of large-scale PV power plants considering the AC network E. Prieto-Araujo, R. Ferrer-San-Jose, O. Gomis-Bellmunt (CITCEA-UPC, Spain) (Submission-ID SIW17-55)
12:35 – 13:00	Discussions

11:15 – 13:00	SESSION 2C – R&D PROJECTS
> Session Chair	Name (Company, Country)
11:15 – 12:35	Presentations (16 min. each)
	<ul style="list-style-type: none"> • The Global electricity network - Feasibility study G. Sanchis, J. Yu (Cigre C1-35, France) (Submission-ID SIW17-20) • e-Highway2050 project: Tomorrow's Grid for Low-Carbon Energy in Europe G. Sanchis (RTE, France) (Submission-ID SIW17-35) • The impact of PV module configurations on transmission and backup needs in a highly renewable European power system K. Chattopadhyay (University of Oldenburg, Germany), A. Kies (Frankfurt Institute for Advanced Studies, Germany) (Submission-ID SIW17-285) • Asymmetrical Fault Generation for Grid Connected Solar Inverter Evaluation R. Hadidi, J. Leonard, C. Fox (Clemson University, Duke Energy eGRID Center, United States), M. McKinney, (The Citadel Electrical Engineering Department, United States) (Submission-ID SIW17-295) • Smart Renewable Hubs: Solar hybridization to achieve high RE penetration in a grid-friendly manner. J. M. Estebarez Pelaez, R. Duran Vicente, A. Rodriguez Rocha (Cobra Instalaciones y Servicios (COBRA), Spain), J. Servert, E. Cerrajero, D. Lopez (Investigación, Desarrollo e Innovación Energética S.L (IDIE), Spain), G. Weinrebe (SBP Sonne (SBP), Germany), E. Sanchez (Fundación Tecnia Research & Innovation (TECNALIA), Spain), A. Vaiani (Centro Elettrotecnico Sperimentale Italiano (CESI), Italy), E. Stavropoulou, M. Kourasi, P. Markopoulos (Hellenic Electricity Distribution Network Operator (HEDNO), Greece), A. Dimeas, R. Gogou (National Technical University of Athens (NTUA), Greece), A. Kofoed-Wiuff (EA ENERGIANALYSE (EA ENERGY), Denmark) (Submission-ID SIW17-241) • BIOSTIRLING-4SKA : A cost effective and efficient approach for a new generation of solar dish-Stirling plants based on storage and hybridization L. Saturnino, D. Rubio (Gonvarri, Spain), I. Calama, F. Caballero (ALENER, Spain), D. Barbosa, P. Andre (University of Lisbon, Portugal), P. Antunes, T. Paixão (University of Aveiro, Portugal), A. van Ardenne, D. Kant, N. Ebbendorf (ASTRON, Netherlands), L. Verdes-Montenegro, E. Garcia, A. Tamayo (IAA-CSIC, Granada, Spain), P. Eskilson, L. Gustavsson, C. Anderson, J. Lindh (Cleanergy, TBA, Sweden), R. Keller, M. Kramer (Max Planck Institute for Radioastronomy, Germany), N. Pfanner (Fraunhofer ISE, Germany) (Submission-ID SIW17-299)
12:35 – 13:00	Discussions
13:00 – 14:00	LUNCH BREAK

14:00 – 15:45	SESSION 3A – FORECASTING II
> Session Chair	Name (Company, Country)
14:00 – 15:30	Presentations (18 min. each)
•	Understanding Spatio-Temporal Solar Forecasting R. Amaro e Silva, M. Centeno Brito (University of Lisbon, Portugal) (Submission-ID SIW17-176)
•	Utility scale solar short term generation forecasting improved dispatch and system security J. Dyson, H. Mackenzie (Dispatch Solutions, Australia), N. Engerer, J. Luffman (Solcast, Australia) (Submission-ID SIW17-138)
•	Country scale solar irradiance forecasting for PV power trading S. Cros, E. Buessler, F. Le Guillou, M. Turpin (Reuniwatt, France) (Submission-ID SIW17-73)
•	Experiences with State Forecasting of Smart Distribution Grids using Solar Generation Forecast F. Paulat, M. Ludwig, K. Korotkiewicz (University of Wuppertal, Germany), X. Le Pivert (Steadysun, France) (Submission-ID SIW17-58)
•	Short-term solar forecasting performance of popular machine learning algorithms A. Florita (National Renewable Energy Laboratory, United States) (Submission-ID SIW17-198)
15:30 – 15:45	Discussions

14:00 – 15:45	SESSION 3B – PV IN DISTRIBUTION GRIDS
> Session Chair	Name (Company, Country)
14:00 – 15:36	Presentations (18 min. each)
•	U-Control – Recommendations for Distributed and Automated Voltage Control in Current and Future Distribution Grids O. Marggraf, S. Laudahn, B. Engel (TU Braunschweig – elenia, Germany), M. Lindner, C. Aigner, R. Witzmann (TU München, Germany), M. Schoeneberger, S. Patzack, H. Vennegeerts (Forschungsgemeinschaft für elektrische Anlagen und Stromwirtschaft e.V.(FGH e.V), Germany), M. Cremer, M. Meyer, A. Schnettler (RWTH Aachen University, Germany), I. Ghourabi, A. Großhans (Netze BW, Germany), T. Bülo (SMA Solar Technology, Germany), J. Brantl, F. Wirtz (Bayerwerk, Germany), R. Frings (Infrawest, Germany), F. Pizzutto (Maschinenfabrik Reinhausen, Germany) (Submission-ID SIW17-157)
•	Coordinating LVRT, AID and area EPS reclosing mechanisms S. Laudahn (TU Braunschweig - elenia, Germany), T. Bülo (SMA Solar Technology, Germany), B. Engel (TU Braunschweig - elenia, Germany) (Submission-ID SIW17-230)
•	Smart Network Control with Coordinated PV Infeed J.D. Schmidt, S. Hempel, E. Tröster, T. Ackermann (Energynautics, Germany) (Submission-ID SIW17-254)
•	Mitigation of Voltage Rise Caused by Intensive PV Development in LV Grid P. Kacejko, P. Pijarski, M. Wancerez (Lublin University of Technology, Poland) (Submission-ID SIW17-278)
•	Integration of PV in Active Distribution Grids Using a Grid Traffic-Light Approach in Combination with a Distribution System State Estimation C. Lakenbrink, K. Volk, C. Kurka, M. Konermann (Netze BW, Germany), D. Groß, P. Wiest, K. Rudion (University of Stuttgart - IEH, Germany) (Submission-ID SIW17-121)
•	Consideration of different features of Photovoltaic Power Plants for an efficient integration in a smart distribution grid M. Modemann, P. Steinbusch, R. Uhlig, M. Zdrallek (University of Wuppertal, Germany), S. Blanaru (SAG CeGIT, Germany), U. Schlüter, W. Friedrich (Phoenix Contact Energy Automation, Germany) (Submission-ID SIW17-156)
15:36 – 15:45	Discussions

14:00 – 15:45	SESSION 3C – MICROGRID WITH PV
> Session Chair	Name (Company, Country)
14:00 – 15:30	Presentations (18 min. each)
	<ul style="list-style-type: none"> • Performance models of renewable energy sources for grid integration studies – Model validation L. Petersen (Aalborg University, Aalborg, Denmark Vestas Wind Systems A/S, Aarhus, Denmark), F. Iov, D.-I. Stroe (Aalborg University, Denmark) (Submission-ID SIW17-98) • Power and Energy Management with Battery Storage for a Hybrid Residential PV-Wind System – A Case Study for Denmark D. Stroe, A-C. Zaharof, F. Iov (Aalborg University, Denmark) (Submission-ID SIW17-276) • Consensus Control of DC Microgrid based on Network Topology S. Chaturvedi (IIT Jodhpur, India) (Submission-ID SIW17-270) • Modelling and Control of Solar-Wind Hybrid System V. Na, V. Mukherjee (Indian Institute of Technology (ISM), India) (Submission-ID SIW17-249) • Optimal Planning and Operation of Hybrid Energy System Supplemented by Storage Devices M. S. Javadi Estahbanati (Islamic Azad University, Iran) (Submission-ID SIW17-286)
15:30 – 15:45	Discussions

15:45 – 16:05 **COFFEE BREAK**

16:05 – 18:25	SESSION 4A – INTERNATIONAL STUDIES AND EXPERIENCE
> Session Chair	Thomas Ackermann (Energynautics, Germany)
16:05 – 18:04	Presentations (17 min. each)
	<ul style="list-style-type: none"> • Greening the Grid: Pathways to Integrate 160 Gigawatts of Wind and Solar Energy into India's Electric Grid D. Palchak, J. Cochran, A. Ehlen, B. McBennett (National Renewable Energy Laboratory, USA), R. Deshmukh, N. Abhyankar (Lawrence Berkeley National Laboratory, USA) (Submission-ID SIW17-62) • Short-term off-river pumped hydro energy storage to support a 100% renewable electricity grid in Australia B. Lu, A. Blakers, M. Stocks (Australian National University, Australia) (Submission-ID SIW17-63) • Optimising the expansion of renewable generation and transmission for the Vietnamese Power System A. Kies (Frankfurt Institute for Advanced Studies, Germany), B. Schyska (University of Oldenburg, Germany ForWind, Germany), D. Thanh Viet (University of Danang, Vietnam), K. Chattopadhyay, L. von Bremen, D. Heinemann (University of Oldenburg, Germany ForWind, Germany), S. Schramm (Frankfurt Institute for Advanced Studies, Germany) (Submission-ID SIW17-287) • Renewable Energy Integration into the Namibian Network. M. Manchen, E. Krige (Nampower, Namibia) (Submission-ID SIW17-119) • Impact of waterworks pumps demand response to increase maximum photovoltaic integration capacity M. Imanaka, Y. Uchiyama, N. Fujii, T. Saito (University of Tokyo, Japan), N. Higa (SMAECO, Japan) (Submission-ID SIW17-266) • A project experience from installing, monitoring and evaluating a new 34 kWp grid-connected PV system in Central Brazil S. Pimentel, E. Marra, W. Nogueira (Federal University of Goias (UFG), Brazil), M. Bousquet (L&M Engenharia e Consultoria, Brazil), A. Neto (JMalucelli Energia, Brazil), A. Rezende (Espora Energetica, Brazil) (Submission-ID SIW17-269) • Challenges of power system planning in the grid integration of solar power in Hambantota, Sri Lanka H.M.W. Banda, U.N. Sanjaya, G.B. Alahendra, G. Abeynayake (Ceylon Electricity Board, Sri Lanka) (Submission-ID SIW17-8)
18:04 – 18:25	Discussions

16:05 – 18:25	SESSION 4B – PV IN DISTRIBUTION GRIDS II
> Session Chair	Name (Company, Country)
16:05 – 18:04	Presentations (17 min. each)
	<ul style="list-style-type: none"> • Technical solutions and control strategies for managing high shares of solar PV systems in distribution grids F. de Nigris (ABB Switzerland, Switzerland Eindhoven University of Technology TU/e, Netherlands), A. Oudalov, A. Timbus (ABB Switzerland, Switzerland), H. Slootweg, N. Blaauwbroek (Eindhoven University of Technology TU/e, Netherlands) (Submission-ID SIW17-129) • Predicting hosting capacity of photovoltaic power production in low-voltage grids using regressive techniques D. van der Meer, J. Andersson, V. Bernström, J. Törnqvist, J. Widén (Uppsala University, Sweden) (Submission-ID SIW17-227) • Integration of Rooftop PV in Urban and Rural Distribution Grids in India P.-P. Schierhorn J.-D. Schmidt, B. Narasimhan, E. Tröster, T. Ackermann (Energynautics, Germany) (Submission-ID SIW17-253) • Automated quantification of PV hosting capacity in distribution networks under user-defined control and optimisation procedures W. Martin, A. Hutter, C. Ballif, P.-J. Alet (CSEM PV-center, Switzerland) (Submission-ID SIW17-238) • Handling high PV penetration and electric vehicle charging in a distribution grid R. Luthander, M. Shepero, J. Widén, J. Munkhammar (Uppsala University, Sweden) (Submission-ID SIW17-75) • Inverter Assisted Fault Identification for Adaptive Relaying in Distribution Systems with high renewable penetration R. Jain (North Carolina State University, United States) (Submission-ID SIW17-146)
18:05 – 18:25	Discussions

16:05 – 18:20	SESSION 4C – REGULATORY AND MARKET ASPECTS
> Session Chair	Name (Company, Country)
16:05 – 17:53	Presentations (18 min. each)
	<ul style="list-style-type: none"> • EMPOWER - A network market approach for local energy trade and renewable electricity system integration B. Bremdal, J. Rajasekharan (Smart Innovation Norway Norwegian Centre of Expertise Smart Energy Markets, Norway), P. Olivella (Polytechnical University of Catalonia - UPC, Spain) (Submission-ID SIW17-104) • Time and Locational Value of PV on Distribution Feeders in Spain A.O'Connell, B. Rogers, J. Roark, J. Smith (Electric Power Research Institute, Ireland) (Submission-ID SIW17-300) • Economics of Flexible Generation of Conventional Power Plants in California P. Besuner (Component Reliability Consultants, USA) (Submission-ID SIW17-272) • Comparison of Different Photovoltaic Models in a Capacity Credit Evaluation P. Tapetado, J. Usaola (University Carlos III Madrid, Spain) (Submission-ID SIW17-233) • Impact of technology development on the market for residential PV systems - techno-economic implications of storage and smart meters M. Döring, K. Burges (Ecofys Germany, Germany), F. Lobas-Funck, S. Laudahn, C. Reinhold (Brunswick University of Technology, Germany) (Submission-ID SIW17-228) • Remuneration of controllable reactive power inside so far free-of charge ranges: Cost-Benefit Analysis E. Kämpf, M. Braun (Fraunhofer IWES, Germany Universität Kassel, Germany), B. Ernst (Fraunhofer IWES, Germany) (Submission-ID SIW17-168)
17:53 – 18:20	Discussions

18:30 POSTER SESSION & NETWORKING

09:00 – 10:50	SESSION 5A – FREQUENCY ISSUES
> Session Chair	Name (Company, Country)
09:00 – 10:30	Presentations (18 min. each)
	<ul style="list-style-type: none"> An Experimental Study on P-f and Q-V Droop Control of Photovoltaic Power Generation Contributing to Grid Frequency Operation Y. Kimpapa, M. Kurimoto (Nagoya University, Japan), Y. Manabe, T. Funabashi, T. Kato (Nagoya University, Japan) (Submission-ID SIW17-108) Mitigating Frequency Fluctuations in Power Grids with High Photovoltaic Penetration: AGC30 Model Case Study A. Dawuda, T. Oyama (Yokohama National University, Japan) (Submission-ID SIW17-100) Distributed grid forming inverters in power grids P. Unruh (Fraunhofer IWES, Germany) (Submission-ID SIW17-240) On Frequency Stability in the Future Renewable Nordic Power System with Gas Sector Integration J. Ikäheimo, J. Kiviluoma (VTT Technical Research Centre of Finland, Finland) (Submission-ID SIW17-120) Real Time Simulation for Evaluation of Frequency support from distributed hybrid PV-Storage System I. Ibrahim (University College Dublin, Ireland) (Submission-ID SIW17-242)
10:30 – 10:50	Discussions

09:00 – 10:50	SESSION 5B – NORTH AMERICAN EXPERIENCE
> Session Chair	Name (Company, Country)
09:00 – 10:36	Presentations (16 min. each)
	<ul style="list-style-type: none"> Pre-event Planning, Real-time Forecasting and Post-event Analysis of the Impact of the Aug 21, 2017 Solar Eclipse on Renewable Generation In California J. Zack (AWS Truepower, USA) (Submission-ID SIW17-258) Presentation TBA Nick Miller (GE, USA) Renewable Electricity Futures Study: Operational Analysis with Very High Wind and Solar Penetrations G. Brinkman, J. Novacheck (NREL, United States) (Submission-ID SIW17-135) Anonymous Solar Forecasting Trial Outcomes E. Lannoye (EPRI International, Ireland), A. Tuohy (EPRI, USA), J. Sharp (Sharply Focused, Portland, USA), P. Markham, Q. Wang (EPRI, United States) (Submission-ID SIW17-126) Using Probabilistic Renewable Forecasts to Determine Reserve Requirements E. Lannoye, E. Ela, A. Tuohy, R. Enriken (EPRI, Knoxville, USA), R. Philbrick (Polaris Systems Optimization, USA) (Submission-ID SIW17-125) The potential for energy storage to be used for pollution control under the United States Clean Air Act K. Wadsack, T. Acker (Northern Arizona University, United States) (Submission-ID SIW17-48)
10:36 – 10:50	Discussions

09:00 – 10:50	SESSION 5C –PV AND STORAGE
> Session Chair	Name (Company, Country)

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

- **Sharing Economy: multi-use community electric storages for economical PV-integration**
A.Bogensperger, S. Köppl, F. Samweber (Forschungsstelle für Energiewirtschaft e. V., Germany) (Submission-ID SIW17-22)
- **Design of Residential and Community Level Storage Systems Combined with Photovoltaics (PV)**
S. Afxentis, M. Florides (University of Cyprus (UCY), Cyprus), P. Norgaard, H. Bindner (Technical University of Denmark (DTU), Denmark), J. Kathan, H. Brunner, C. Mayr (Austrian Institute of Technology (AIT), Austria), C. Anastassiou, V. Efthymiou, G. E. Georghiou (University of Cyprus (UCY), Cyprus) (Submission-ID SIW17-166)
- **Overcoming grid connection limitations of PV plants in distribution networks with battery storage systems**
P. Chodura, M. Verburg, M. van Melzen (DNV GL, Arnhem, Netherlands) (Submission-ID SIW17-41)
- **Development of a Grid-Friendly Active Power Control of PV-Batteries using Rolling Forecasts**
C. Schweinsberg, J.-D. Schmidt, E. Tröster (Energynautics, Germany) (Submission-ID SIW17-252)

10:20 – 10:50 Discussions

10:50 – 11:15 COFFEE BREAK

11:15 – 12:15	SESSION 6 – CLOSING SESSION
> Session Chair	Name (Company, Country)

11:15 – 11:45 Presentations (10 min. each)

Topics addressed:

- TBA

Panelists:

- TBA

11:45 – 12:15 Discussions

12:15 – 14:00 LUNCH

POSTER PRESENTATIONS

- **Maintaining Grid Voltage from Spot Renewable Generation**
F. Cornelius (ABB, Germany), J. A. Kern (ABB, United States), J. Tepper (ABB, Germany) ([Submission-ID SIW17-SIW17-14](#))
- **A novel algorithm to estimate PV module parameters for accurate translation of I-V curves**
P. Maheshwari, K. Jain (PV Diagnostics, India | Indian Institute of Technology Bombay, India) ([Submission-ID SIW17-18](#))
- **Estimation of regional photovoltaic power generation using a geo-stationary satellite, Himawari-8**
F. Uno (National Institute of Advanced Industrial Science and Technology (AIST), Japan | Meteorological Research Institute (MRI), Japan Meteorological Agency (JMA), Japan), T. Oozeki (National Institute of Advanced Industrial Science and Technology (AIST), Japan) ([Submission-ID SIW17-32](#))
- **Simulation and Comparison of Three Phase CHB MLI and Three Phase Cascaded Voltage Source MLI Topologies for Grid Connected PV Applications**
A. Noman, A. Al-Shamma'a, K. Addoweesh (King Saud University, Saudi Arabia), A. Alabduljabbar, (King Abdulaziz City for Science and Technology, Saudi Arabia), A. Alolah (King Saud University, Saudi Arabia) ([Submission-ID SIW17-33](#))
- **Evaluating business models of a decentralized energy system**
C. Dufter, M. Hinterstocker, B. Hörner, S. von Roon (Forschungsgesellschaft für Energiewirtschaft mbH, Germany) ([Submission-ID SIW17-45](#))
- **Assessment of active power curtailment methods in low and medium voltage grids in the German regulatory context with regard to voltage and loading margins**
F. Meier (University of Kassel, Germany | Fraunhofer IWES, Kassel, Germany), J. Kupka (University of Kassel, Germany), M. Braun (University of Kassel, Germany | Fraunhofer IWES, Germany) ([Submission-ID SIW17-53](#))
- **Metering Solar Energy for Rental Flats**
J. Bergner, B. Siegel, D. Beier, V. Quaschnig (University of Applied Sciences Berlin, Germany), N. Pflugradt (Bern University of Applied Sciences, Switzerland) ([Submission-ID SIW17-72](#))
- **Scenario-based modelling of the potential for solar energy charging of electric vehicles in two Scandinavian cities**
C. Good (UiT The Arctic University of Norway, Norway), M. Shepero, J. Munkhammar (Uppsala University, Sweden), T. Boström (UiT The Arctic University of Norway, Norway) ([Submission-ID SIW17-114](#))
- **Technical costs of operating a PV-STATCOM during nighttime**
L. F. Lourenço, R. Monaro, M. Salles (University of Sao Paulo, Brazil), L. Quéval (CentraleSupélec, France) ([Submission-ID SIW17-151](#))
- **HIL test on Smart Inverter Control of Photovoltaic Generations and Electric Vehicles**
S. Kamo, Y. Ota, T. Nakajima (Tokyo City University, Japan), K-I. Kawabe (Tokyo Institute of Technology, Tokyo, Japan)
A. Yokoyama (University of Tokyo, Japan) ([Submission-ID SIW17-152](#))
- **Probabilistic forecast of solar irradiation based on beta regression and copula based Markov process**
T. Shiga (Toyota Central R&D Labs., Japan), T. Kato (Nagoya University, Japan) ([Submission-ID SIW17-160](#))
- **PV Integration a Portfolio Theory Approach**
I. Smith (SM Solar, Trinidad and Tobago) ([Submission-ID SIW17-161](#))
- **Solar PV Based Grid Connected Power Generation System for Decarbonization of Printing Operations**
A. Bose, K. R. Rajan (EIT InnoEnergy, KTH Royal Institute of Technology, Sweden), J. Rathnakumara (Wijeya Newspapers Limited, Sri Lanka), R. Abeyweera, N. Senanayake (Open University Sri Lanka, OUSL, Sri Lanka), T. Wickramaratna (Ceylon Electricity Board, Sri Lanka), J. Jayasuriya (MSc. SELECT, EIT InnoEnergy, KTH Royal Institute of Technology, Sweden | EIT InnoEnergy, Sweden, Sweden) ([Submission-ID SIW17-185](#))
- **A Comparative Analysis of Widely Used Techniques for Solar Resource Forecasting (Particle Swarm Optimization, Spatial - Temporal Models and Time Series)**
I. Smith (SM Solar, Trinidad and Tobago) ([Submission-ID SIW17-191](#))
- **Controller Design for Solar PV and Storage based Microgrid**
P. Chaudhary, M. Rizwan (Delhi Technological University, India) ([Submission-ID SIW17-219](#))
- **Solar Parks to Ramp up Solar Projects in the Country: The recent Downward trends in Solar Tariff**
R. S. Meena (Ministry of New & Renewable Energy, India | Rajasthan Technical University, India), D K Palwaliya (Rajasthan Technical University, India), N. Gupta (Malaviya National Institute of Technology, India), A. K. Sharma, D. K. Sambhariya

- (Rajasthan Technical University, India), S. Johari (Rajasthan Technical University, India | Sri Balaji College of Engineering & Technology, India), S. K. Sharma (University of Kota, India) (Submission-ID SIW17-220)
- **Feasibility study of PV-Wind hybrid power system with storage for water pumping for irrigation in Ouled Fares region, Algeria**
M. Kheireddine (Chlef University, Algeria) (Submission-ID SIW17-223)
 - **Simulation-based assessment and optimization of residential PV storage systems**
M. Hinterstocker, B. Eberl, M. Nagl, S. von Roon (Forschungsgesellschaft für Energiewirtschaft, Germany) (Submission-ID SIW17-232)
 - **Stochastic Optimization of PV Battery System Operation Strategy under different Utility Tariff Structures**
M. Korpås, J. S. Erdal (Norwegian University of Science and Technology, Norway) (Submission-ID SIW17-235)
 - **Comprehensive Evaluation of Impacts of High Penetration Distributed Generation Integration in Distribution Network**
Z. Liu, X. Wang, H. Yu, R. Zhuo (North China Electric Power University, China) (Submission-ID SIW17-245)
 - **Technical, Social and Economic Aspects Relating to the Integration of Photovoltaic Microgeneration Systems in Public Education Buildings in Cape Verde (Africa)**
C. Lima, S. Pimentel, B. Alvarenga, E. Marra, L. Araújo, T. Cesar (Federal University of Goiás, Brazil) (Submission-ID SIW17-248)
 - **Benchmarking of Smart Grid Concepts in LV Distribution Networks**
O. Bertetti, E. Tröster (Energynautics, Germany) (Submission-ID SIW17-251)
 - **Limit Voltage Dips & Inrush Currents When Energizing Power Transformers—Controlled Switching of 3-Pole Operated MV Switchgears & HV CBs—Theory and Case Study**
P. Taillefer, L. Poutrain (Vizimax, Canada) (Submission-ID SIW17-261)
 - **The Value of Solar PV Revisited: A Central Planning Perspective**
T. Bischof-Niemz, J. Wright, J. Calitz (Council for Scientific and Industrial Research (CSIR), South Africa) (Submission-ID 308)
 - **Load Frequency Control in Power Systems with High Penetration of Photovoltaic Using Hybrid Air Conditioners**
T. Sawa, T. Tsuji, T. Oyama (Yokohama National University, Japan), T. Yagi, T. Tsukada (Tokyo Gas, Japan) (Submission-ID SIW17-311)