REM
RENEWABLE ENERGY INTEGRATION with MINI/MICROGRID

ADB

THE APPLIED ENERGY INNOVATION INSTITUTE

Australian Government
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energy for all

REM 2016:
Renewable Energy Integration with Mini/Microgrid
APPLIED ENERGY SYMPOSIUM AND FORUM

CONFERENCE PROGRAM
APRIL 19-21, MALDIVES
PARADISE ISLAND RESORT

ASIA CLEAN ENERGY FORUM 2016

Manila, Philippines 6–10 June 2016

The Asia Clean Energy Forum (ACEF) is the premier knowledge-sharing event for staying current with the latest developments and key issues in Asia's clean energy sector. Every June, clean energy professionals convene at Asian Development Bank (ADB) Headquarters to network, discuss, exchange knowledge and do business. Join us at the Forum at ADB Headquarters in Manila from 6-10 June 2016.

Discussions at this year's ACEF will revolve around four main tracks:

- Innovations in Energy Efficiency
- Innovations in Renewable Energy
- Increasing Energy Access
- Charting the Future of Clean Energy in Asia

The first two days of the ACEF week will be devoted to deep dive workshops and technical sessions for in-depth discussions on clean energy topics.

Register for the event and view the latest updates on our website:

www.asiacleanenergyforum.org

Organizers

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Acknowledgements

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Asian Development Bank
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RENEWABLE ENERGY INTEGRATION with MINI/MICROGRID

REM 2016: Renewable Energy integration with Mini/Microgrid
APPLIED ENERGY SYMPOSIUM AND FORUM 2016

APRIL 19-21, 2016, MALDIVES

Welcome to REM2016

Energy systems have been in transition, extending their boundaries beyond the energy systems themselves, characterized in the 3-D interactive extensions that relate to the dimensions of physical Space, Time scale and Human behaviors, so called Space-Time-Human 3D extension. One of the important changes associated with increased widespread use of renewable energy calls for investigation of the new challenges: variable generation and controllable demand. This defines the aim and scope of the Applied Energy Symposium and Forum, REM2016: Renewable Energy Integration with Mini/Microgrid to be held in April 19-21, 2016 in Maldives organized by Asian Development Bank (ADB) together with Applied Energy Journal and Applied Energy Innovation Institute (AEii). As it was necessary for us to explore how we could efficiently and effectively use our space to supply, convert and use renewable energy resources, we need to introduce new smart grids and intelligent energy systems. These tools aim to solve the challenges of intermittent power generation and mismatching of energy supply and demand over a time scale. Human behaviors is also integrated into the energy systems to interactively improve the sustainability.

The REM2016, with the theme of “Powering a renewable future with mini/microgrid” is to provide a platform focused on three tracks, namely technology innovations, high penetration of renewable energy, and implementation, commercialization and financing. Island renewable energy system is of particular importance in the Symposium. We invite all stakeholders including academia, inventors, project developers, financiers, suppliers, policy decision makers, even the public and end-users to participate in the conference. We explore the new approach, innovation solutions to solve the challenging issues associated with new transitions of future renewable energy systems. Its interdisciplinary and synthetic approach not only reveals the systematic overview, but also detailed components of renewable energy systems.

The event consists of keynote sessions, panel discussions, academic papers sessions, and on-site tour of renewable pilot projects.

We are looking forward to meeting you in Maldives.

Conference Chairs

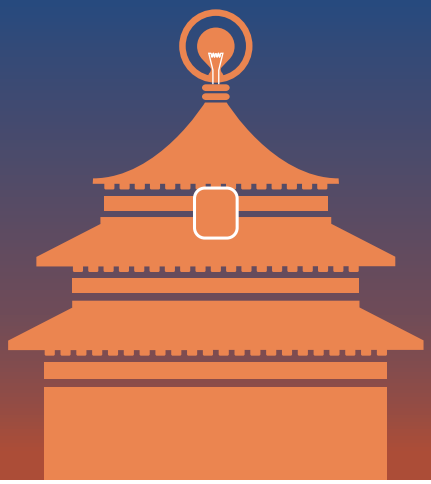
Dr. Yongping Zhai
Technical Advisor (Energy), Asian Development Bank

Prof. Jinyue Yan
Editor-in-Chief of Applied Energy

icae

International Conference on Applied Energy

Beijing, China



8th International Conference on Applied Energy

October 8-11, 2016

Call For Papers

Deadline of draft paper: Jun. 30, 2016

Notification of acceptance: Aug. 1, 2016

Deadline for final paper: Sept. 1, 2016

Topics (but not limited to)

- Renewable Energy
- Clean Energy Conversion Technologies
- Mitigation Technologies
- Intelligent Energy Systems
- Energy Storage
- Energy Management, Policy, Economics and Sustainability
- Energy Sciences

All papers presented at the ICAE2016 will be included in Energy Procedia. Special Issue of selected papers from ICAE2016 will be published in prestigious journals including Applied Energy.

APPLIED ENERGY: 2014 IMPACT FACTOR: 5.613

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The Applied Energy Innovation Institute

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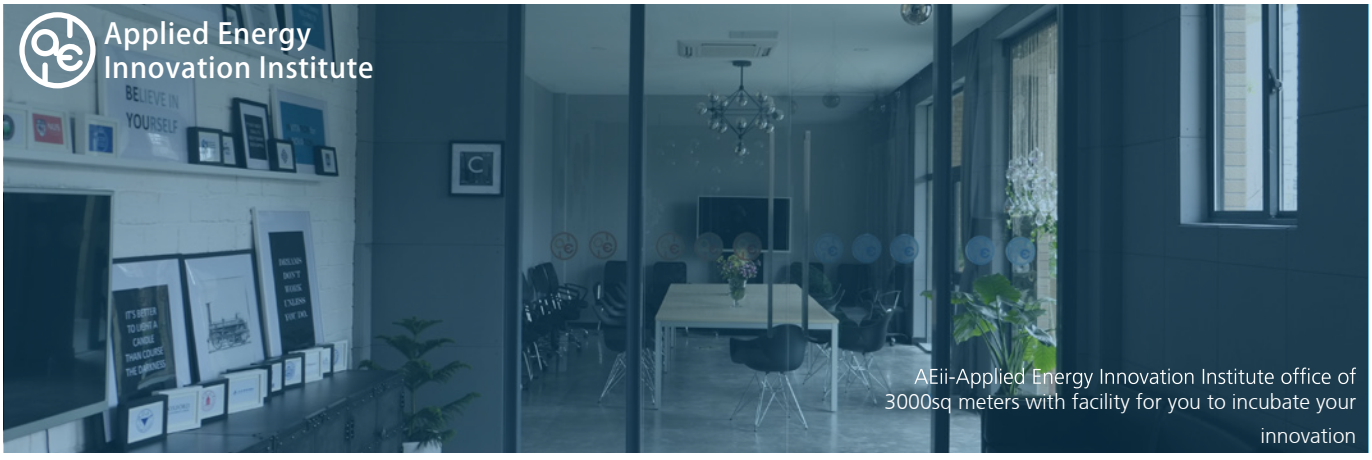
AEii = Internatio nal + China & Applied Energy +In novation Platform

The AEII, Applied Energy Innovation Institute, is an international, independent, and non-profit institute to incubate future clean energy technologies and solutions into sustainable market by engaging stakeholders including product producers, decision makers, investors, project developers and end-users.



AEii-Applied Energy Innovation Institute office of 3000sq meters with facility for you to incubate your innovation

Program at a Glance

Registration: April 19th: 08:00-10:00; April20th: 08:30-9:00; April,21st: 08:30-9:00			
Day 1: April 19th			
10:00-10:30	Opening		
10:30-10:45	TEA/COFFEE BREAK		
10:45-11:30	Keynote: Smart Grids with Intelligent Periphery: An Architecture for the Energy Internet Prof. Felix Wu University of California, Berkeley and University of Hong Kong		
11:30-12:30	Keynote: China's Experience in Renewable Energy Integration with Mini/Micro-Grid Mr. Dinghuan Shi Chinese State Council		
12:30-13:30	LUNCH		
Session	1	2	3
13:30-15:30	New utility business models	Forecasting, modeling and optimization of intermittent renewables	Hybrid energy system including HVAC and EV
15:30-16:00	TEA/COFFEE BREAK		
Session	4	5	6
16:00-18:00	Mini/Microgrid architecture and design	New strategies for grid operation	Case studies and best practices
Day 2: April 20th			
9:00-9:45	Keynote: A Multi-level Voltage Control in a PV MicroGrid Prof. Janaka Ekanayake University of Peradeniya		
9:45-10:30	Keynote: Integrated Smart Micro-, Distribution- and Transmission-Grids Prof. Vladimir Terzija University of Manchester		
10:30-10:45	TEA/COFFEE BREAK		
10:45-12:00	Poster session		
12:00-13:00	LUNCH		
Session	7	8	9
13:00-14:40	Transmission-distribution networks	Implementation of high renewable penetration islands	Integration and utilization of distributed energy resources (DERs) in mini/microgirds
14:40-15:00	TEA/COFFEE BREAK		
Session	10	11	12
15:00-16:40	Energy storages for mini/microgrid applications	Renewable energy for distributed applications	Renewable energy systems in traditional generation planning in island systems
19:00-21:00	BANQUET		
Day 3: April 21st			
9:00-10:00	Panel I: From R&D to implementation: challenges, opportunities and solutions of REM		
10:00-10:30	TEA/COFFEE BREAK		
10:30-12:30	Panel II: Overcoming barriers for accelerated deployment of RE mini-grids		
12:30-13:30	LUNCH		
13:30-18:00	Plant Tour: K. Dhiffushi island		

Are you working on the challenging issues associated with the development of our future energy systems?

ISBN: 978-1-118-38858-7

- How to provide clean, affordable, secure energy
- How energy can be effectively and efficiently utilized
- How to make conventional energy systems cleaner and operationally more flexible
- How to integrate different processes in the whole chain of energy systems, from energy resources, conversion and storage, to end uses
- How to balance the supply and demand of energy
- How to mitigate climate change through technology innovations
- How to determine the best pathways and policy options for investing in renewable energy in the future

The Handbook of Clean Energy Systems provides many answers and solutions around the world's energy challenges. Bringing together information on innovation, research, development, and practical applications throughout all areas of clean energy systems and technology this unique reference:

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Keynote Speakers

Prof. Felix Wu

Keynote: Smart Grids with Intelligent Periphery: An Architecture for the Energy Internet

Felix Wu is Professor Emeritus at the University of California, Berkeley (UCB) and the University of Hong Kong (HKU). He joined the faculty in the Department of Electrical Engineering and Computer Sciences at UCB in 1974 and served at HKU as Pro Vice Chancellor (Vice President, 1997-2000), Philip Wong Wilson Wong Professor of Electrical Engineering (2001-11) and Distinguished Visiting Professor in Clean Energy and Environment (2011-14). He is a Fellow of IEEE. He was the TEPCO Chair of "Frontier Technology for the Future Electric Energy System" in 1991 and held visiting professorship at Swiss Institute of Technology (ETH-Zurich), University of Tokyo, University of Cassino (Italy), Tsinghua University and many other universities. He served as a consultant to a number of industry and government agencies including Pacific Gas and Electric Company, Electric Power Research Institute (USA), ABB-Systems Control, Starcraft Norway, Iberdrola Spain, Executive Council of Abu Dhabi, etc. He served on the Smart Grid Advisory Panel of CLP Power (2011-14). He is currently a member of Committee of Experts, China Southern Grid. Professor Wu is an Advisor to the President of Tianjin University and served as a Board Member of Shantou University (2000-03), and a Trustee of Croucher Foundation (2003-10). Professor Wu received his BS degree from National Taiwan University, MSc degree from University of Pittsburgh and PhD degree from University of California, Berkeley.

Mr. Dinghuan Shi

Keynote: China's Experience in Renewable Energy Integration with Mini/Micro-Grid

Mr. Shi Dinghua has been appointed as the Counselor of the Chinese State Council since March 2004. Mr. Shi also serves as the Chairman of the China Technology Advisory Association, China Society for Scientific and Technical Information, Chinese Solar Energy Society and China Association of Promotion Centers. Mr. Shi was born in 1943 and graduated in Engineering Physics from Tsinghua University. He has been responsible since 1980s for the research and setting of strategies and policies for energy, science and technology development. He has worked in Tsinghua University, then in State Commission of Science and Technology (the Former of Ministry of Science and Technology) as the Deputy Division Chief of the Forecasting Bureau, the Deputy Director of the Industrial Technology Bureau, and then Director of the Department of Industrial Science and Technology. Mr. Shi took the office of the Secretary General of Ministry of Science and Technology of the PRC in August 2001, and became in 2013 a member of the Mid- and Long Term Project Planning Office for National Science and Technology Development and the leader of the Strategic Research Group.

Prof. Janaka Bandara Ekanayake

Keynote: A Multi-level Voltage Control in a PV MicroGrid

Janaka Ekanayake is attached to the Department of Electrical and Electronic Engineering, University of Peradeniya, Sri Lanka as a Professor since April 2013. He is also a visiting Reader at Cardiff University, UK. His main research interests include power electronic applications for power system, renewable energy generation and its integration, and Smart Grids. He has published more than 50 papers in refereed journals, more than 100 conference papers and has also co-authored five books. The key books to which he contributed are: Electric Power Systems (2012), Wiley; Smart Grid: Technology and Applications (2012), Wiley; Distributed Generation (2010), Institution of Engineering and Technology; and Wind Energy Generation: Modelling and

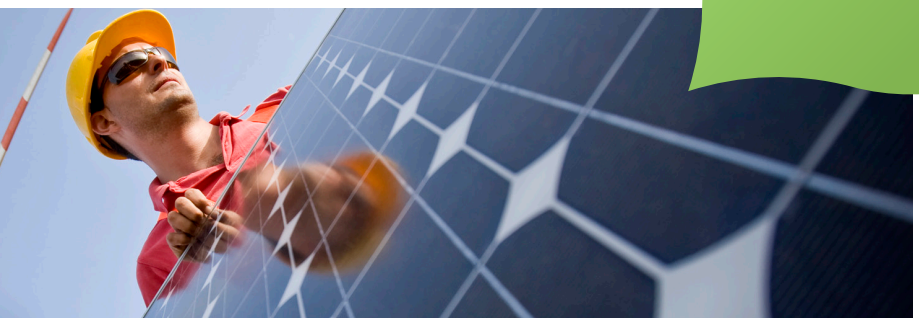
Control (2009) Wiley. He is a Fellow of IET and IESL, and a Senior Member of IEEE. He is also an IEEE PES Distinguish Lecturer. He has been a Royal Society and Commonwealth Fellow at the University of Manchester Institute of Science and Technology, UK in 1997 and 2001. He is a member of the Editorial Board of IEEE Transaction on Energy Conversion, IET Renewable Energy journal and Wind Engineer. He was the Organising Vice Chairperson of the First IEEE PES conference of Innovative Smart Grid Technologies, Asia (2012). He served as a consultant to a number of organisations such as Asian Development Bank; International Copper Association; National Microelectronic Institute, UK; Utility Partners Limited, UK; and Gamesa, Spain.

Keynote: Integrated Smart Micro-, Distribution- and Transmission-Grids

Prof. Vladimir Terzija

Professor Vladimir Terzija is the Engineering and Physical Science Research Council Chair Professor in Power System Engineering with the School of Electrical and Electronic Engineering, The University of Manchester, Manchester, U.K., where he has been since 2006. He was born in Donji Baraci (former Yugoslavia). He received the Dipl-Ing., M.Sc., and Ph.D. degrees in electrical engineering from the University of Belgrade, Belgrade, Serbia, in 1988, 1993, and 1997, respectively. From 1997 to 1999, he was an Assistant Professor at the University of Belgrade, Belgrade, Serbia. From 2000 to 2006, he was a senior specialist for switchgear and distribution automation with ABB AG Inc., Ratingen, Germany. His current research interests include smart grid application of intelligent methods to power system monitoring, control, and protection; wide-area monitoring, protection, and control; switchgear and fast transient processes; and digital signal processing applications in power systems. Prof. Terzija is currently leading a number of large scale projects funded by the UK Government, UK and international industry and European Union. The total value of these projects is more than £30m. In his research team he has currently 10 PhD students and 5 Postdoctoral Research Associates. He is currently convenor of the Cigré Working Group B5.14 “Wide Area Protection and Control Technologies” and a contributing member of several IEEE working groups. Prof. Terzija has published over 300 peer-reviewed papers in international journals and in proceedings of international conferences. He held visiting professorship at the Shandong University (Jinan, China), University of Malaya (Kuala Lumpur, Malaysia) and University of Belgrade (Belgrade, Serbia). He also serves as a consultant to a number of industry and government agencies including National Grid, UK, Scottish Power, UK, Electricity North West, UK, EPSRC and many others. He is Editor in Chief of the International Journal of Electrical Power and Energy Systems. Prof. Terzija is IEEE Fellow, Alexander von Humboldt Fellow, as well as a DAAD and Taishan Scholar.

FUTURE ENERGY



FUTURE ENERGY CENTER

THE CHALLENGES due to energy related emissions, increased energy demand and the fragile state of the global economy calls for rethinking global energy systems. Therefore, the research within the Future Energy Center focuses on renewable energy, energy efficiency and emission mitigation, as well as smarter modelling, optimization and management.

The Future Energy Center is one of Sweden's strongest research environments in process optimization targeting the process industry and the energy sector. We develop innovative solutions and tools within the areas of energy, building and environmental engineering.

The Future Energy Center has good relationships with both companies and recognized national and international centers, including several Chinese universities. The profile comprises nine professors, a further fifteen senior researchers and more than forty graduate students.

THREE FOCUS AREAS

The research at Future Energy Center is focused on three areas:

TRACK 1 Renewable energy

TRACK 2 Energy efficiency and emission mitigation

TRACK 3 Smarter modelling/ optimisation and management

The Future Energy Center also offers studies at post-graduate level in Energy and Environmental engineering. We are also part of the research school Reesbe (Resource-Efficient Energy Sytems in the Built Environment).

CONTACT US

www.mdh.se

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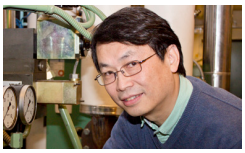

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MÄLARDALEN UNIVERSITY
SWEDEN

FUTURE ENERGY

RESEARCH THAT PROVIDES **VALUE** AND **BENEFIT**

Mälardalen University invest in research which generates beneficial solutions for societal development.

COOPERATION FOR THE **BENEFIT** OF ALL

MDH has a long tradition and history of close cooperation with society at large and works in a strategic and goal-oriented manner towards being a co-productive university that benefits industry and the community.

STAFF AT THE **UNIVERSITY**

900 employees, 71 professors, 447 teachers, 213 doctoral students; 69 are financed externally.

MÄLARDALEN UNIVERSITY SWEDEN

MÄLARDALEN UNIVERSITY (abbreviated MDH) is one of Sweden's large institutes of higher education. The University has over 13,000 students studying our 51 programmes and 1,000 courses, and 900 faculty and staff. The University, with its campuses in Eskilstuna and Västerås, is characterised by its close cooperation with companies and with the public sector in the region and by its distinct environmental profile.
Thanks to our partnerships with international companies such as ABB, Volvo and Bombardier and HEIs all around the world, we offer an international study and working environment.

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Day 1 Oral Presentations

Registration: April,19th: 08:00-10:00, April,20th: 08:30-9:00, April,21st: 08:30-9:00	
Time	**Day 1, April 19th**
10:00-10:30	**OPENING SESSION** **Welcome from the Government of Maldives and REM2016 Conference Chairs** Hon. Thoriq Ibrahim, Minister of Environment and Energy, Republic of Maldives Hon. Abdulla Jihad, Minister of Finance and Treasury, Republic of Maldives Dr. Yongping Zhai, Technical Advisor (Energy), Asian Development Bank Prof. Jinyue Yan, Editor-in-Chief of Applied Energy
10:30-10:45	TEA/COFFEE BREAK
10:45-11:30	Keynote: Smart Grids with Intelligent Periphery: An Architecture for the Energy Internet Prof. Felix Wu University of California, Berkeley and University of Hong Kong
11:30-12:30	Keynote: China's Experience in Renewable Energy Integration with Mini/Micro-Grid Mr. Dinghuan Shi Chinese State Council
12:30-13:30	LUNCH

Room: Kethi
Session title: New utility business models
Session chairs: Hailong Li, David Manetsgruber

Time	ID	Author	Paper title
13:30-13:50	63	C. Blanksby, T. Tereapii, W.Y. Lee, D. Nikolic	Cook Islands: planning 100% renewable energy in different guises
13:50-14:10	47	C. Zhang, J. Wu, M. Cheng	A bidding system for peer-to-peer energy trading in a grid-connected microgrid
14:10-14:30	60	T. Hong, M. Lee, H.A. Kang	Framework for optimizing the solar incentive from the perspectives of residents and policy makers
14:30-14:50	62	P. Perera	Constraints and barriers to deployment of distributed energy systems and micro grids in china
14:50-15:10	39	J. Pan, L. Tian, R. Du, W. Li	The decision analysis of PV investment and market linkage development under carbon price
15:10-15:30	110	D. Philipp, R. Dumitrescu, D. Ciganovic, F. Piela, S. Groh	Renewable energy currency
15:30-16:00	TEA/COFFEE BREAK		

Room: Kethi
Session title: Mini/Microgrid architecture and design
Session chairs: Shengwei Wang, Yongping Zhai

Time	ID	Author	Paper title
16:00-16:20	45	Q. Qi, J. Wu, L. Zhang, M. Cheng	Multi-objective optimization of electrical distribution network operation considering reconfiguration and soft open points
16:20-16:40	53	S. Liu, F. Liu, T. Ding, Z. Bie	Optimal allocation of reactive power compensators and energy storages in microgrids considering uncertainty of photovoltaics
16:40-17:00	91	S. Saravanan, N.B. Ramesh	Non-isolated DC-DC converter for renewable based grid application
17:00-17:20	64	Z. Chen, R. Xiong, Y. Yang, J. Lu	Genetic algorithm-based parameters identification of lithium-ion battery models concerning different aging conditions
17:20-17:40	43	Q. Yang, J. Li, S. Le Blond, C. Wang	Artificial Neural Network based fault detection and fault location in the DC microgrid
17:40-18:00	89	F. Chen, X. Ding	Efficiency and current harmonics comparison between SiC and Si based inverters for microgrids

Room: Roanu
Session title: Forecasting, modeling and optimization of intermittent renewables
Session chairs: Hongjie Jia, Javier Campillo

Time	ID	Author	Paper title
13:30-13:50	61	L.I. Minchala-Avila, J. Abril, D. Pesántez, Y. Zhang	Design and implementation of a smart meter with demand response capabilities
13:50-14:10	85	V.N. Coelho, I.M. Coelho, E. Rios, A.S.T. Filho, A.J.R. Reis, M.J. F. Souza, F. Gadelha Guimaraes	A hybrid deep learning forecasting model using GPU disaggregated function evaluations applied for household electricity demand forecasting
14:10-14:30	104	A. Magnasco, H. Kirchhoff, S. Chowdhury, S. Groh	Data services for real time optimization of dynamic DC nanogrids
14:30-14:50	27	J. Li, Q. Yang, X. Wang, P. Yao, Q. Sun, Z. Zhang, M. Zhang, W. Yuan	A novel use of the SMES/battery hybrid energy storage system for primary frequency control in a microgrid
14:50-15:10	19	B. Cui, F. Xiao, S. Wang	Optimal design of active cool thermal energy storage concerning life-cycle cost saving for demand management in non-residential building
15:10-15:30	6	Z. Zhang, R. Li, F. Li, C. Zhao	Cross-characterization of PV and sunshine profiles based on hierarchical classification
15:30-16:00	TEA/COFFEE BREAK		

Room: Roanu
Session title: New strategies for grid operation
Session chairs: Youmin Zhang, Jun Xu

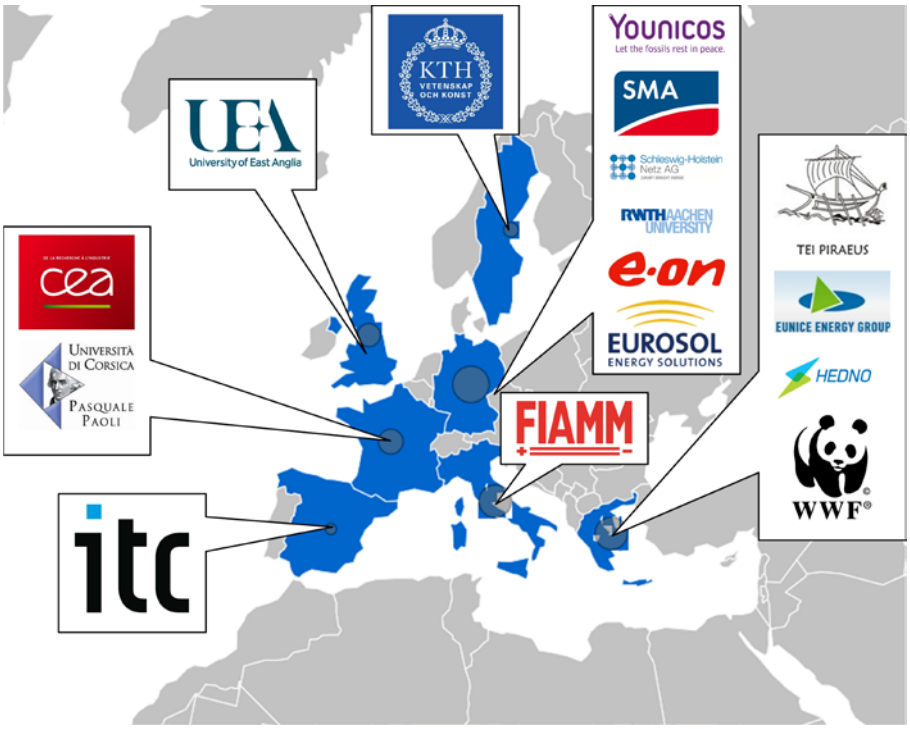
Time	ID	Author	Paper title
16:00-16:20	116	S.B. Qamara, I. Janajreh	Renewable energy sources for isolated self-sufficient microgrids: comparison of solar and wind energy for UAE
16:20-16:40	11	S. Wang, D.C. Gao, R. Tang, F. Xiao	Cooling supply-based HVAC system control for fast demand response of buildings to urgent requests of smart grids
16:40-17:00	40	E. Wanjiru, S. Sichilalu, X. Xia	Optimal integrated diesel grid-renewable energy system for hot water devices
17:00-17:20	17	C.Y. Lau, C.K. Gan, Z. Salam, M.F. Sulaima	Impact of solar photovoltaic system on transformer tap changer in low voltage distribution network
17:20-17:40	44	M. Cheng, J. Wu	Use of heating loads for grid frequency control
17:40-18:00	80	N. Prabaharan, K. Palanisamy	Modeling and analysis of a quasi-linear multilevel inverter for photovoltaic application

Room: Funoas
Session title: Hybrid energy system including HVAC and EV
Session chairs: Raza Naqvi, Isam Janajreh

Time	ID	Author	Paper title
13:30-13:50	33	C. Shao, C. Li, X. You, H. Wu, J. Zhang, Y. Ding, Y. Song	Optimal coordination of CHP plants with renewable energy generation considering substitutability between electricity and heat
13:50-14:10	38	S.M. Sichilalu, H. Tazvinga, X. Xia	Integrated energy management of grid-tied-PV-fuel cell hybrid system
14:10-14:30	54	Y. Lin, Z. Bie	Study on the resilience of the integrated energy system
14:30-14:50	106	Z. Li, H. He, R. Xiong	An improved battery state of charge and model parameters estimation method using forgetting factors recursive least-squares
14:50-15:10	102	C. Ghenai	Design of solar-biomass hybrid microgrid system in Sharjah
15:10-15:30	14	H. Badihi, Y. Zhang, H. Hong	Model-based cooperative active fault-tolerant control in an offshore wind farm
15:30-16:00	TEA/COFFEE BREAK		

Room: Funoas Session title: Case studies and best practices Session chairs: Hongxing Yang, Representative Government of Maldives			
Time	**ID**	**Author**	**Paper title**
16:00-16:20	84	P. Wijayatunga, L. George, J. Aguado, A. Lopez	Integrating clean energy in small island power systems: Maldives experience
16:20-16:40	82	D. Majumder, J. Tazdik, K.A. Uddin, M.A. Al Matin	KPI for solar PV-Diesel hybrid mini grids in remote islands of Bangladesh
16:40-17:00	13	H. Li, P.E. Campana, J. Yan	Dynamic performance of the standalone wind power driven heat pump
17:00-17:20	115	M. Naqvi, J. Yan, E. Dahlquist	Business feasibility of distributed off-grid electricity generation using mixed biomass compost: A scenario-based study from Pakistan
17:20-17:40	117	M. Hussain, I. Janajreh	Multiple source sustainable hybrid micro-grid for urban communities: A case study in UAE
17:40-18:00	94	S. Aziz, S.A. Chowdhury, S. Groh	The success of solar diesel minigrids in Bangladesh: a case study of Sandwip Island

Technology Innovation *for the* Local Scale
Optimum Integration *of* Battery Energy Storage



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 646529.

Day 2 Oral Presentations

Time	Day 2, April 20th
9:00-9:45	Keynote: A multi-level voltage control in a PV MicroGrid Prof. Janaka Ekanayake University of Peradeniya
9:45-10:30	Keynote: Integrated Smart Micro-, Distribution- and Transmission-Grids Prof. Vladimir Terzija University of Manchester
10:30-10:45	TEA/COFFEE BREAK
10:45-12:00	POSTER SESSION
12:00-13:00	LUNCH

Room: Kethi
Session title: Transmission-distribution networks
Session chairs: Peng Li, Priyantha Wijayatunga

Time	ID	Author	Paper title
13:00-13:20	32	W. Zhenshu, Z. Qi, S. Yunpeng, Q. Shichao	The optimal dispatch with combination of wind power and photovoltaic power systems
13:20-13:40	24	M. Kowsalya, S. Sureshkumar	Distributed energy resources allocation using flower pollination algorithm in radial distribution systems
13:40-14:00	88	V.N. Coelho, I.M. Coelho, M.J.F. Souza, H.G. Santos, N. Mladenovic, F. Gadelha Guimaraes	A smart pool search math-heuristic algorithm for solving a multi-objective MILP microgrid energy dispatching problem
14:00-14:20	52	Y. He, N. Jenkins, J. Wu	Smart metering for outage management of electric power distribution networks
14:20-14:40	73	M.A. Zehir, A. Batman, M.A. Sonmez, A. Font, D. Tsiamitros, D. Stimoniaris, T. Kollatou, et al.	Impact of renewable based microgrid supply/demand profiles on low voltage distribution networks
14:40-15:00	TEA/COFFEE BREAK		

Room: Kethi
Session title: Energy storages for mini/microgrid applications
Session chair: Jianzhong Wu, Meng Cheng

Time	ID	Author	Paper title
15:00-15:20	87	K. Sethuraman, A.S. Pabbewar	Three level neutral point clamped inverter using space vector modulation with proportional resonant controller
15:20-15:40	97	Y. Qi, B. Qu, J. Yang, Y. Mu, B. Guo	Frequency control strategy of hybrid energy storage system for autonomous microgrid based on frequency hysteretic loop
15:40-16:00	113	M. Ye, H. Guo, R. Xiong, R. Yang	Model-based state-of-charge estimation approach of the Lithium-ion battery using an improved adaptive particle filter
16:00-16:20	57	Z. Chen, R. Xiong, J. Lu, X. Shang	Experimental study on external short circuit fault of the lithium-ion battery for electric vehicles application
16:20-16:40	31	R. Yang, R. Xiong, H. He	Model-based health condition monitoring method for multi-cell series-connected battery pack

Room: Roanu Session title: Implementation of high renewable penetration islands Session chair: Shizhong Li, Dusan Nikolic			
Time	**ID**	**Author**	**Paper title**
13:00-13:20	78	P. Bargotra, A. Bhatt, A. Kandya	Microgrids in developing countries
13:20-13:40	98	B. Sah	Geo-enabled decision support system for potential clean energy mix for Bali, Indonesia
13:40-14:00	103	M. Koepke, S. Groh	Against the odds: The potential of swarm electrification for small island development states
14:00-14:20	107	C. Zhang, P.E. Campana, J. Yang, J. Yan	Analysis of distributed photovoltaic financing: a case study approach of crowdfunding with photovoltaic water pumping system in microgrids
14:20-14:40	99	Y. Zhou, Z. Li, X. Tao	Urban mixed use and its impact on energy efficiency of micro grid system
14:40-15:00	TEA/COFFEE BREAK		
Room: Roanu Session title: Renewable energy for distributed applications Session chair: Pradeep Perera, Xiao Fu			
Time	**ID**	**Author**	**Paper title**
15:00-15:20	56	F. Liu, S. Liu, Y. Yang, Y. Wang, T. Ding, Z. Bie	Zonal reserve model for renewable power integrated system
15:20-15:40	83	Y. Zhang, A. Lundblad, P.E. Campana, J. Yan	Comparative study of employing battery and hydrogen storages to increase photovoltaic self-sufficiency in a residential building of Sweden
15:40-16:00	30	H. Tan, Y. Lei, Y. Chen	Renewable energy development for buildings
16:00-16:20	58	T. Ma, H. Yang	Long term performance analysis of a 19.8kWp standalone photovoltaic system in a remote island
16:20-16:40	114	K.A. Baharin, H.A. Rahman, M.Y. Hassan, C.K. Gan, M.F. Sulaima	Quantifying solar variability in the tropics for photovoltaic microgrid application

Room: Funoas Session title: Integration and utilization of distributed energy resources in mini/microgirds Session chair: Wenwei Wang, Rui Xiong			
Time	**ID**	**Author**	**Paper title**
13:00-13:20	67	X. Jin, Y. Mu, H. Jia, J. Wu, X. Xu, X. Yu, F. Qi	Hierarchical management for building microgrid considering virtual storage system and plug-in electric vehicles
13:20-13:40	69	J. Campillo, E. Dahlquist	Object-Oriented three-phase power flow formulation for microgrids with large penetration of distributed generation
13:40-14:00	71	J. Xu, B. Cao, S. Li, B. Wang, B. Ning	A hybrid criterion based balancing strategy for battery energy storage systems
14:00-14:20	79	N. Prabaharan, K. Palanisamy	A single phase grid connected hybrid multilevel inverter for interfacing Photovoltaic system
14:20-14:40	105	C. Chen, F. Sun, R. Xiong, H. He	A novel dual H infinity filters based battery parameter and state joint estimation approach for electric vehicles
14:40-15:00	TEA/COFFEE BREAK		

Room: Funoas Session title: Renewable energy systems in traditional generation planning in island systems Session chair: Raza Naqvi, Representative Government of Maldives			
Time	**ID**	**Author**	**Paper title**
15:00-15:20	34	D. Manetsgruber, B. Wagemann	Risk management for mini-grid deployment in rural areas
15:20-15:40	77	L. Zhang, X. Zu, J. Fu, S. Li	A novel combined ethanol and power contributing model of microgrid driven by sweet sorghum using advanced solid-state fermentation
15:40-16:00	5	P.E. Campana, J. Zhang, Y. Zhang, A. Lundblad, H. Li, J. Yan	Effects of future solar irradiation, temperature and wind changes on hybrid power systems
16:00-16:20	65	A.R. Bhatti, Z. Salam, R.H. Ashique	Electric vehicle charging using photovoltaic based microgrid for remote islands

Day 2 Poster Presentations

Poster session April 20, 10:45-12:00		
ID	**Author**	**Paper title**
2	X. Fu, H. Sun, Q. Guo	Thermal load prediction considering solar radiation and weather
3	X. Fu, H. Sun, Q. Guo	Electric power output optimization for CCHP using PSO theory
7	C. Chen, H. Ling, N. Yu, N. Li, M. Zhang, Y. Li	Numerical modelling of thermal performance of active-passive ventilation wall with phase change material
8	Y. Lv, L. Guan, Z. Tang, Q. Zhao	A probability model of PV for the middle-term to long-term power system analysis and its application
16	H. Liu, H. Lian, S. Ge, Jifeng Li, B. Fan	Initiative control capability of electric vehicle and renewable energy consumptive control strategy
22	C. Wang, G. Song, P. Li, H. Ji, J. Zhao, J. Wu	Optimal configuration of soft open point for active distribution network based on mixed-integer second-order cone programming
35	W. Nookuea, P. E. Campana, Y. Tan, J. Yan	Hybrid power system for sustainable shrimp farm
41	P. Chen, L. Guan, Z. Tang, X. Chen, Z. Jiang	An optimal planning method for combined cooling heating and power system
46	Y. Chen, H. Liu, H Lian	Consumptive optimization model of stability margin in random dynamic security domain (RDSR) considering renewable energy
48	Z. Wang, Y. Zhang, B. Li, R. Li, Z. Zhang	Distributed storage capacity reservations in microgrid for LV network operation
75	C. Wang, R. Dunn, Q. Yang, B. Lian, W. Yuan, J. Li	The active and reactive power dispatch for charging station location impacts factors analysis
90	M. Ding, J. Yang, J. Mao, L. Wang	Risk evaluation of security and stability control system for renewal energy cluster
96	Z. Qiao, Q. Guo, H. Sun, Z. Pan	Unified power flow analysis in natural gas and electricity coupled networks considering the uncertainty of wind power
100	F. Wu, Q. Guo, H. Sun, Z. Pan	Research on the collaborative optimization of multi-energy flow microgrids
101	D. Wang, Z. Chen, J. Zhang, H. Jia, B. Li, W. Wang, J. Tang	Study on three-phase stability simulation model of distributed generation system for multi energy utilization

Day 3 Panel Sessions

9:00 – 10:00 From R&D to implementation: challenges, opportunities, and solutions of REM

The session will explore the challenges, opportunities and solutions of renewable mini/microgrids from an academic prospective. In particular, fast demand response of buildings to smart grids, peer to peer virtual microgrids, and hybrid solar-wind power generation in remote areas for off-grid mini/microgrids applications will be the main addressed topics.

Chair: *Prof. S.K. Chou, National University of Singapore, Singapore*

Presentations/Panelists:

1. *Prof. Jianzhong WU, University of Cardiff, United Kingdom*
2. *Prof. Shengweii Wang, The Hong Kong Polytechnic University, Hong Kong*
3. *Prof. Hongxing Yang, The Hong Kong Polytechnic University, Hong Kong*

10:30 – 12:30 Overcoming barriers for accelerated deployment of RE mini-grids

The session will explore the challenges to the deployment of RE mini-grids highlighting the technical, regulatory and financial barriers. Panelist representing government, private sector, financing institution, and academia will discuss, based on their area of expertise, the current situation, successful models, policies and way forward to an accelerated implementation of RE mini-grids.

Chair: *Dr. Yongping Zhai, Technical Advisor (Energy), Asian Development Bank*

Presentation: *Ms. Luo Duo, China Singyes Solar Technologies Holdings Ltd., China*

Panelists:

1. *Representative Government of Maldives*
2. *Dr. Soe Soe Ohn, Deputy Director, New and Renewable Energy Department, Ministry of Mines and Energy, Myanmar*
3. *Mr. Akbar Ayub Khan, Chief Executive Officer, Pakhtunkhwa Energy Development Organization, Pakistan*
4. *Mr. Dipta Majumder, Senior Technical Officer (RE), IDCOL, Bangladesh*
5. *Dr. Sebastian Groh, Chief Executive Officer, ME SOLshare Ltd., Bangladesh*
6. *Ms. Luo Duo, China Singyes Solar Technologies Holdings Ltd., China*

Panelists

Prof. S.K. Chou

Chair

S.K. Chou obtained a B.Eng. in Mechanical Engineering from the University of Singapore, and a D.E.A. and Dr-Ing. from Ecole Nationale Superieure d'Arts et Metiers, Paris, under a French Government Scholarship. He joined the Department of Mechanical Engineering, National University of Singapore, as a lecturer, in 1980, and is presently Professor. He is jointly appointed to the NUS Energy Studies Institute as its Executive Director. S.K. Chou is a Fellow and Immediate Past President of the Institution of Engineers (IES), Singapore, and a Fellow of the American Society of Heating, Refrigerating and Air-Conditioning Engineers. He is a Fellow of the Singapore Academy of Engineering, the ASEAN Academy of Engineering and Technology, and the Energy Institute, UK. He chairs the Advisory Committee of the School of Mechanical and Aeronautical Engineering, Singapore Polytechnic. He is chairman of the Technical Evaluation Panel on the Grant for Energy Efficiency Technology of the National Environment Agency, Singapore. He is an editor of the Elsevier journal, Applied Energy.

Dr. Yongping Zhai

Chair

Dr. Yongping Zhai has been working on energy development in Asia and Africa for about 25 years. He is currently Technical Advisor, Energy Sector Group, Asian Development Bank (ADB), in charge of overall energy policy coordination and technical support to ADB Energy Divisions of East Asia, South Asia, Southeast Asia, Central and West Asia as well as the Pacific Region. Prior to his current position, Dr. Yongping Zhai was Director, South Asia Energy Division (2010-2015), ADB, covering energy sector operations in Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka. In this capacity, he led ADB's support to renewable energy, energy efficiency and power trade in South Asia. He also served as ADB's Lead Energy Specialist (2008-2010), in charge of energy sector in Southeast Asia including Indonesia, Philippines, and the Greater Mekong Subregion (GMS). In particular, he was instrumental in leading ADB's support to the power sector's successful restructuring process in the Philippines. Moreover, Dr. Zhai has played a key role in promoting power trade and cooperation in GMS. From 1993 to 2000, Dr. Zhai was a Principal Program Coordinator/Public Utilities Economist at the African Development Bank (AfDB) in charge of energy projects in Southern African Development Community (SADC). Between 1990 and 1993, he served as an Assistant Professor at the Energy Technology Division (Energy Policy and Planning), Asian Institute of Technology (AIT) in Bangkok, Thailand. Dr. Yongping Zhai graduated from the Thermal Energy Engineering Department, Tsinghua University, Beijing, China (1983) and received a Ph.D in Energy Economics from Institute of Energy Economics and Policy, affiliated with the University of Pierre-Mendès France in Grenoble, France (1989).

Prof. Jianzhong Wu

Panelist

Prof. Jianzhong Wu is a Professor of Multi-Vector Energy Systems. He joined Cardiff University as a Lecturer in June 2008, and was promoted to Senior Lecturer (2013), Reader (2014) and Professor (2015). From 2006 to 2008, he was a research fellow in the University of Manchester. Prof. Wu researches on Smart Grid and energy infrastructure. He is an Associate Editor of Applied Energy (IF 5.261), and has a track record of undertaking a number of large research projects in Smart Grids and Energy Infrastructure. He has been Principal Investigator or Co-Investigator of more than 30 research projects funded by European Commission, Research Council of the UK and the industry. In particular, he is the deputy leader of the multi-energy theme of EPSRC HubNet, principal investigator of projects on dynamic demand funded by National Grid, Toshiba and OPEN ENERGI, and the Cardiff principal investigator of a Horizon 2020 project on Peer to Peer energy supply networks.

Prof. Shengwei Wang

Panelist

Prof. Wang joined PolyU in 1993 and promoted to the Chair Professor of in 2008. His research interests include: building system simulation and diagnosis, system optimal control, system optimal design, building demand response methods for smart grid and intelligent building technology. He has obtained over thirty research grants and received totally over 18 million HKD industrial funds. He has been conducting many energy saving and optimization projects for new and existing buildings in Hong Kong, such as International Commerce Centre (the tallest building in Hong Kong), New Word Centre redevelopment, hotels, airport buildings, hospitals, industrial buildings, MTR underground stations as well as all buildings of his campus.

Prof. Hongxing Yang

Panelist

Prof. Yang received his BEng and MEng in Tianjin University, China. He obtained his PhD in Mechanical Engineering Department, University of Wales College of Cardiff, UK. He is now leading the Renewable Energy Research Group (RERG) in the Department of Building Services Engineering, The Hong Kong Polytechnic University. His research interests cover a number of renewable energy topics including solar photovoltaic applications in buildings, wind power and other energy saving and renewable energy projects. He has over 250 academic papers and 5 professional books published. He is serving the International Journal of Applied Energy as associate editor and other international journals as editorial board member.

Ms. Luo Duo

Panelist

Ms. Luo Duo is Chief Engineer, Vice President of Institution, Director of Green Building Researching Center of China Singyes Solar Technologies Holdings Limited, Chairman of Building Energy Conservation Enterprise Committee of China-US Clean Energy Researching Center CERC-BEE, A Consultant Expert of Solar Energy Building Association of China Renewable Energy Society, Vice Secretary-General of Guangdong PV Energy System Standards Committee, Appointed professor of Chang Chun Architecture & Civil Engineering College, Postgraduate Tutor of Electrical Engineering Discipline of Xiangtan University. Ms. Luo attained over 20 items of national utility-model patents，published more than ten papers in national professional journals，presided over or participated in 30 national or industry standards. Photovoltaic Building Integrated Renovation Project of Zhuhai Dong'ao Island Culture Center and Complex" and "Rooftop Solar PV Projects of Renhengxinyuan" directed by Ms. Luo, have been approved of as the first national "photovoltaic building" financial support demonstration projects. The BIPV project directed by Ms. Luo has acquired Guangdong Province Science and Technology Achievement Appraisal.

Dr. Soe Soe Ohn

Panelist

Dr. Soe Soe Ohn works as a Director at the National Electrification Project (NEP) (PMO) in the Department of Rural Development, Ministry of Agriculture Livestock and Irrigation and has received her PhD in Chemical Engineering from Yangon Technological University, Myanmar. She has worked in the Renewable Energy Department of the Ministry of Science and Technology as a chief of bio-gas projects for rural electrification from 2003 to 2013. In the bio-gas projects, she researched and worked in more than 150 villages for electrification using community and family scale bio-gas plants. Currently she works as a project manager at NEP (off-grid electrification) for access to electricity in remote areas of Myanmar using renewable energy (solar, hydro and biomass) in order to achieve universal access to electricity in Myanmar by 2030.

Mr. Akbar Ayub Khan

Panelist

Akbar Ayub Khan is currently the Chief Executive of the Pakhtunkhwa Energy Development Organization (PEDO) entrusted with the responsibility of exploiting huge untapped hydro power potential of the province of Khyber Pakhtunkhwa (KP), Pakistan. KP province constitutes approximately 70 percent (30,000 MW) of the national hydro power potential. Since his arrival PEDO has taken various initiatives like development of hydro power projects in private sector fast tracking public sector investment, development of investor friendly power policy and micro hydels etc. He previously served as the Chief Financial Officer (CFO) for the Khyber Pakhtunkhwa Oil and Gas Company Limited KPOGCL since September 14 to February 15. From August 2012 to September 2014, he served as the Finance Director Business Separation Plan at Abbot Laboratories in Singapore. Furthermore he worked on various key positions at the British American Tobacco company across different countries namely Pakistan, Japan and Papua New Guinea from January 2006 to July 2012. Mr. Akbar completed his Masters in Business Administration from Lahore University of Management Sciences in 1998. He also completed his Chartered Financial Analyst Program in 2009 becoming a member of the CFA institute USA and CFA association of Pakistan (CFAAP). In addition he attended various professional trainings in Chicago, London, Dubai and Pakistan from 2001 to 2013.

Mr. Dipta Majumder

Panelist

Dipta Majumder was born in Chandpur, Bangladesh. He has completed B.Sc. in Electrical and Electronic Engineering from Bangladesh University of Engineering and Technology (BUET). Afterwards, he joined Infrastructure Development Company Limited (IDCOL) as Technical Officer, Renewable Energy. Currently, he is working as Senior Technical Officer, Renewable Energy in IDCOL. He has been involved in Solar Home System (SHS) program and Solar Mini Grid projects. His research interests are on integration of Solar Mini Grids, Smart Grids, Solar Charging Stations, and Energy Efficiency.

Dr. Sebastian Groh

Panelist

Dr. Groh holds a PhD from Aalborg University (Denmark) where he wrote his thesis on the role of energy in development processes, energy poverty and technical innovations. He is living and working in Bangladesh as the CEO and co-founder of ME SOLshare Ltd. Dr. Groh is further Adjunct Assistant Professor at Independent University Bangladesh and Eastern University Business Research Methods as well as Microeconomics. Dr. Groh is further project manager at MicroEnergy International (MEI) since 2009, a Berlin based consulting company focusing on the linkage between microfinance and sustainable energy supply. Previous to his work at MEI, he worked on the trading floor at Commerzbank in Frankfurt, at ProCredit in El Salvador and Planet Finance in India. Dr. Groh received his Bachelor in Economics from University of Mannheim (Germany) and Universidad Carlos III de Madrid (Spain) as well as a Masters in International Economics from the University of Goettingen (Germany), University of Pune (India) and Universidad José Matías Delgado (El Salvador). Dr. Groh also received an executive training on strategic leadership for microfinance from Harvard Business School and is a Stanford Ignite Fellow of 2013 from Stanford Graduate School of Business.

Speakers´ Guide

Presentation

Length of presentation material should be in accordance with your allocated time. You are requested to load your presentation files before the session starts. Each oral presentation at the breakaway venues is limited to 20 minutes, which include the questions and answers. Please refer to this program booklet for actual presentation times. You are kindly requested to be present in the relevant presentation venue at least 15 minutes before the session starts.

Each presentation room is equipped with a laptop computer with a data projector. PowerPoint is the standard presentation format. The computers in the meetings rooms are provided to Window-based PC Users. Conference volunteers will be available to assist you in case you encounter difficulties to use the IT equipment.

Presentation Venues

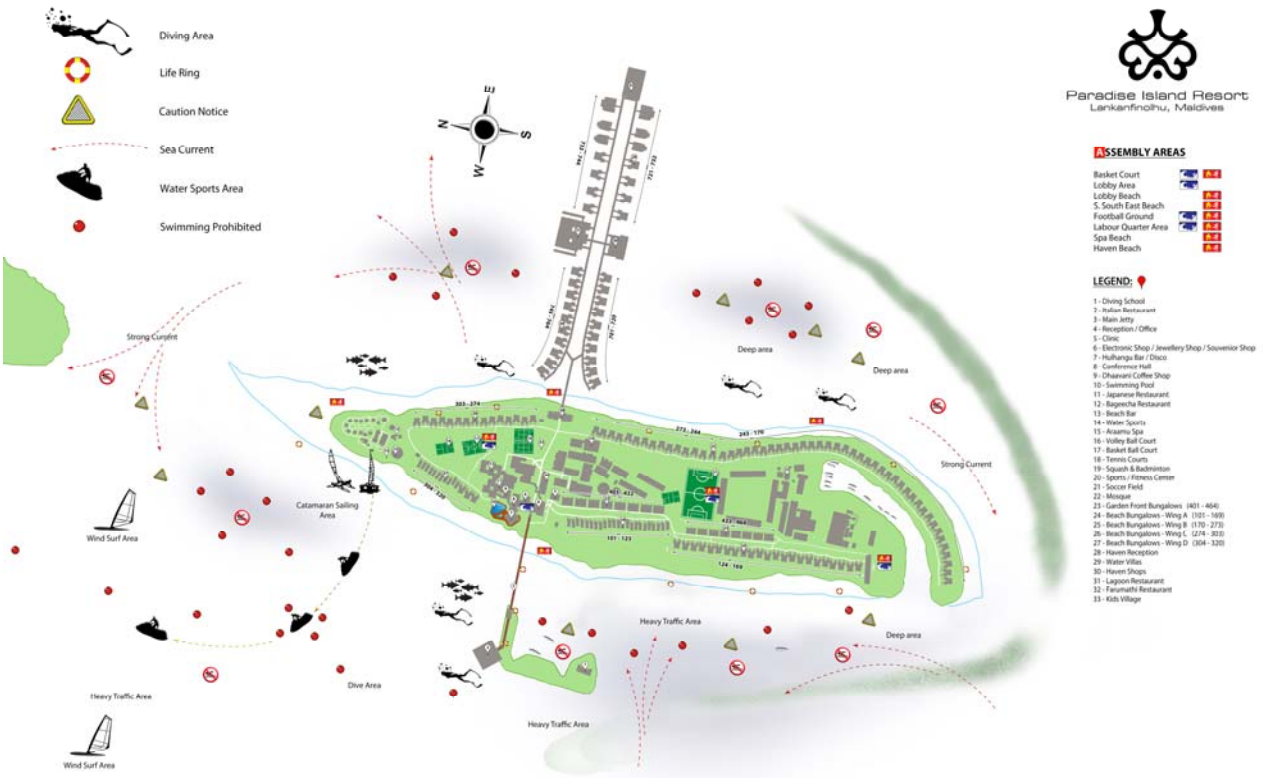
The opening ceremony and keynote speeches will be held at the Burunu Conference Hall. The main conference venues are Kethi, Roanu, and Funoas. The following table lists all the presentation venues with abbreviations which are used in the detailed programs in the late part of this booklet.

SESSION	ROOM	TITLE
1	Kethi	New utility business models
2	Roanu	Forecasting, modeling and optimization of intermittent renewables
3	Funoas	Hybrid energy system including HVAC and EV
4	Kethi	Mini/Microgrid architecture and design
5	Roanu	New strategies for grid operation
6	Funoas	Case studies and best practices
7	Kethi	Transmission-distribution networks
8	Roanu	Implementation of high renewable penetration islands
9	Funoas	Integration and utilization of distributed energy resources (DERs) in mini/microgirds
10	Kethi	Energy storages for mini/microgrid applications
11	Roanu	Renewable energy for distributed applications
12	Funoas	Renewable energy systems in traditional generation planning in island systems

Practical Guide

Venue and contact information

Paradise Island Resort in Paradise Island (http://www.paradise-island.com.mv)



How to get to Paradise Island Resort

All the international flights land in Male airport which is located in Hulhumale Island. ADB will provide transport during the conference to Paradise Island from Male, Hulhumale and Bandos islands.

Lunch and banquet

The lunch will be in Bageecha Restaurant and the coffee break will be outside each conference venues. The banquet dinner will be held on the beach (in case of inclement weather it will be held at Lagoon Restaurant).

Planned technical tour

ADB has organized a technical tour to visit the renewable microgrid at K. Dhiffushi island. The transportation will be arranged by ADB.

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RENEWABLE ENERGY INTEGRATION with MINI/MICROGRID

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International Conference on Applied Energy