

# ASIA CLEAN ENERGY FORUM 2018

HARNESSING INNOVATION TO POWER THE FUTURE

Manila, Philippines • 4-8 June 2018



## Scaling-Up Solar PV Deployment: Implementing Projects with Assured Quality

8 June 2018 (Friday), 9:00 a.m. - 12:30 p.m.

### Background

The competitiveness of renewable energy technologies is improving rapidly, also highlighted by recent price developments, including in the field of PV technologies. The next challenge for a major scale-up in markets is to assure, to all stakeholders, that these technologies will deliver the anticipated services, with the expected performance, during their lifetime.

The necessary scale-up in PV deployment will therefore need to be underpinned by systematic quality assurance, requiring a physical and institutional infrastructure, so-called Quality Infrastructure (QI). QI comprises the institutional network and legal framework within which standards are formulated and implemented, including other elements such as metrology, testing, certification and accreditation of a technology. IRENA, with support from its partner organisations, has developed comprehensive guidelines and tools, an example is shown in Figure 1, to support countries in developing and maintaining such a quality infrastructure for PV systems, based on international best practices.

Figure 1 Step by step approach to develop quality infrastructure for Solar PV systems



Experience has shown that the implementation of a quality infrastructure accelerates future investments in PV projects, lowers capital costs, improves overall performance, extends module lifespans and lowers the resulting electricity costs.

## Objective of the Workshop

Growing PV markets require that the service provided by PV systems meet the expectations from users and stakeholders in terms of performance, safety and durability. The workshop aims at sharing best practices in assuring quality for PV systems based on experts' experience as well as IRENA's tools and guidelines. Experts will explain technical challenges and risks with performance and durability of PV systems in Asia. Also, they will showcase step by step approaches on how to develop and implement quality infrastructure, and its impact in the bankability of PV projects for different markets. The audience will have the opportunity to raise any questions and interact with the speakers in different segments across the workshop.

## Tentative Agenda

Time	Topic	Speakers
	<b>Opening</b>	
09:00 - 09:10	Welcome and introduction to the workshop	Opening by IRENA: Francisco Boshell
	<b>Session 1: Role of Quality Infrastructure (QI) in PV Markets</b>	
09:10 - 09:25	Quality Infrastructure boosting PV Markets	Francisco Boshell, Analyst for RE Technology, Standards and Markets, International Renewable Energy Agency (IRENA)
09:25 - 09:40	The importance of Standards and Quality Assurance to support financing of PV projects	Dr. Yongping Zhai, Technical Advisor, Technical Advisor, Energy Sector Group, ADB
09:40 - 09:55	Integration of quality infrastructure into public policy and regulation in South Asia	Vimal Mahendru. Ambassador of IEC for mini-grids, IEC
09:55 -10:05	<b>Open mic: questions, highlights, experiences from the Audience</b>	
	<b>Session 2: QI mitigating technical risks for PV</b>	
10:05 -10:20	Reliable warranty insurance: A key metric of sustainable PV projects	Ronald Sastrawan, Senior Risk Analyst Munich Re
10:20 -10:35	Technical challenges with performance and durability of PV systems in Asia: Regional experiences	Dr. Alex Li. Head of Jinko Solar's Asia-Pacific Technical Service, Jinko Solar
10:35 –11:00	Coffee Break	
11:00-11:15	PV System: Quality Control, Test, Risk Evaluation and Management	Hui YU, General Manager, China General Certification Center

11:15 -11:30	Resilient Photovoltaic Systems	Kyle Datta, General Partner Ulupono Initiative
11:30 – 11:40	<b>Open mic: questions, highlights, experiences from the Audience</b>	
	<b>Session 3: Implementing effectively QI</b>	
11:40 – 11:55	Good practices in testing and certification for PV systems in Asia	Sebastian Petretschek Vice General Manager   Head of Independent Engineering Asia   Solar/ Fuelcell Technology Greater China, TÜV Rheinland
11:55 – 12:10	Enhance your analysis and projects with the web tool INSPIRE (International Standards and Patents in Renewable Energy)	Alessandra Salgado, Associate Professional, IRENA
12:10 – 12:25	The PV module reliability scorecard	Alfredo Jakub. Senior Consultant, Clean Technology Centre, DNV GL
12:25 – 12:50	<b>Ask the expert</b> Topic: How to build up QI in countries with different context and market maturity? Moderator: Vimal Mahendru	
	<b>Closure</b>	
12:50 –13:00	Key messages	Francisco Boshell, Analyst for RE Technology, Standards and Markets IRENA
13:00 –13:05	Group photo	

## Speakers



### **Francisco Boshell**

Analyst for RE Technology, Standards and Markets,  
International Renewable Energy Agency (IRENA)

Mr. Francisco Boshell is an Analyst in markets and standards for renewable energy technologies at the International Renewable Energy Agency (IRENA). He supports IRENA's activities aimed at promoting strong and growing markets for renewables through technology innovation and a wider use of standards and quality assurance mechanisms. During his 13+ years professional career, Mr. Boshell has: Developed technical standards for quantifying GHG emission reductions from CDM projects and supported the climate change negotiations under UNFCCC; Provided consultancy services for the development of renewable energy and energy efficiency projects at KEMA Consulting; Designed and implemented infrastructure and energy related projects in the automotive manufacturing sector at General Motors. Francisco's background is in Mechanical Engineering and he holds a MSc. in Sustainable Energy Technology from the Eindhoven University of Technology, in the Netherlands.



**Kyle Datta,**  
General Partner  
Ulupono Initiative

As general partner, Kyle is responsible for developing Ulupono Initiative's partnerships with stakeholders, policy makers and community organizations. He also oversees the organization's systems-thinking approach to strategy development and transformation. Kyle is a member of Ulupono's management team.

Kyle received a master's degree in public and private management from the Yale School of Organization and Management, as well as a master's degree in environmental science in resource economics from the Yale School of Forestry and Environmental Studies. His previous positions include CEO of U.S. Biodiesel Group; managing director of research and consulting at the Rocky Mountain Institute; and a vice president at Booz Allen Hamilton, where he served as managing director of the Asia energy practice and the U.S. utility practice. He currently serves on the boards of directors for Blue Planet Foundation and the Johnson Ohana Charitable Foundation, and the steering committee of the Sustainable Agriculture and Food Systems Funders. In 2017, Kyle was named to the new Transformation Advisory Council of the Puerto Rico Energy Power Association, which will assist in the development of a long-term vision and transformation execution plan for the power system in Puerto Rico following the devastation of Hurricane Maria.



**Alfredo Jakub**  
Senior Consultant, Clean Technology Centre,  
DNV GL

Alfredo has been working in the solar photovoltaic industry since 2010, focusing largely on the Engineering, Procurement and Construction (EPC) of solar photovoltaic (PV) power plants. Since joining DNV GL, Alfredo focuses on assisting customers with solar PV detailed design, EPC selection, yield assessment, site audit, construction monitoring, asset operational management as well as other owner engineering services. He has been involved in financing of various PV projects in the Asia Pacific region totalling more than 2GW of solar projects. He is also involved in microgrid project implementation as well as other utility scale solar+storage solution.

In his previous assignment as Project Manager at Phoenix Solar, he designed, built and commissioned various PV projects covering utility scale ground mount power plant, Building integrated PV, residential, industrial, commercial rooftop as well as hybrid systems. Hence, he is familiar with the electrical and civil design related to the construction of PV power plant in Asia as well as the financial and logistics arrangement of PV projects.



**Dr. Alex Li**  
Head of APAC Technical Services  
JinkoSolar

Dr. Li currently serves as Head of JinkoSolar's Asia-Pacific Technical Service. In this capacity, Dr. Li is responsible for providing technical support and consultation for solar projects of all scales through delivering technical trainings, developing analytical modelling, and performing system design evaluation. Combining his academic achievement of receiving a PhD in Photovoltaics from the University of New South Wales, Dr. Li is an expert on both the economics and technology behind cutting-edge solar.



### **Vimal Mahendru**

Ambassador of IEC for mini-grids,  
IEC

Vimal Mahendru is the President of Legrand-India, a subsidiary of the French multi-national Legrand. In his present role, he guides strategic initiatives of the company, especially forays into new and emerging markets.

Besides this, Vimal is presently the IEC Ambassador, representing IEC in various government and stakeholder fora relevant to the electrotechnical community. He is the IEC Standardization Management Board (SMB) member from India and Chair of the IEC Systems Committee on Low Voltage Direct Current and Low Voltage Direct Current for Electricity Access (SyC-LVDC). Specifically, on Electricity Access, Vimal is representing IEC in various UN, multi-government and international fora, to drive electricity access initiatives through standardization.

He is also a member of the governing council of Indian Electrical & Electronics Manufacturers' Association (IEEMA), the apex industry body in India. Besides this, he is also the Chair of the Bureau of Standards, Sectional Committee 39, for standardization of fuses and fuse accessories.

Based on his contributions to industry and global electrification, in 2016, Vimal was recognized by the Electrical Research and Development Association (ERDA) with its Lifetime Achievement Award. In 2017, the Control Panel and Switchgear Manufacturers' Association conferred the COSMA Gaurav award on Vimal for his ongoing contributions to the Indian and global electrical fraternity.

Vimal is married and has two children, and is based out of New Delhi, India.



### **Sebastian Petretschek**

Vice General Manager | Head of Independent Engineering Asia | Solar/ Fuelcell Technology  
Greater China

Sebastian Petretschek holds a degree in Technology Management from the University of Stuttgart, Germany and has spent parts of his studies at Tsinghua University in Beijing, China.

Sebastian has been active in solar photovoltaic business since 2009 and has been acting as Independent Engineer for investors, lenders and insurances in Europe, South America, Middle East, South Africa, India and various countries in Asia including Japan, China, Thailand and others. He has conducted numerous technical due diligence reviews - including yield as well as EPC and O&M contract assessments - and has performed construction and operation monitoring services.

Further, Sebastian is a specialist for quality assurance along the value chain of PV components, particularly PV modules. Sebastian is heading TÜV Rheinland's PV Power Plant business in Asia and is the Director of the Global Technical Competence Center for PV Power Plants.



**Alessandra Salgado**

Associate Professional  
International Renewable Energy Agency (IRENA)

Alessandra Salgado is an Associate Professional at the International Renewable Energy Agency (IRENA). She is part of IRENA Innovation & Technology Centre, where she performs analytical work and research in patents, technology innovation and quality assurance for renewable energy. Before joining IRENA, she worked for 5 years in the private sector as an Engineer, having this experience in McKinsey & Company and INTEL Corporation. Alessandra Salgado has a degree of Master of Science with a major in mechanical engineering for sustainable energy from the Royal Institute of Technology (KTH), Sweden. She graduated as an Industrial Engineer from the University of Costa Rica.



**Dr. Ronald Sastrawan**

Senior Risk Analyst  
Green Tech Solutions – Special Enterprise Risks  
Corporate Insurance Partner – Munich Re

Ronald is part of Green Tech Solutions within the Munich Re Group insuring long-term risks for suppliers and project developers of green technologies. His main focus lies on correctly back-stopping solar module supplier's warranties. Green Tech Solutions has supported over €12 billion capital in green technologies with an exposure of over €1 billion. Ronald has more than 15 years of experience in the solar industry. After his PhD in physics at the Fraunhofer Institute for Solar Energy Systems, he set up factories for solar cell production in Asia and USA. Prior to joining the Munich Re Group, he headed an R&D team in the solar production equipment industry.



**Dr. Yongping Zhai**

Chief of Energy Sector Group,  
Asian Development Bank

Dr. Yongping Zhai has been working on energy development in Asia and Africa for more than 25 years. He is currently Chief of Energy Sector Group of the Asian Development Bank (ADB), in charge of overall energy policy coordination and technical support to ADB energy sector operations. He is also in charge of developing energy sector knowledge work for ADB and interacts with worldwide energy sector partners.

Prior to his current position, Dr. Yongping Zhai was Director of 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.

He 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).

## Hui YU

General Manager,  
China General Certification Center

**Education** 2007-2012 Doctoral Researcher, Delft University of Technology  
2005-2007 Master, Tsinghua University  
2001-2005 Bachelor, Beijing University of Aeronautics and Astronautics

**Work Background** Convener of IECRE REMC WG008 Hybrid/Microgrid Systems  
China General Certification Centre  
Tsinghua University  
Delft University of Technology

**Work Experience**

- A lot of work experience in the field of renewable energy;
- Engaged in research and development of solar-related policies and related technologies;
- Led and participated in a large number of research projects in renewable energy by working closely with domestic and international experts;
- Participated in the preparation of a number of photovoltaic-related IEC international standards;
- Contributed to the formulation of renewable energy related policies, the promotion of technology assessments, and the development of China's renewable energy industry as an expert;
- Experienced at testing and certification in the field of solar energy, including modules, converters and so on.

**Projects** Convener of IECRE REMC WG008 Hybrid/Microgrid systems  
Period: 2017 – Present  
Title: IECRE REMC WG008 convener  
Description: IECRE REMC WG008 was approved by the IEC System for Certification to Standards Relating to Equipment for Use In Renewable Energy Applications (IECRE) at the end of 2017. This work group is responsible for the development and maintenance of the rules for testing, certification, and evaluation of microgrid equipment and systems, and maintains communication and cooperation with the existing work of IECRE and the IEC technical committees responsible for standard writing. Responsibility: I am responsible for the overall management of various research and development projects within the working group. I coordinate the participation of testing and certification agencies, new energy product manufacturers, and research institutes in the development of testing and certification system accepted internationally, and I accelerate the integration of China's microgrid industry with international renewable energy certification systems.

Participation in writing IEC TS 62941:2016 (Terrestrial photovoltaic (PV) modules – Guidelines for increased confidence in PV module design qualification and type approval)

Period: 2014 – Present

Description: IEC TS 62941 is an IEC technical specification on the quality management system of PV module manufacturing industry, and an additional requirement for the production quality management system of PV module companies based on ISO9001. This technical specification

puts forward a high quality of all aspects of management requirements in the product design and development, product certification, process control, key raw material management, procurement, product testing and monitoring, and documentation requirements of photovoltaic modules. Responsibility: I participated in the writing of the standard, including various rounds of preparation and discussion.

Photovoltaic Module Accelerated Aging Test Technology Research and Test Equipment Development Project  
Period: 2014-2018

Description: This project is sponsored by the National High Technology Research and Development Program of China (863 Program). It studied accelerated aging test methods for photovoltaic modules and technical specifications for accelerated aging test of photovoltaic modules, developed accelerated aging testing technologies and equipment, and established an accelerated weathering test platform for photovoltaic modules that meets international standards for temperature and humidity control.

Responsibility: I was responsible for the overall management of project implementation and participated in the development of accelerated aging technology for PV modules.

## Preparation / Additional Information for Participants

- Quality infrastructure for Solar PV: <http://www.irena.org/publications/2017/Sep/Boosting-solar-PV-markets-The-role-of-quality-infrastructure>
- International standards and patents in renewable energy (INSPIRE): <http://irena.org/inspire>
- IRENA Project Navigator: <http://www.irena.org/navigator>

## About the Organizers

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international cooperation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. With more than 170 Member States actively engaged, IRENA promotes renewable resources and technologies as the key to a sustainable future and helps countries achieve their renewable energy potential.

## For any questions, please contact:

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