

KNOWLEDGE EXCHANGE ON ENERGY STORAGE



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Day 1 October 31st 2019

Session 1 Welcome, Introductions, and Overview

Session 2 Energy Storage Technologies and Costs

Moderator: **Simon J. Stolp**, Lead Energy Specialist,
Energy & Extractives, South Asia, World Bank

Session 3 Energy Storage Applications

Moderator: **Mr. Eugene Sullivan**, Principal Investment
Officer, IFC

Session 4 Energy Storage Policies for Deployment

Moderator: **Mr. Jie Tang**, Practice Manager, Energy &
Extractives, East Asia and Pacific, World Bank

Day 2 November 1st 2019

Session 5 Financing Energy Storage

Moderator: **Mr. Marcus Williams**, Sector Manager,
Energy & Extractives, MIGA

Session 6 World Bank Energy Storage Projects
and Partnership

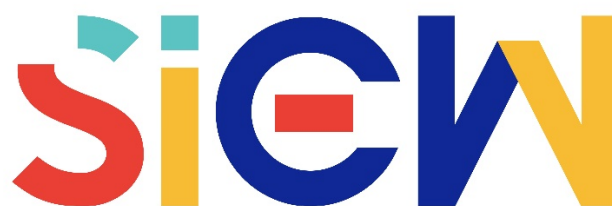
Moderator: **Ms. Julia Fraser**, Program Manager,
Energy & Extractives, East Asia and Pacific, World Bank

Session 7 Next Steps

* This session is for World Bank Country Teams and Government
Counterparts by invitation only.



PART OF THE



SINGAPORE INTERNATIONAL ENERGY WEEK

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Background

The global energy landscape is undergoing a major transformation. Attractive costs for solar and wind are making clean energy a compelling proposition in many countries and improving the prospects for global efforts to fight climate change. Renewable energy sources, including solar and wind, accounted for almost two-thirds of net new power capacity around the world in 2016, with almost 165 gigawatts (GW) of power coming online in 2016. Renewable electricity capacity is also forecast to expand by over 920 GW between 2017 and 2022.

While solar and wind energy are starting to see more and more uptake, the role of energy storage systems is gaining prominence. To integrate renewable resources into grids, energy storage is the key. Storage will allow for the increased use of wind and solar power. Energy storage solutions can also improve grid reliability, stability, and power quality. This has increased the need for energy storage more than ever. However, batteries used in energy generation systems are expensive despite falling prices, and are not yet widely deployed in large-scale projects.

To overcome the challenges before large scale uptake of energy storage to open new markets for energy storage in developing countries, the World Bank Group (WBG) launched the energy storage initiative in 2018. WBG has committed \$1 billion for a program to accelerate investments in battery storage for electric power systems in low and middle-income countries. This investment is intended to increase developing countries' use of wind and solar power, and improve grid reliability, stability and power quality, while reducing carbon emissions. The \$1 billion in World Bank Group financing is expected to mobilize another \$4 billion in concessional climate financing and public and private investments. The program aims to finance 17.5 gigawatt hours (GWh) of battery storage by 2025 – more than triple the 4-5 GWh currently installed in all developing countries. With the right solutions, it can be possible to build large-scale renewable energy projects with significant energy storage components, deploy batteries to stabilize power grids in countries with weak infrastructure, and increase off-grid access to communities that are ready for clean energy with storage. As part of the initiative, an Energy Storage Partnership (ESP) is also launched, as research and development, knowledge-sharing, training, and capacity building is an important way to encourage the uptake of energy storage technologies in developing countries and ultimately enable more integration variable renewable energy.

Energy Storage Workshop 2019

The World Bank and its Energy Sector Management Assistance Program (ESMAP) will hold a 1.5 days' Energy Storage Workshop from October 31st to November 1st at the Marina Bay Sands Convention Center in Singapore, coinciding with the Singapore International Energy Week and the Asia Clean Energy Summit. This event is held in collaboration with the Singapore Energy Market Authority and the Sustainable Energy Association of Singapore. The objective of the event is to exchange knowledge, build capacity, and identify areas of World Bank support to Asian countries on scale up energy storage.

More than 150 participants are expected – from policy makers, regulators, and utilities to project developers, market leaders, and financiers from countries across East Asia and South Asia, including China, Mongolia, the Philippines, Indonesia, Vietnam, Laos, Myanmar, India, Pakistan, Nepal, Sri Lanka, Maldives, Bhutan, PNG, Solomon, Marshall, Vanuatu, and Tuvalu.

Participants will have an opportunity to discuss successful experiences developing storage projects in the US, China, and South Korea, as well as leading international industry players on energy storage deployment. New battery storage technologies and energy storage applications at both utility- and minigrids-scale will be introduced; policies and regulatory approaches will be shared; and financing mechanisms will be explored. World Bank's new international Energy Storage Partnership of more than 30 organizations will be presented, and the next steps for scaling up World Bank support to energy storage in Asia will be discussed.

This workshop is also part of the Energy Transition (ET) in Asia initiative, launched in 2016. Energy Transition in Asia initiative aims at assisting six key Asian countries - China, India, Indonesia, Pakistan, the Philippines, and Vietnam -- in slowing down the rapid growth of coal and accelerating the scale-up of energy efficiency and low-carbon energy alternatives. It is projected that 75 percent of global newly built coal power capacity by 2020 will be in these six Asian countries. The Energy Transition in Asia initiative is implemented through four pillars: (a) mobilizing concessional financing; (b) providing policy support and technical assistance; (c) facilitating knowledge exchange; and (d) engaging partners. This planned workshop will facilitate knowledge exchange and engage partners on energy storage to help Asian countries achieve their ambitious renewable energy targets.

Program

Day 1: October 31

AGENDA

8:30-9:00 *Welcome and Registration*

Session 1: Welcome, Introductions, and Overview

Time	Topic	Speakers
9:00-9:10	Welcome to Singapore	Ms. Jyoti Shukla , Country Director, Singapore, World Bank
9:10-9:20	Private sector investment in energy storage and renewable energy in Singapore	Mr. Tan Keng Hwee Seth , Executive Director, Infrastructure Asia, Singapore
9:20-9:30	The importance of energy storage	Ms. Julia Fraser , Program Manager, Energy & Extractives, World Bank
9:30-9:40	The role of energy storage to scale up renewable energy in Singapore	Mr. Bernard Nee , Deputy Chief Executive, Energy Planning and Development Division and Corporate Services Group, Energy Market Authority, Singapore

Session 2: Energy Storage Technologies and Costs

Moderator: **Mr. Simon J. Stolp**, Lead Energy Specialist, Energy & Extractives, South Asia, World Bank

Time	Topic	Speakers
9:50-10:20	Energy storage technologies and costs	Mr. Julian Jansen , Research & Analysis Manager, Energy Storage, IHS Markit
10:20-10:50	Roles of energy storage in increasing penetration of renewable energy: Global trends and prospects	Mr. Nicholas Wagner , Programme Officer – Renewable Energy Roadmaps, IRENA
10:50-11:20	Value and benefits of energy storage	Ms. Janice Lin , Founder and Chief Executive Officer, Strategen
11:20-11:50	Overview and comparison of different energy storage technologies and applications	Dr. Rahul Walawalkar , Chair, Global Energy Storage Alliance
11:50-12:20	Questions and Answers	

12:20-13:30 *Lunch @Exhibition Hall, Level 4*

AGENDA

Session 3: Energy Storage Applications

Moderator: **Mr. Eugene Sullivan**, Principal Investment Officer, IFC

Time	Topic	Speakers
13:30-14:00	New energy technologies	Mr. Randell Johnson , CEO ACELEREX
14:00-14:20	Utility-scale applications	Mr. Ivan Poerwowidjojo , Head, Business Development and Energy Products, Tesla
14:20-14:40	Mini-grid applications	Ms. Malin Östman , Manager, Project Development, Wartsila
14:00-15:00	Behind-the-meter applications	Mr. Howetian Ho , Commercial Director, Envision
15:00-15:30	Questions and Answers	

15:30-16:00 *Coffee Break @Exhibition Hall, Level 4*

Session 4: Energy Storage Policies for Deployment

Moderator: **Mr. Jie Tang**, Practice Manager, Energy & Extractives, East Asia and Pacific, World Bank

Time	Topic	Speakers
16:00-16:30	Energy storage deployment and policies in USA	Mr. Nate Blair , Group Manager, Distributed Systems and Storage Group, Strategic Energy Analysis Center, U.S. National Renewable Energy Laboratory
16:30-17:00	Energy storage deployment and policies in China	Ms. Liu Yafang , Deputy Director General, National Energy Administration, China
17:00-17:30	Energy storage deployment and policies in Korea	Dr. Yu-Tack Kim , Senior R&D Manager, Korea Energy Association
17:30-18:00	Energy storage deployment and policies in Australia	Mr. Mark Wilson , Senior Technical Advisor, Australia Energy Regulator
18:00-18:10	UK Government's climate finance to energy storage	Dr. Peter Warren , Head of Climate Finance for Innovation and Technology, International Climate Finance, Department for Business, Energy, & Industry Strategy, UK
18:10-18:30	Questions and Answers	
19:00-21:00	Reception at World Bank Group Singapore	

AGENDA

19:00-21:00

World Bank – Infrastructure Asia Evening Networking Cocktails

MARINA BAY FINANCIAL CENTRE (MBFC) Tower 2, Level 12

World Bank – Infrastructure Asia Networking Cocktails

Jointly hosted by the World Bank and Infrastructure Asia

Time	Topic	Speakers
19:00-19:30	Arrival of Guests and networking	
19:30-19:35	Opening remarks	Ms. Jyoti Shukla , Country Director, Singapore, World Bank Mr. Tan Keng Hwee Seth , Executive Director, Infrastructure Asia, Singapore
19:35-19:50	Sharing of experiences from Singapore's private sector	
20:30	Departure of first shuttle to hotel (optional)	
21:00	Official Close Departure of second shuttle to hotel	

AGENDA

Day 2: November 1

Session 5: Financing Energy Storage

Moderator: **Mr. Marcus Williams**, Sector Manager, Energy and Extractives, MIGA

Time	Topic	Speakers
9:00-10:00	Panel discussion on financing energy storage	Mr. Rohit Khanna , Practice Manager, Energy & Extractives, World Bank Mr. Peter Mockel , Principal Industry Specialist, IFC Mr. Achal Sondhi , Market Director for Asia Pacific region, Fluence Mr. Jerome Ortiz , Managing Director, Bright Energy Mr. Mark Leslie , Managing Director Asia Pacific, Macquarie Group
10:00-10:30	Questions and Answers	

10:30-10:40 *Coffee Break @Bayview Foyer*

Session 6: World Bank Energy Storage Projects and Partnership

Moderator: **Ms. Julia Fraser**, Program Manager, Energy & Extractives, East Asia and Pacific, World Bank

Time	Topic	Speakers
10:40-11:00	WB financing energy storage in China	Mr. Zhang Yongmiao , General Manager for the Green Finance Center, Huaxia Bank
11:00-11:20	WB financing energy storage in India	Mr. Aman Hans , Consultant, Niti Aayog, India
11:20-11:40	World Bank Energy Storage Partnership	Mr. Rohit Khanna , Practice Manager, ESMAP, World Bank
11:40-12:00	Questions and Answers	

12:00-13:15 *Lunch @Bayview Foyer*

This session is for World Bank Country Teams and Government Counterparts by invitation only.

Session 7: Next Steps

Time	Topic	Speakers
13:15-14:20	Break-out group discussions of country teams with clients	
14:20-14:30	Summary and closing	Mr. Jie Tang , Practice Manager, Energy & Extractives, East Asia and Pacific, World Bank

Moderators and Speakers Bio



Ms. Jyoti Shukla - Director, Singapore Infrastructure and Urban Development Hub, The World Bank

Ms Shukla is Director of the World Bank in Singapore. The Singapore Hub comprises of 200 staff from the World Bank, IFC, and MIGA, and focuses primarily on improving infrastructure services and promoting smart urban development through public-private sector partnerships.

Ms. Shukla joined the World Bank as a Young Professional in 1994 and has since held multiple positions, largely in the area of public-private partnerships in infrastructure. Her most recent position in the Bank Group has been as Director of the Global Water Practice.

Ms. Shukla holds masters' degrees from the Delhi School of Economics and the Woodrow Wilson School of Public and International Affairs at Princeton University. Before joining the World Bank, she held a faculty position at Princeton University and worked with a development consulting firm in India.



Mr. Tan Keng Hwee Seth - Executive Director, Infrastructure Asia

Seth is the Executive Director of Infrastructure Asia, which is a project facilitation office under the Singapore government. Set up by Enterprise Singapore and the Monetary Authority of Singapore, the office aims to harness the network and collective capabilities of public sector agencies and private sector firms, and partner stakeholders across the region to meet Asia's infrastructure needs. Prior to his role as head of the Infrastructure Asia office, he has helmed leadership roles in DBS Bank, BNP Paribas, Standard Bank, and Babcock & Brown, and was based overseas in China, Australia, Hong Kong. Over his 23 years involvement in

the infrastructure sector, he has worked on various opportunities across various infrastructure sub-segments.



Julia Fraser - Program Manager, Energy & Extractives, World Bank

Julia Fraser is the Manager for the World Bank's Energy and Extractives Global Practice Front Office which has a portfolio of about US\$40 billion. She has more than 25 years' experience in the World Bank, including on energy, transport, private sector participation in infrastructure, public-private partnerships, and climate change finance. Prior to her current role, Ms. Fraser was the Practice Manager for Energy in the East Asia and Pacific Region from 2014-2019, based in Singapore, and the Sector Manager for Sustainable Development in Southeast Asia in the East Asia and Pacific Vice Presidency (EAP), based in Bangkok, from

2012-2014. Prior to her move to East Asia, she spent 12 years working in South Asia, including five years leading the Bank's efforts on the energy sector in Afghanistan where she was based in Kabul. Ms. Fraser holds a Master of Business Administration from Vanderbilt University, USA.



Bernard Nee - Deputy Chief Executive, Energy Market Authority (EMA)

Bernard Nee is the Deputy Chief Executive, Energy Market Authority (EMA). In his current role, Bernard oversees the dual portfolio of Energy Planning and Development Division and the Corporate Services Group.

Since 2012, he has been responsible for growing Singapore's energy ecosystem. His teams catalyse innovation in policies and R&D, prepares a future-ready power sector workforce and advances Singapore's energy thought leadership through flagship events such as the Singapore International Energy Week. Bernard leads a new National Energy Transformation Office that coordinates whole-of-government energy R&D and enabling policies. He also oversees the HR, IT, corporate communications and administrative functions to ensure that EMA works efficiently and effectively.

Prior to EMA, Bernard spent 18 years at the Singapore Economic Development Board in senior management roles such as the Chief Information Officer and Executive Director for New Technologies.

A recipient of a Singapore Government scholarship, Bernard received his MSc in Management from the Massachusetts Institute of Technology and a Master's in Electrical Engineering from the University of Illinois at Urbana-Champaign.



Mr. Simon J. Stolp - Lead Energy Specialist, Energy & Extractives, South Asia, World Bank

Mr. Stolp leads the World Bank's \$4.5 billion Energy & Extractives Program in India, which supports the acceleration of India's energy transition, through significant investments in India's renewable energy sector, and the turn-around of India's financially stressed electricity distribution sector. Mr Stolp led the World Bank's commitment of \$1.5 Billion in financing and technical assistance to develop India's solar power market, over \$1.5 Billion in financing and technical assistance to turn around India's financially stressed utilities sector, and is currently leading the development of a \$1 billion program of financing and technical assistance to create a battery energy storage systems market in India.

Mr. Stolp joined the World Bank as its Country Manager in Iraq in 2007, at a time of intense political upheaval and post-conflict reconstruction. He led all aspects of the Bank's engagement with the Government of Iraq and its international partners. He advised on critical decisions about Iraq's future economic development and its national energy strategy, and led an emergency financing program of \$1 billion. He then led the World Bank's regional energy program across the Middle East.

Prior to joining the World Bank, Mr. Stolp represented the Australian Government in Iraq, where he was seconded to the US Department of Defense to lead the US Government's \$5.5 billion energy sector reconstruction program.

Mr. Stolp's early career was with Hydro Tasmania, Australia's largest renewable energy provider, where he led PPP development of renewable energy infrastructure throughout Australia and South-East Asia. Mr. Stolp has also consulted to government, international development agencies, private developers, and financiers in the international energy sector.



Julian Jansen - Research Manager, IHS Markit

Julian Jansen is a research manager in the IHS Markit Clean Technology and Renewables group. He leads the group's global research on stationary energy storage and provides deep insight on the key value drivers and emerging business models accelerating storage deployment across the world.

Along with covering new energy technologies, he delivers strategic advice for bespoke projects on the interplay between e-mobility and the energy industry. Previously, he established and managed the energy storage research area at specialist consultancy firm Delta-ee.

Mr. Jansen holds a Bachelor of Business Administration in European management from Lancaster University, United Kingdom, a Bachelor of Science in international management from ESB Business School in Germany, and a Master of Science in ecological economics from the University of Edinburgh, Scotland.



Nicholas Wagner - Programme Officer, International Renewable Energy Agency

Nicholas Wagner is a Programme Officer at the International Renewable Energy Agency (IRENA) located at IRENA's Innovation and Technology Centre in Bonn, Germany. He is part of the REmap team – IRENA's renewable energy roadmaps - which focuses on global, regional and country analysis and energy transition roadmaps. REmap focuses on energy system analysis to the year 2050 and works in concert with over 70 countries to determine the potential of accelerating renewable energy, energy efficiency and other low-carbon technologies and their impacts on the energy transition. Prior to working at IRENA, Nicholas worked in renewable energy consulting in California, and research positions at the German Institute for Economic Research (DIW) and as German Chancellor Fellow of the Alexander von Humboldt Foundation at the Fraunhofer Institute for Solar Energy Systems.



Janice Lin - Founder and Chief Executive Officer, Strategen

Janice Lin is the Founder and Chief Executive Officer of Strategen. She brings more than two decades of experience in clean energy strategy, market development, and corporate strategy to Strategen. Janice's superpower is nurturing and empowering champions from the public and private spheres to accelerate grid decarbonization. Janice uses the Strategen platforms of consulting, association management, and events to achieve measurable global impact in growing the clean energy sector.

Prior to founding Strategen in 2005, Janice held several senior management positions with PowerLight Corporation (now SunPower Corporation), including Vice President of Product Strategy and Vice President of Business Development. During her tenure at PowerLight, Janice led initiatives in product and new market strategies, business development, regulatory affairs, strategic partnerships, investor relations, and customer finance.

Janice has won numerous industry awards, including the 2019 Entrepreneur of the Year Cleanie® Award; the 2014 NAATBATT Market Development Award; and the ESA 2013 Phil Symons Energy Storage Award. Janice has served on the Electricity Advisory Council of the US Department of Energy, the Board of Advisors for the Energy Policy Initiatives Center (EPIC) and the Energy Storage Committee of Joint Venture Silicon Valley.

Janice holds an MBA from the Stanford Graduate School of Business, a BS from the Wharton School, University of Pennsylvania, and a BA in International Relations from the University of Pennsylvania's College of Arts and Sciences.



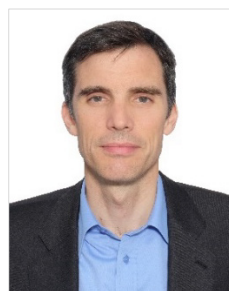
Dr. Rahul Walawalkar - Chair, Global Energy Storage Alliance

Dr. Rahul Walawalkar is President & MD of Customized Energy Solutions India Pvt. Ltd. He leads the Emerging Technologies practice for Customized Energy Solutions globally with focus on energy storage, renewables, demand response, electric vehicles and smart grid technologies. Rahul is founder and Executive Director of India Energy Storage Alliance since 2012. He served as board member for Energy Storage Association, USA during 2009-15 and currently serves as Chair for Global Energy Storage Alliance.

In 2014, he was nominated as part of Standing Committee on Energy Storage and Hybrid systems by MNRE and is currently working on drafting the national energy storage mission. He served as member of national taskforce for renewable integration by Central Electricity Authority & Ministry of Power during 2013-2014.

Under Rahul's leadership Customized Energy Solutions' has received various awards including IPPAI Power Innovation Award for creation of India Energy Storage Alliance in 2016-2017, Brad Roberts Award for outstanding industry contribution by Energy Storage Association (USA) in 2016, USAID's PACEsetter Fund Award for MICRO initiative in 2016 and CII Innovative Energy Services Award for Tata Power Demand Response program in 2012.

He was recognized with India Smart Grid Forum (ISGF) President's Award in 2018 for outstanding contribution to growth of smart grids in India. He is also recipient of Energy Storage Crusader Award from Renewable Energy India Expo in 2017, DSK Energy Award from Institution of Engineers (India) in 2014 and Computer Society of India's Young IT Professional Award for 2000 and 2001. Rahul holds a Ph.D. in Engineering and Public Policy from Carnegie Mellon University, M.S. in Energy Management from NYIT and B.E. from Walchand College of Engineering.



Eugene Sullivan - Principal Investment Officer, International Finance Corporation (IFC)

Mr. Sullivan looks after the IFC's operations in China for infrastructure, with a focus on environmental services, logistics, power and utilities. Within China, IFC partners with entrepreneurs and companies to implement new technologies and business models, and create new financing markets for infrastructure. IFC also partners with Chinese entrepreneurs to develop and implement infrastructure investments in developing countries worldwide.

Prior to his current role, Mr. Sullivan looked after same portfolio for IFC in the Mekong sub-region, including Cambodia, Laos, Myanmar, Thailand and Vietnam.

Before joining the IFC, Mr. Sullivan held investment banking and general management roles at ANZ and Credit Suisse. He holds degrees from Cornell University and INSEAD.



Jie Tang - Practice Manager, Energy & Extractives, East Asia and Pacific, World Bank

Jie Tang, Practice Manager for the Energy and Extractive Global Practice of the World Bank and is in charge of the Bank's investment portfolio and technical assistance to policy, institution and regulation development in the energy sector of countries in East Asia and Pacific Region. He joined the World Bank in 2001 as a Young Professional and has recently held the positions of Lead Energy Specialist, Program Leader for Energy/Transport/ICT, and Practice Manager. Before joining the World Bank, he worked for 15 years on China Three Gorges Dam Project, a US\$38 billion project which took 17 years to build. He has held various technical and managerial positions for the project, from Assistant Engineer to Senior Engineer, and from Division Director to Assistant (1997-2000) to the Vice-Chairman of the State Council Three Gorges Committee, which was chaired by the Prime Minister. He holds a BSc in Electric Engineer from the Hydropower College of Wuhan University, China in 1985, and a MBA from University of Cambridge, England in 2001.



Randell Johnson - CEO ACCELEREX

Dr. Randell Johnson, P.E. has led a 25-year career with engagements in 70 countries in the power/energy sectors for grid optimizations, power and energy market risk analysis, M&A, planning and strategy for utilities, developers, investors, and governments. Randell has advised for over \$35B of energy infrastructure projects.

Dr. Johnson led the modeling of the ground-breaking **Massachusetts State of Charge Report, which gained global attention and was studied as a Harvard Business Case**, and the World Bank commissioned report **Energy Storage Roadmap for the Maldives, which was presented at the UN Climate Action Summit** in September 2019. He also oversaw the analytics for **NYSERDA Energy Storage Roadmap, MISO Energy Storage Study**, and **National Research Council Canada (NRC) Energy Storage Study**, and he is leading the development of advanced energy storage valuation algorithms for **IRENA** (International Renewable Energy Agency). Dr. Johnson has a wide range of experience and expertise in modeling, as well as valuation of Energy Storage Technologies like Pump Storage, Flywheels, Icemakers, CAES, Lithium-ion, used EV batteries(behind-the-meter), Hydrogen storage, Flow Batteries and Super-Capacitors.

Dr. Johnson is the founder and CEO of Acelerex, Inc, an independent consultant and software maker with branch offices in Cambridge, Washington, Houston, Miami, Santiago, and Istanbul, with consultants located in numerous countries worldwide.

Dr Johnson holds degrees in Quantitative Finance (MSc) (Cass Business School), Gas and Electric Utility Corporate Finance (UConn School of Business), and Electric Power Engineering (Ph.D., MEng) (Rensselaer Polytechnic Institute).

Ivan Poerwowidjojo - Head, Business Development and Energy Products, Tesla



Malin Östman - *Manager, Project Development, Wärtsilä*

Malin Östman is responsible for Wärtsilä Energy Business project development of Energy storage and hybrid projects in Asia. She is based in Wärtsilä's Singapore office.

Malin has been working with project development for Wärtsilä since 2013 and has worked with hybrid projects (combinations of renewable energy, energy storage and conventional power) since 2014.

Prior to joining Wärtsilä she worked as a management consultant for BCG. Malin has an MSc. Degree in Industrial Engineering and Management from Aalto University, Finland.

Howetian Ho - *Commercial Director, Envision*



Nate Blair - *Group Manager, Distributed Systems and Storage Group, Strategic Energy Analysis Center, U.S. National Renewable Energy Laboratory*

Nate Blair manages the Distributed Systems and Storage Analysis group within the Strategic Energy Analysis Center (SEAC) at the National Renewable Energy Laboratory (NREL). Nate has twenty-five years of experience in energy systems modeling and energy analysis. Before NREL, he worked at the Univ. of WI – Solar Energy Laboratory, Global Energy Partners, and Thermal Energy System Specialists, Transsolar, CSTB (France) and at Sandia National Laboratories, Nate has a B.A. Physics (1992) from Gustavus Adolphus College before a M.S.M.E.

(1993) and an MBA (2002) from the UW-Madison.

His 17 years at NREL include roles developing the System Advisor Model (SAM) and PVWatts – both well-known system modeling tools - as well as the ReEDS electric grid planning model. He currently manages a growing capability around distribution technology and storage analysis. Recently, he worked on assignment at the ESMAP program within the World Bank from 2015-2016 providing technical support on renewables and specifically variable renewable grid integration.

Liu Yafang - *Deputy Director General, National Energy Administration, China*



Dr. Yu-Tack Kim - *Team Leader, KBIA (Korea Battery Industry Association) & KORBA (Battery R&D Association of Korea)*

Dr. Yu Tack, Kim obtained Ph. D degree in new materials engineering in YONSEI University.

He joined KORBA (Battery R&D Association of Korea) and KBIA (Korea Battery Industry Association) from 2011. In association, he was managed in battery R&D planning and Industry support. He has a member of initial ESS program working group. He has project leader of international standard of battery for ESS, EV in ISO, IEC.



Mark Wilson - Senior Technical Advisor, Australia Energy Regulator

Mark Wilson – Senior Technical Advisor – Australian Energy Regulator (AER). The AER regulates wholesale and retail energy markets, and energy networks, under national energy legislation and rules. Our functions mostly relate to energy markets in eastern and southern Australia.

I am an electrical engineer with 33 years' experience in the power industry - 20 years in regulation and policy and 13 years in electricity operations.

In my current role (since 2013) I provide: industry expertise within the context of the national electricity and gas objectives; specialist advice to the AER board, executive and staff; external liaison with the regulated industries, peak bodies, technical regulators, and consumer groups; and internal training for AER staff to develop their industry knowledge.

Previous roles in the AER have included monitoring compliance and investigating and prosecuting breaches of the National Energy (Electricity, Gas and Retail) Laws and the National Energy Rules (previously the National Electricity Code).

Prior to this I worked in various engineering roles in the South Australian electricity utilities – including transmission and distribution system operations, generation dispatch, generation performance monitoring, and distribution operations.



Dr. Peter Warren - Head of Climate Finance for Innovation and Technology, Senior Policy Advisor & Senior Climate Finance Investment Lead, Department for Business, Energy & Industrial Strategy, UK Government

Dr. Peter Warren is head of climate finance for innovation and technology in the UK Government's Department for Business, Energy & Industrial Strategy (BEIS). Peter manages the UK's climate finance investments and international policy across various clean energy technology areas, such as sustainable cooling, energy storage, industrial decarbonisation, CCUS and clean energy innovation. He previously led the former UK Government Department of Energy and Climate Change (DECC)'s evidence needs and analysis on smart technologies and smart energy.

Prior to working in government, Peter worked in the International Energy Agency (IEA)'s energy efficiency in emerging economies team, focusing on energy efficiency in small-to-medium-sized enterprises (SMEs), as well as energy efficiency policy in India. Prior to this, he worked as a Sustainability Manager in industry. Peter holds a PhD in energy policy from University College London (UCL), two multidisciplinary master's degrees (from UCL and Durham University), a PgC (from the University of Bath), and a bachelor's degree (from Durham University), all in the energy and climate field. Peter is a Chartered Environmentalist (CEnv) and is a part-time Lecturer in energy and climate policy at UCL (since 2013). He has published 17 academic papers and 7 conference papers in the energy and climate field.



Mr. Marcus Williams - Sector Manager, Energy and Extractives, MIGA

Marcus Williams is the Global Head for Energy, Oil & Gas and Mining at the Multilateral Investment Guarantee Agency (MIGA), the political risk insurance and credit enhancement arm of the World Bank Group. He has been in this role since November 2017 prior to which he was Acting Global Head since September 2015, and previously Lead Operations Officer.

From 2004-2014, Marcus was Adviser to MIGA's Executive Vice President with responsibilities that included overseeing corporate strategy and Board relations, and managing the corporate communications team. From 2004 to 2006 he was Chief of Staff.

Before this, Williams held several positions in the World Bank and in MIGA including: Officer in the World Bank's Corporate Strategy Group, working with the World Bank Group's President and Senior Management on the Group's long-term strategy and business agenda; Senior Business Development Officer heading the Business Development team at the World Bank's Global Development Learning Network; Officer in MIGA's Guarantee Department.

Before joining the World Bank Group, Williams spent two years with Wharton Econometric Forecasting Associates covering the international energy markets.



Mr. Rohit Khanna - Practice Manager, ESMAP, World Bank

Rohit Khanna is Manager for Energy Climate Finance and the Energy Sector Management Assistance Program (ESMAP) at the World Bank. Mr. Khanna, an Indian national, joined the World Bank in 2000. Prior to assuming his current position, Mr. Khanna worked on the Global Environment Facility (GEF) and Clean Technology Fund (CTF) at the World Bank. He has worked in Cambodia, Ghana, and South Africa, and was part of the team that developed the CTF investment program for Concentrating Solar Power in the Middle East and North Africa. Before joining the Bank, he was a Program Officer in the United Nations

Environment Program and worked for Save the Children Federation in its Bhutan Field Office. Mr. Khanna is a graduate of the University of Delhi and has a Master of Public Administration degree from American University in Washington, DC.



Peter Mockel - Principal Industry Specialist, International Financial Corporation (IFC)

Peter Mockel is a Principal Industry Specialist at the International Financial Corporation (IFC) of the World Bank Group. He focuses on energy storage and smart grid technology for emerging markets. Previously CTO with a Berlin-based smart electricity metering start-up, and with more than 10 years in telecommunications with Deutsche Telekom AG as VP Strategy Development and SVP R&D, and in consulting with Booz, Allen & Hamilton.

He is the co-author of "Applied Technology and Innovation Management" (Springer 2010) and "Technological Trends in ICT" (Springer 2012).

Peter holds a B.A. (Hons) and M.A. in Computer Science from Cambridge University, UK, as well as a M.Sc. in Software Engineering from TU Aachen, Germany.



Achal Sondhi - APAC Market Director, Fluence

Achal Sondhi is the APAC Market Director at Fluence. In this role, he supports the regional sales team and helps customers identify applications that are attractive and economical for energy storage development. As part of his responsibilities, he works to educate potential customers and stakeholders on the benefits of energy storage. Achal has been in various roles in the energy industry his whole career, including as Business Development Manager for Symbior Energy in Hong Kong, with AES, in their global corporate finance team based out of Washington DC and ICF International advising public and private sector clients evaluate the wholesale power market across North America and Europe. Most recently Achal was at GE Capital as Vice President of Energy Financial Services, where he worked on both advisory and investment execution for Energy transactions around the world.



Mr. Jerome Ortiz - Managing Director Asia at BrightNight

Jerome leads the Asia team and he is responsible for BrightNight's operations in Asia. He brings over 15 years of development and financing experience in the power and renewables sector across various emerging markets.

Prior to joining BrightNight, Jerome was Vice President at 8minutenergey, where he spearheaded the firm's efforts into fast growth markets in Asia, with a particular focus on development and capital raising activities. He was instrumental in developing one of the first utility-scale solar projects in Bangladesh.

Previously, Jerome held several senior banking project finance roles. He was Senior Vice President and acted as Asia Head of Power & Renewables at MUFG, the largest project finance bank globally, where he led a team that arranged and advised several billion dollars' worth of conventional power and renewable energy project finance transactions across Asia. Prior to that, Jerome was a senior Director at Standard Chartered Bank in London and Singapore, where he led multiple advisory, project finance and capital raising transactions in Asia and Africa. He notably led the bank's successful efforts into the renewable energy market in India, which would become one of the largest renewable market in Asia.

Jerome lives in Singapore with his wife Sandra and two children, Anna and Max. He holds a master's degree from Grenoble university and a bachelor's degree in Economics and Finance from Nantes university.

Mark Leslie - Managing Director Asia Pacific, Macquarie Group

Mr. Zhang Yongmiao - General Manager for the Green Finance Center, Huaxia Bank



Mr. Aman Hans - Consultant, Niti Aayog, India

Aman Hans is a Public Private Partnership Specialist (Lead Consultant) with NITI Aayog, Government of India. He has over ten years of experience in diverse facets of public policy and structured finance. Prior to NITI Aayog, he served with multi-national corporates including SBI Capital Markets Ltd., Sumitomo Mitsui Banking Corporation, Ernst & Young LLP and ITC Ltd. He holds a B.A in Mathematics (Hons) from St. Stephen's College, Delhi University, a post-graduate degree in Msc Finance from Warwick Business School (U.K) and is a level-3 Candidate CFA, Virginia USA.

Dress code

The dress code for the entire event is **business casual** (e.g. Jacket optional, no tie).

Venue Information

Location

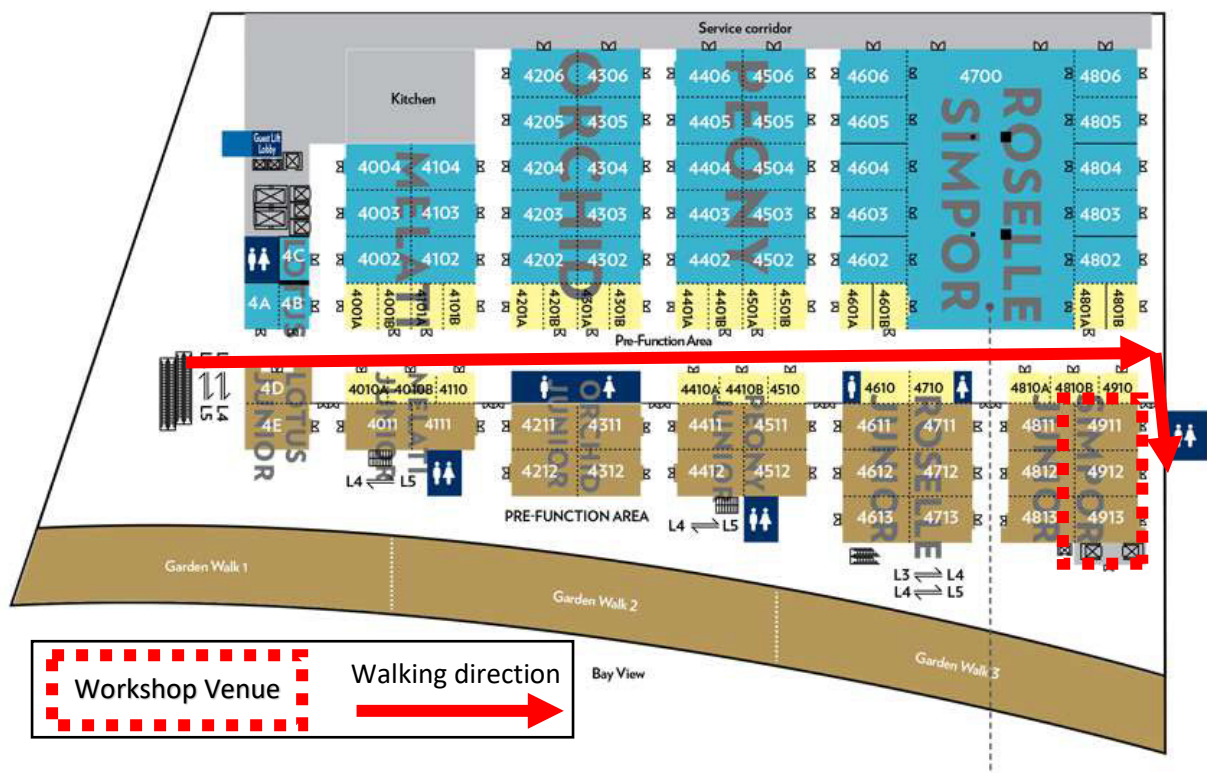
The workshop will be held at:

MARINA BAY SANDS (MBS) CONVENTION CENTER

Address: 10 Bayfront Ave, Singapore 018971

SIMPOR JUNIOR, LEVEL 4, ROOM: 4911-4913

As the workshop is held concurrently with the Singapore International Energy Week and Asia Clean Energy Summit, we expect a high volume of delegates and events that are happening at the same time at Marina Bay Sands (MBS) Convention Centre. Therefore, please note the venue and the location as per the level 4 floorplan below.



Registration

You may check-in and pick up your badges at the registration counters located outside Roselle-Simpur Ballroom, Level 4.

Admission is restricted to registered participants only. Participants are always advised to put on their badges for identification purposes. Only participants who are wearing the Delegate badge can enter the conference rooms and exhibition hall.

Registration Counter Opening Hours and Lanes:

Date	Time	Registration Counter Number
31 October 2019	07:30 hrs – 18:00 hrs	Counter 7 & 8 – “World Bank”
1 November 2019	08:00 hrs – 18:00 hrs	Counter 7– “World Bank”

Parking

ACES 2019 is a carbon neutral event and we encourage all participants to play their part to lower their carbon footprint by taking public transport. However, if you still prefer to drive, car park coupons are available for purchase at Level 1, Concierge at SGD 8 nett (for parking from 08:00hrs to 18:00hrs daily).

Refreshments

Lunch and tea breaks will be catered for at the event. Tea breaks will be served outside the workshop while lunch will be held in conjunction with the concurrent events at the exhibition all area. Timing for the refreshments are as per the program.

World Bank – Infrastructure Asia Networking Cocktail

The evening cocktails will be held at the World Bank Group Singapore Hub Offices at:

MARINA BAY FINANCIAL CENTRE (MBFC) Tower 2, Level 12

Address: 10 Marina Boulevard, MBFC Tower 2, #12-01, Singapore 018983

There will be a shuttle to take delegates from the Marina Bay Sands Convention Center to World Bank Offices. Please see timings at the venue shuttle section below.

Security clearance is required for entry into the lift to level 12, however your name has already been provided to security for pre-clearance. Please proceed to Level 12 of Tower 2 after making yourself known to security/reception desk at level 1.

The bus drop-off point will be at Tower 3, hence you will be required to walk from the drop off point of tower 3 to the lift lobby of Tower 2.

The pick-up point for the shuttle heading back to the hotel will be the same as the drop off point.



Accommodation

Hotel Information

The World Bank has reserved a block of rooms for World Bank Staff and Government Officials, and negotiated preferential rates at the JW Marriott Hotel Singapore South Beach for the event.

JW MARRIOTT HOTEL SINGAPORE SOUTH BEACH

Address: 30 Beach Road, Nicoll Hwy, Access Via, 189763

Tel: +65 6818 1888

Fax: +65 6822 2321

Webpage: <https://www.marriott.com/hotels/travel/sinmw-jw-marriott-hotel-singapore-south-beach>

- The negotiated rate is for Single Occupancy and includes buffet breakfast and standard in-room internet access.
- Check-in date is no earlier than Wednesday, October 30, 2019 and check-out date is no later than Saturday, November 2, 2019.
- Check-in time is 3:00 pm and check-out is 12:00pm noon. Late check-out and early check-in is subject to availability and additional charge.

Should participants change their arrival date or cancel, please contact your focal point immediately to avoid cancellation penalties. For security reasons, as a participant in the workshop, you are required to stay at the hotel we have selected for the event.

Travel and Transport

Visa to Singapore

According to the Immigration and Checkpoints Authority of Singapore (ICA), an entry visa is required for foreigners from the below-listed countries/regions to Singapore. However, given the constant changes without noticing, *we encourage participants from **all countries** to re-check visa requirements as early as possible with the Singapore consular affairs office in their respective city/country, before they travel at (<https://www.ica.gov.sg/enteranddeparting/before/entryvisa>).*

It is the responsibility of the delegates to obtain a visa to enter Singapore or transit visa for connecting flights if necessary. Please begin your visa request as soon as possible. Ensure that your passport has at least six months' validity upon arrival in Singapore.

If you need an invitation letter to expedite your visa, please contact Noppakwan Inthapan (Kwan) noppakwan@worldbank.org.

Airport Transfers

Please find information on public transportation from Changi Airport to downtown at this website: <http://www.changiairport.com/en/transport/public-transport.html>

The hotel is located about 20 minutes from Changi International Airport Singapore by taxi at a cost of S\$20-30+ depending on traffic condition.

REGULAR TAXI

- Taxis are available at taxi stands on the Arrival levels of each Terminal.
- A ride to the city takes about 20-30 minutes and costs between SGD 20 and SGD 40.
- Fares are metered but also subject to the following surcharges, as applicable: and there is an additional Airport surcharge for all trips originating from the Airport.

LIMOUSINE & LARGE TAXI

- For dedicated taxis to accommodate larger groups, please approach the 24-hour Ground Transport Concierges at the Arrival Halls.
- Rates: SGD 55.00 (4-seater limousine); SGD 60.00 (7-seater large taxi)

Venue Shuttle

Please noted that we will provide shuttle bus from the JW Marriott Hotel Singapore South Beach to Marina Bay Sands Convention Center as following:

October 31, 2019

- 07:50 am Bus depart the **hotel** to Marina Bay Sand Convention Center
- 07:00 pm Bus depart **Marina Bay Sand Convention Center** to World Bank Offices
- 08:45 pm and 09:00 pm Bus depart **World Bank Offices** to hotel

November 1, 2019

- 08:30 am Bus depart the **hotel** to Marina Bay Sand Convention Center
- 03:00 pm Bus depart Marina Bay Sand Convention Center to hotel

Mass Rapid Transit (MRT)

JW Marriot – MBS

- Please take the Circle Line (CCL) at **Esplanade** Station (**CC3**), which is below the JW Marriot hotel, for two (2) stops and alight at **Bayfront** Station (**DT16** / **CE1**).
- The **Bayfront** Station (**DT16** / **CE1**) is located next to the MBS Convention Centre at Basement 2.

MBS – MBFC

- To travel from MBS Convention Centre to MBFC, please take the Downtown Line (DTL) at **Bayfront** Station (**DT16** / **CE1**) for one stop and alight at **Downtown** Station (**DT17**).
- MBFC Tower 2 is also located above the **Downtown** Station (**DT17**) of the Downtown Line (DTL). The **Bayfront** Station (**DT16** / **CE1**) is located next to the MBS Convention Centre at Basement 2.

Driving

We encourage all participants to play their part to lower their carbon footprint by taking public transport. However, if you still prefer to drive, parking coupons are available for purchase at Level 1, Concierge at SGD 8 nett (for parking from 08:00hrs to 18:00hrs daily).

General information about Singapore

Language

English is the main language in Singapore. Mandarin, Malay and Tamil are also official languages.

Climate & Weather

It is hot and humid all year round with no distinct seasons given Singapore's tropic location. Rain falls almost daily especially throughout October to March, therefore it is advisable to carry an umbrella at all times for the rain and for sun. Average temperatures for Singapore in March are 24°C/75°F (Low) and 31°C/88°F (High).

Useful Contacts

Emergency contact for World Bank staff (not based in Singapore): + 1 202 458 8888

Ambulance and Fire: 995

Police: 999

Weather: 6542 7788

Foreign Exchange Rate and Banking

The monetary unit of Singapore is Singapore Dollar (SGD). Singaporean currency consists of 5c, 10c, 20c, 50c and \$1 coins and 2, 5, 10, 50, 100, 1000-dollar notes. (1 USD = SGD 1.35)

Internationally recognized credit cards including VISA, AMEX, Master Card and JCB can be used to get cash advance in Singapore Dollar at ATMs installed at airports, major hotels and convenience store.

Electricity

The standard voltage in Singapore is 220V/240V, 50 Hz. If you have equipment that runs on a higher voltage, you should not connect it to Singaporean power unless you have the correct transformer (voltage adaptor).

Singapore uses the British BS1363 three-pronged square pin type socket (see below). Plugs from the US, Western and Eastern Europe, and Asia will not fit into a Singapore power plug unless with adaptor or transformer. Sheraton Hotel rooms have international plugs in the room sockets. It is suggested that you check with other hotels where you choose to stay or buy an adaptor. Some hotels may be able to lend you one, or not at all.

