ISUW 2020 MASTER CLASSES BROCHURE

MASTER CLASSES - AGENDA

03 MARCH 2020, 09:30 TO 17:30

TRACKT-1: TECHNOLOGIES ENABLING ENERGY TRANSITION: DIGITALIZATION **Regency 1&2, The Lalit Hotel, New Delhi**	
Background The energy transition taking place today is driven by mainstreaming distributed renewable energy (DRE) resources in the power system. DRE which are intermittent require a host of technologies to integrate with the grid for stable operation. Digital technologies are playing a vital role in increasing the visibility of power flows on the grid and offer flexibility in demand as well as help forecast demand and generation from DRE. Advanced Metering Infrastructure (AMI) or Smart Metering is a key application facilitating digitalization of the electric grid. The energy transition also paves the way for more consumer participation as well as optimum usage of decentralized resources because of which more human machine collaboration at user end is coming into play and energy efficiency and conservation becoming a priority. For example, Smart meters are capable of two-way communication between power system operators and consumers which can detect and instantly react to local changes in generation and demand, increasing efficiency and flexibility. Artificial intelligence (AI) is another emerging area that could bring out new insights on the status of the grid and its operations from the massive data the new technologies are gathering. AI will sweep through this data at a rapid rate, pinpointing patterns of behavior and making accurate predictions on energy demand and much more. This course will cover key topics listed below.	
SESSION 1 **Time:** 09:30~13:00	1. Digital Consumers 2. AMI and Utility Transformation – Different Use Cases 3. Asset Management through Advance Analytics
Tutors: 1. **Dan Nordell,** AMI Leader, Xcel Energy Inc 2. **Anant Venkateswaran,** India Smart Grid Forum 3. **Ajoy Rajani,** India Smart Grid Forum	
Time: 13:00~14:00	**LUNCH AT THE PRE-FUNCTION AREA OF REGENCY**
SESSION 2 **Time:** 14:00~17:30	1. Cybersecurity in the Digital Age 2. Cloud – The enabler for Digitalization. 3. An introduction to AI, Machine Learning, and Big Data and their Impacts on the utility. 4. Unlocking the “Fifth Fuel” - Increased Energy Efficiency with Machine Learning and Big Data
Tutors: 1. **Andrew Ginter,** VP, Industrial Security at Waterfall Security Solutions 2. **Prateek Parashar,** Oracle Technologies 3. **Anant Venkateswaran,** India Smart Grid Forum	
Session Coordinator: **Suddhasatta Kundu,** ISGF	**Contacts:** s.kundu@indiasmartgrid.org | +91 96744 46886

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TRACK-2: TECHNOLOGIES ENABLING ENERGY TRANSITION: E-MOBILITY

Regency 5, The Lalit Hotel, New Delhi

Background

India has launched a number of schemes and initiatives to stimulate and expedite the adoption of Electric Vehicles (EVs) in the country such as the 'National Electric Mobility Mission Plan (NEMMP) 2020', followed by the introduction of the scheme named 'Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles (FAME India)'. The FAME-II, an extension of the FAME scheme, was launched in 2019.

Eight state governments have released final and draft versions of electric vehicle policies for their respective states. Twelve states and one union territory have also introduced separate EV tariff. Because of Indian standards (BIS) issued IS: 17017-Part-1, 21, 23 and 24, related to EV charging equipment. Several other policy initiatives have been taken by Ministry of Power, Department of Heavy Industries, NITI Aayog and Ministry of Road Transport and Highways.

This course will cover EV policies and programs in India vis-a-vis what are leading countries in the world. Introduction to EV charging infrastructure, standards and communication technologies.

SESSION 1 **Time:** 09:30~11:00	1. Global EV Deployment 2. EV Technologies 3. International Best Practices
Tutor: **Girish Ghatikar,** EPRI, USA and India Smart Grid Forum	
Time: 11:00~11:30	**TEA/COFFEE BREAK**
SESSION 2 **Time:** 11:30~13:00	1. Electric Vehicle Charging Infrastructure 2. Vehicle to Grid Integration 3. Enhancement and Health Management
Tutors: 1. **Lonneke Driessen-Mutters,** OCPP Alliance, Netherlands 2. **Reji Kumar Pillai,** India Smart Grid Forum	
Time: 13:00~14:00	**NETWORKING LUNCH - PRE-FUNCTION AREA OF REGENCY**
Session Coordinator: **Anand Singh,** ISGF	**Contacts:** anand@indiasmartgrid.org | +91 99252 18036

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TRACK-3: ADVANCED CYBER SECURITY

Regency 5, The Lalit Hotel, New Delhi

Background

Security has become a crucial factor for the success and wide deployment of smart grid technologies. A cyber-attack on the power grid could result in complete disruption of all activities in the society and it can cause electrical blackouts and compromise even national security. Cyber security is a growing concern and a key success factor for reliable operation of the power systems. According to an IT Governance Report, there were more than 1.7 billion data breaches and cyber-attacks in January 2019 alone. A cyber-attack can have far-reaching implications including financial losses, theft of intellectual property, and loss of consumer confidence and trust. Cybercrime affects society in a number of different ways, both online and offline.

SESSION 1 **Time:** 14:00~16:00	1. Attack Patterns 2. Defenses and Their Limitations
Tutors: 1. **Andrew Ginter,** Vice President, Waterfall Security Solutions 2. **Anant Venkateswaran,** India Smart Grid Forum	
Time: 16:00~16:30	**TEA/COFFEE BREAK**
SESSION 2 **Time:** 16:30~17:30	Designs for High-Threat Environments
Tutor: **Andrew Ginter,** Vice President, Waterfall Security Solutions	
Session Coordinator: **Anand Singh,** ISGF	**Contacts:** anand@indiasmartgrid.org | +91 99252 18036

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TRACK-4: TECHNOLOGIES ENABLING ENERGY TRANSITION: ENERGY STORAGE SYSTEMS (ESS)

Regency 3, The Lalit Hotel, New Delhi

Background

India's renewable energy (RE) target of 175 GW (including 40 GW RTPV Solar) target by 2022 is well on track – having achieved 87 GW by January 2020. ISGF undertook detailed studies and estimated 17 GWh of battery energy storage systems (BESS) requirements for integration of 175 GW of RE to the grid by 2022. Besides this, BESS required for other stationary applications such as data centres, telecom towers, UPS and inverters, DG replacement and etc., is calculated at 121 GWh making an aggregate requirement of 138 GWh for stationary applications. Electric Vehicles (EVs) would require another 40 GWh of BESS during the same period, up to 2022. This session will discuss key topics listed below.

SESSION 1 **Time:** 09:30~13:00	1. Battery Technologies for Grid Storage and Electric Vehicles 2. Energy Storage Systems Roadmap for India: 2019-2032

Tutors:

1. **Arumugam Manthiram, Director,** Texas Materials Institute, Materials Science and Engineering Graduate Program, The University of Texas, Austin, USA
2. **Ravi Seethapathy,** Honorary Member and WG Chair, ISGF and Chairman, Biosirus Inc. Canada

Time: 13:00~14:00	**LUNCH AT PRE-FUNCTION AREA OF REGENCY**
SESSION 2 **Time:** 14:00~17:30	1. Manufacturing of Energy Storage Systems in India 2. Value Streams and Business Case for Energy Storage: Impact of Power Market Design and Regulation 3. Battery Requirements for Electric Mobility in India 4. Storage Projects: International Best Practices and Lessons for India

Tutor:

Rahul Walawalkar, India Energy Storage Alliance (IESA)

Session Coordinator: **Shuvam Sarkar Roy,** ISGF	**Contacts:** shuvam@indiasmartgrid.org | +91 9874969066

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PROFILE OF TUTORS

Ajoy Rajani

Ajoy Rajani is a renowned expert in the M2M space – he pioneered M2M and AMR in India, prior to that he was involved with one of the largest AMR deployments in combined Americas at EPSA. He has been at the forefront of innovation in Communication technologies particularly Powerline and Wireless Communications. He has several papers to his credit and was the key-note speaker and guest of honour at the Vienna PLC gathering in 2007 for having completed one of the world's largest Broadband over Powerline deployments. The wireless AMR architecture developed by him was awarded the 3G global industry award in 2009.He was instrumental in Reliance garnering the largest share of the low-cost telephony market in India. As a past entrepreneur Ajoy Rajani built a successful enterprise in India and exited the same in 2004 and joined Reliance Energy as their CTO. Presently he is Chair of ISGF Working Group on IOT, Smart Metering AI & Analytics.

Anant Venkateswaran

An experienced industry professional with over two decades of international experience in business, financial, regulatory/policy, operations and technology aspects of the energy and utility sector. Anant Venkateswaran serves on several technical, standards, advisory and tutorial committees and is a teacher, presenter, panellist, moderator and speaker at international venues including Distributech, ISGW, IEEE and CIGRE. Working across the globe, he has managed major technology investments and advised clients from visioning to validation. A senior member of the team accountable for strategy, trusted advisory/ consultative, thought leadership and partnerships, Anant has worked both in the traditional aspects of the grid as well new and emerging areas of Big Data, IoT, Cloud Computing and Smart Energy. Anant has worked with several industrial, utility & Govt customers globally. Anant is based in Denver, Colorado and is currently with ABB's Power Grid Solutions business.

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Andrew Ginter

Andrew Ginter is the VP Industrial Security at Waterfall Security Solutions, leading a team of experts who work with the most secure industrial sites on the planet. Andrew is the co-chair of the ISA SP-99 Working Group 1 and is a frequent contributor to cybersecurity standards, regulations and post-secondary curricula. He is the author of two books, ***"SCADA Security – What's broken and how to fix it"*** and ***"Secure Operations Technology"***, and is a co-author of the ***"Industrial Internet Consortium Security Framework"***. Andrew has 20 years of experience, leading the development commercial products for industrial control systems, IT/OT middleware and industrial cybersecurity, and he holds a dozen industrial cybersecurity patents. Andrew was awarded BS AMAT and MS CS degrees from the University of Calgary.

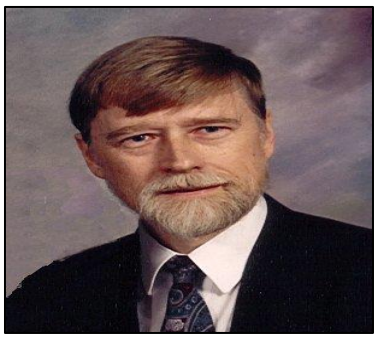
Arumugam Manthiram

Arumugam Manthiram is currently the Cockrell Family Regents Chair in Engineering and Director of the Texas Materials Institute and the Materials Science and Engineering Program at the University of Texas at Austin (UT-Austin). He received his Ph.D. degree in chemistry from the Indian Institute of Technology Madras in 1981. After working as, a postdoctoral researcher at the University of Oxford and at UT-Austin with 2019 Chemistry Nobel Laureate Professor John Goodenough, he became a faculty member in the Department of Mechanical Engineering at UT-Austin in 1991. Dr. Manthiram's research is focused on clean energy technologies: rechargeable batteries, fuel cells, and supercapacitors. He has authored more than 770 journal articles with around 61,000 citations and an h-index of 125. He directs a large research group with about 30 graduate students and postdoctoral fellows. He has provided research training to more than 250 students and postdoctoral fellows, including the graduation of 60 Ph.D. students and 26 M.S. students. He is the Regional (USA) Editor of Solid-State Ionics, Co-Editor of Ceramics in Modern Technologies, and an Associate Editor of Energy and Environmental Materials.

Dr. Manthiram is a Fellow of six professional societies: Materials Research Society, Electrochemical Society, American Ceramic Society, Royal Society of Chemistry, American Association for the Advancement of Science, and World Academy of Materials and Manufacturing Engineering. He is an elected member of the World Academy of Ceramics. He received the university-wide (one per year) Outstanding Graduate Teaching Award in 2012, Battery Division Research Award from the Electrochemical Society in 2014, Distinguished

Alumnus Award of the Indian Institute of Technology Madras in 2015, Billy and Claude R. Hocott Distinguished Centennial Engineering Research Award in 2016, Da Vinci Award in 2017, Honorary Mechanical Engineer of the ME Academy of Distinguished Alumni Award in 2019, Henry B. Linford Award for Distinguished Teaching from the Electrochemical Society in 2020, and Research Award of the International Battery Association in 2020. He is a Web of Science Highly Cited Researcher in 2017, 2018, and 2019. He delivered the 2019 Chemistry Nobel Prize Lecture on behalf of Professor John Goodenough in Stockholm.

Daniel E. Nordell, P.E.



Daniel E. Nordell received the BSEE degree with distinction from the University of Minnesota in 1970. He has been employed by Xcel Energy (formerly Northern States Power Company) since 1969. During that time, he has been engaged in long-range research activities on a variety of utility system problems including the development and testing of new communication technologies and architectures, advanced distribution automation techniques, and state-of-the-art metering and automatic metering systems.
He is currently working on the deployment of solid-state meters in an AMI system. He has been an active participant in the development of the Utility Communication Architecture (UCATM) and IEC61850 standards and is a member of the IEEE Power System Communication Committee and of the US delegation to the International Electrotechnical Commission. He is a contributing member of the ANSI C12 electricity meter standards committee. Mr. Nordell is a registered professional engineer in the state of Minnesota.

Girish Ghatikar

Girish Ghatikar is a Senior Program Manager and leads the information and communication technologies (ICT) for distributed energy resources (DER) and integration research at Electric Power Research Institute (EPRI) in Palo Alto, California. The research identifies, creates, and transfers ICT-centric solutions for the adoption of DER into the power system.

Before joining EPRI, Ghatikar was the Chief Research Officer at Greenlots and led the development of electric vehicle-grid and battery storage-integrated systems. At the U.S. Department of Energy's Lawrence Berkeley National Laboratory, he was the Deputy Leader for Grid Integration program and the Chief Architect for international standard, OpenADR.

Girish Ghatikar's work has appeared in over 75 publications and he is regularly asked to speak at events and conducted trainings related to clean transportation and clean energy. Ghatikar holds Master's Degrees in Telecommunication systems, Computer Technologies and Infrastructure. He is also the Chair of ISGF Working Group on Flexibility & Electric Mobility.

Lonneke Driessen - Mutters

Lonneke Driessen-Mutters is Director Standardization and Test Lab at ElaadNL. ElaadNL is the Knowledge and Innovation Centre in the field of (smart) charging infrastructure in the Netherlands and is owned by the Dutch Grid Operators. Within ElaadNL, she is responsible for the EV Charging Testing facilities, open standards development in secure EV charging and is in charge of activities regarding the Open Charge Alliance (OCPP) and EClearing.net (Roaming solutions and Public Key Infrastructure solutions). Lonneke Driessen has a longstanding career in the Utility Industry and has operated in key strategic developments, such as market liberalization, smart metering and smart grids before entering the EV charging domain three years ago. She has a Master of Science degree in Electrical Engineering from the Delft University of Technology.

Prateek Parashar

Prateek Parashar is an engineering graduate from IIT, Roorkee with 20+ years of experience in technology & leadership roles. He is currently heading the Cloud Program & Release Engineering for all Oracle Utilities Products for On-Premise as well as cloud native. His team is responsible for providing technology leadership, platform expertise, Release Engineering & Operations and driving Cloud Releases for all products in Utilities Global Business Unit. He has worked in various roles like Director, Program Management, Senior Technology Architect, Operations Manager, Systems Engineer, Automation Engineer in wide kinds of technology projects.

Rahul Walawalkar

Rahul leads the Emerging Technologies & Markets practice for Customized Energy Solutions. Customized Energy Solutions manages a portfolio of over 3000 MWs of resources including 1300 MWs of wind in various markets in US.

In 2012, Maharashtra Electricity Regulatory Commission (MERC) nominated him as chairperson of working group on Integrating Renewable Energy Sources (RES), Micro-Grids and Energy Storage as part of Smart Grid Coordination Committee.

In June 2013, he was also nominated as member of national taskforce for integration of Electricity from renewable Energy sources in the Grid during the 12th Plan by Central Electricity Authority & Ministry of Power.

Rahul currently serves on the Board of Directors of Electricity Storage Association and is also Executive Director for India Energy Storage Alliance. Recently he has been appointed as Chairman of Global Energy Storage Alliance.

Ravi Seethapathy

After 35+ year career in Electric Utilities/Power Systems, Ravi Seethapathy is now an Advisor to the Utility/Industry, and sits on the Boards of Power Transmission & Distribution (IC) Division of Larsen & Toubro, India; Biosirus Inc., Canada; Smart Grid Canada, and India Smart Grid Forum. His current international activities include (1) “Ambassador for the Americas”, Global Smart Grid Forum; (2) CIGRE Convener WGC6.28-Remote Grids; (3) IEA PVPS Taskforce 14 – Large Scale Solar Integration; (4) IEC TC 120 – Energy Storage; (5) IEC SEG4-LVDC; and (6) Chair, India Smart Grid Forum WG 5-RE & Micro-grids. He an invited speaker internationally and has co-authored over 50 technical papers in the areas of Smart Grid. He Founder/ Executive Chair of Biosirus Inc. in Canada.

Retired in 2014 after 31 year career in Hydro One/Ontario Hydro (a leading utility in Canada), where he managed leading portfolios in R&D, Innovation, Smart Grid Projects, Energy Storage, Renewable Energy Integration, Asset Management, Corporate Operations/Technical Audit, M&A (500M$), Field Operations, and Relaying and Control. His past corporate directorships include Toronto Atmospheric Fund, Ryerson University, TV Ontario, Scarborough Hospital, Nevaro Capital

Corp, Engineers without Borders (Chair), Canadian Club of Toronto (President), Indo-Canada Chamber of Commerce (President).

Ravi has received numerous honours and citations including Queen Elizabeth Diamond Jubilee Medal (2012), Fellow Canadian Academy of Engineering (2012), Hydro One President's Award (2008), Honour Roll of the Shastri Institute (2008), Honorary Fellow, Centennial College (2005), and Indo-Canada Chamber of Commerce (1996) to name a few. Ravi's education includes a B. Tech (Hons) in Electrical Power from IIT, Kharagpur, India; an M. Eng. in Electrical Power from the University of Toronto; and an MBA from the Schulich School of Business, York University. His family/he have endowed an IEEE Award in "Rural Electrification Excellence". He is also Chair of ISGF Working Group on Renewables & Microgrids.

Reji Kumar Pillai

Reji is the President of India Smart Grid Forum (www.indiasmartgrid.org) since its inception in 2011 and is also the Chairman of Global Smart Grid Federation since November 2016. He is an internationally renowned expert with over three decades of experience in the electricity sector in diverse functions covering the entire value chain and across continents. He is spearheading a mission to leverage technology to transform the electric grid in India and light every home at affordable cost through sustainable developmental models. Reji played the pivotal role in formulation of the Smart Grid Vision and Roadmap for India (August 2013) and the launch of a National Smart Grid Mission (March 2015) by Government of India, issue of Model Smart Grid Regulations (June 2015) by Forum of Regulators; and issue of National Standards for Smart Meters (IS: 16444 -2015 and IS 15959 Part 2), Electric Vehicle Charging Infrastructure (IS: 17017-2018) by Bureau of Indian Standards; and Energy Storage Roadmap for India (October 2019). He is presently advocating for a "Right to Electricity Act" that will ensure lifeline supply of electricity to all citizens in the country. His current areas of research and work include: Integration of Distributed Renewable Energy Resources and Electric Vehicles on the Low Voltage Distribution Grid, Smart Grids as Anchor Infrastructure for Smart Cities, Development of Smart City Maturity Model and Electric Vehicle Maturity Model, Grid Interactive Buildings and Campuses, Blockchain for Utilities; Future of Transportation; Policies and Business Models for Electric Vehicle Rollouts and Charging Infrastructure; and Interconnection of Regional Grids in Asia - ASEAN, SAARC and GCC grids.

In November 2016 Reji was unanimously elected as Chairman of Global Smart Grid Federation (GSGF), a global umbrella organization of smart grid associations and utilities from 16 countries and the European Union. As an entrepreneur, Reji has built successful enterprises in India and overseas and exited them. He has studied Engineering, Finance, Management and Law; worked with NTPC and IBM and has been senior consultant with ADB, World Bank and USAID. A

recognized thought leader in smart grid technologies, concepts of smart cities and electric vehicles, Reji is a popular key-note speaker at international symposiums and conferences on smart grids, smart cities and e-Mobility. He has also contributed to several articles, books, research reports and white papers on variety of topics.