2nd International Conference on Energy Systems Integration

UKERC
UK Energy Research Centre

Imperial College London

EERA
European Energy Research Alliance

CESI
National Centre for Energy Systems Integration

ESIG

Welcome

We are excited to host you at the Second International Conference on Energy Systems Integration (ICESI). Throughout the program, you will hear from subject matter experts, researchers, and thought leaders from around the world as we discuss this year's conference theme, "100%: The Role of Energy Systems Integration".

The first ICESI was held at the National Renewable Energy Laboratory in Colorado, USA in December 2017, hosted by the International Institute for Energy Systems Integration (iiESI). Following its success, iiESI has become the Research & Education Working Group within the Energy Systems Integration Group (ESIG) and we decided to bring the event to London. This year's conference is hosted by ESIG, Imperial College, UK Energy Research Centre (UKERC), National Centre for Energy Systems Integration (CESI), European Energy Research Alliance (EERA).

The transformation of our energy systems is happening rapidly and the importance of integrating across these systems is recognized. With the conference theme, "100%: The Role of Energy Systems Integration", we encourage you to think of achieving 100% in all its possible meanings. Our goal for this conference is to address 100% of the energy system and 100% of the integration challenges. We are calling attention to several energy sectors to better understand their unique challenges, as well as unique solutions.

Mark O'Malley - ESIG Research and Education Working Group

Tim Green - Imperial College

William Burns - UKERC

Laurens de Vries - EERA JP ESI

Phil Taylor - CESI

Opening Session

Michael Leibreich – Chief Executive Ofiicer, Leibreich Associates

Michael is Chairman and CEO of Liebreich Associates, through which he provides advisory services and speaks on clean energy and transportation, smart infrastructure, technology, climate finance and sustainable development. He is also the Founder and Senior Contributor to Bloomberg New Energy Finance. He is a member of the UK Department for International Trade's Capital Investment Advisory Board and a Visiting Professor at Imperial College's Energy Futures Lab and most recently joined Sustainable Development Capital LLP (SDCL) as a Senior Adviser. Michael serves on too many advisory boards to list, he is a prolific speaker and writer, and is known to make the occasional angel investment.

Mike Hemsley –Senior Power Analyst, Committee on Climate Change

Mike Hemsley leads the CCC's work on power sector decarbonisation, having joined the Committee on Climate Change five years ago. He has focused on technologies and policies to reduce emissions in the UK power system, as well as improving electricity system flexibility and producing research on the costs of low-carbon policies on consumer bills in the UK. He has recently completed the CCC's review of the best use of hydrogen to meet UK decarbonisation targets, alongside a modelling project on the system costs of decarbonising heat. Prior to joining the CCC, Mike studied Environmental Technology and energy policy at Imperial College London and worked in Brussels at the European Renewable Energy Council.

Session 1: **System Operator Perspective**

Vera Silva – Chief Technology Officer, GE Grid Solutions

Vera Silva is the Chief Technology Officer of GE Grid Solutions, reporting to the CEO and leading a global team of 3,400 engineers in over 17 countries. In this role, she leads the engineering team responsible for designing and producing products in high voltage equipment, HVDC systems, grid automation, grid software and grid services. Vera is a respected industry leader with 3 books and over 40 scientific papers published and was recognized as "Engineer of the Year" in 2016 by the IEEE Power and Energy Society. Vera holds a Ph.D. in Electrical and Electronic Engineering, from Imperial College London and an MSc in Electrical Engineering & Computer Science from the University of Porto, Portugal.

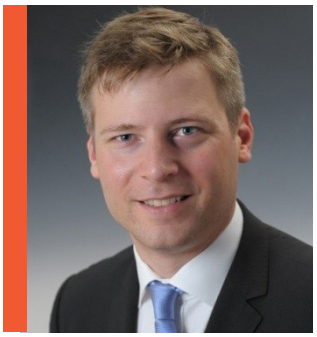
Fintan Slye – Director, National Grid UK

Fintan is currently the Director of the UK System Operator at National Grid covering both gas and electricity. Prior to that he was Chief Executive of the EirGrid Group, the electricity system and market operator in Ireland and North Ireland. He also spent a number of years with McKinsey, supporting companies across Ireland and the UK and with ESB where he held a number of roles in Ireland and the United States.

Gordon van Welie – President and Chief Executive Officer, ISO New England

Gordon van Welie, President and CEO of ISO New England, oversees New England's 32,000 megawatt bulk power system, the multi-billion dollar wholesale electricity marketplace, and a robust system planning process designed to ensure the region's long-term electricity needs. He has been the president and CEO since 2001. Before ISO New England, Gordon was Vice President and General Manager of Power System Control for Siemens. Earlier in his career, he worked in various roles with the South African utility, Eskom. Gordon holds a Bachelor of Science degree in Electrical Engineering and an MBA from University of Witwatersrand in South Africa.

Ulrich Janischka – Manager of Grid Planning, TransnetBW



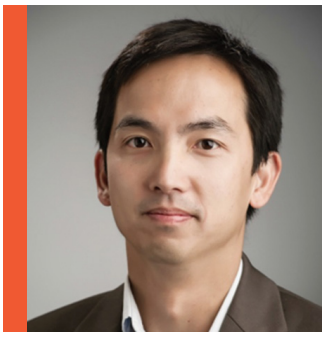
Ulrich Janischka forms part of the steering committee on the German Grid Development Plan in which the four German TSOs deliver solutions for the German "Energiewende". As manager of TransnetBW's grid planning team, he helps to organize the company's safe and efficient progress into a CO2-free and integrated energy system for Europe. For this purpose, he brings in several years of experience as a lobbyist for energy policy in Brussels and Berlin. In those places, he developed his career in electrical engineering by putting together questions asked by politicians and answers delivered by engineers. After almost ten years working in the area of German Energiewende his lesson learnt is: There will be no perfect match, so keep on iterating.

Session 2: **Demand**

Bri Mathias Hodge – Associate Professor, University of Colorado Boulder

Dr. Bri-Mathias Hodge is an Associate Professor in the Department of Electrical, Computer and Energy Engineering and a Fellow of the Renewable and Sustainable Energy Institute (RASEI) at the University of Colorado Boulder. He is also a Chief Scientist in the Power Systems Engineering Center at the National Renewable Energy Laboratory (NREL). His research focuses on the modeling and simulation of power and energy systems, with an emphasis on the operational and planning challenges posed by the integration of renewable energy sources, such as wind and solar power. He is an author on over 100 journal articles and conference papers in this area and has received five best paper awards at the IEEE Power & Energy Society General Meeting.

Trieu Mai – Senior Energy Analyst, NREL



Trieu Mai is a Senior Energy Analyst at the National Renewable Energy Laboratory (NREL). His research interest and expertise span a broad range of topics, including energy-economic modeling, renewable grid integration, clean energy policy, energy system transformation, and electrification. Trieu is currently the principal investigator for the NREL Electrification Futures Study. He was also a technical lead on the Renewable Electricity Futures study (2012) and since joining NREL in 2009 Trieu has contributed to over 70 technical reports and journal articles. Trieu holds a Ph.D. in physics.

Christian Gahm – Production Management Research Lead, University of Augsburg

Christian Gahm studied Applied Computer Science at the University of Augsburg. From November 2006 to 2010, he has been a research assistant (PhD) to the Chair of Production & Supply Chain Management. Since his doctorate in 2011, he leads the Production Management research group. In this area of research, he is involved in the development of tailor-made scheduling algorithms, energy-oriented production planning and advanced planning systems in operational practice. Transferring research results and latest methods into operational practice is of great importance to him and has already led to great success in many practical projects.

Angeliki Koulouri – Innovation Project Lead, UK Power Networks

Angeliki joined UK Power Networks as Innovation Project Lead in January 2018. Angeliki has over nine years of international work experience in the energy industry. Her background is in renewable energy generation, energy policy, energy consulting and project management of EU-funded projects, with a focus on community energy, energy efficiency and stakeholder engagement. Angeliki holds an MEng in Electrical and Computer Engineering and an MSc in Sustainable Energy Futures from Imperial College London.

Lunchtime Speaker

Thibault Prevost – Research Engineer, RTE France

Thibault Prevost is working for R&D of RTE (the French TSO) and has been since 2007. He has worked on grid connection studies for renewable energy and European grid code for generators. He is now working on a European project, Migrate and Osmose, leading work-packages on the operation of a system with only power electronic interfaced generation.

Session 3: **Transport**

Cathy McClay – Head of Future Markets, National Grid System Operator

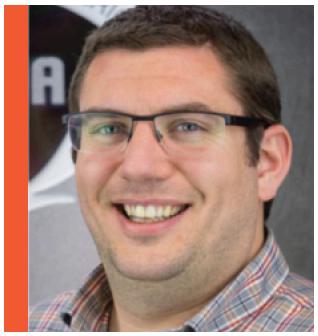
Cathy McClay is Head of Future Markets in the System Operator at National Grid. Cathy and her team work with the wider industry to develop and drive the change in the gas, electricity and capacity markets required to transition to the energy system of the future. Cathy has over 15 years' experience in the electricity industry working for several energy companies in the UK, France and the Netherlands where she specialised in modelling and analysis for trading, risk management and strategy. She is an engineer with a PhD from St John's College, Cambridge in the mathematical modelling of induction motors, a Fellow of the IET and a Visiting Professor at Imperial College. She is a non-exec director of Regen, Xoserve and ENTSOG.

Gernot Liedtke – Department Head Institute of Transport, German Aerospace Center (DLR)

Gernot Liedtke has studied Physics at the University of Stuttgart and industrial engineering at the Ecole Centrale Paris. Since 2000, he worked as a research assistant at the Institute for Economic Policy Research (IWW) at the University of

Karlsruhe (TH). In 2012, he qualified as a professor in economics with a habilitation treatise on modelling and assessing the emergence of logistics networks. In 2014 he received a call from Technical University Berlin in conjunction with a team leadership at the German Aerospace center (DLR).

Christopher Clack – CEO, Vibrant Clean Energy



Dr. Clack is the CEO of Vibrant Clean Energy (VCE), the company that he founded to push the forefront of system planning, optimization, and modeling to address the intelligent transformation of the electric and energy system. With a PhD in applied mathematics and plasma physics from the University of Sheffield, Dr. Clack is an expert in mathematics, statistics and optimization. Dr. Clack and his team at VCE created and utilize the WIS:dom optimization model to investigate various future energy systems that includes high penetration levels of renewables, electrification of end uses, new advanced and novel technologies, and climate change resilience.

Phil Blythe – Professor, Newcastle University

Phil Blythe is Chief Scientific Adviser for the Department of Transport (DfT) and Professor of Intelligent Transport Systems (ITS) at Newcastle. In his role at the DfT he provides a challenge function to the Department on the use of science and engineering evidence in policy making and also ensuring the Department is best informed on new innovations and technologies that may impact on the delivery of transport schemes. Phil's portfolio covers many strategic areas such as intelligent transport, connected and autonomous vehicles, electro-mobility and smart cities/big data/IoT however increasingly energy and the decarbonisation of transport is at the forefront of his agenda.

Session 4: **Transitioning to 100%**

Linda Steg – Professor, University of Groningen

Linda Steg is professor of environmental psychology at the University of Groningen. She studies factors influencing sustainable behaviour, the effects and acceptability of strategies aimed at promoting sustainable behaviour, and public perceptions of technology and system changes. She is member of the Royal Netherlands Academy of Sciences (KNAW), and lead author of the IPCC special report on 1.5°C and AR6. She participates in various interdisciplinary and international research programmes, and collaborates with practitioners working in industry, governments and NGOs.

Jonathan O'Sullivan – Manager of Innovation, EirGrid

Jonathan O'Sullivan is responsible for the facilitation of a broad innovation culture across Dublin and Belfast. Specifically, he is responsible for driving the EirGrid group response in Smart Grids and renewable energy systems integration including energy policy, new technologies and research. This includes responsibility for the Smartgrid Innovation Hub, the DS3 programme including systems services implementation, and new types of distributed power flow controllers. He has more than 13 year's worth of experience with EirGrid. Jonathan holds a

Ph.D in Electronic Engineering and Electrical Power Systems from University College Dublin.

Aidan Tuohy – Principal Project Manager, Electric Power Research Institute (EPRI)

Dr. Aidan Tuohy is a Principal Project Manager at the Electric Power Research Institute (EPRI). He joined EPRI in October 2010 and works in the Grid Operations and Planning group. He is the program manager for the EPRI research program on bulk system integration of variable generation, with research focusing on the impact of variable generation on power system operations and planning. Prior to joining EPRI, Dr. Tuohy completed his PhD at the University College, Ireland, and consulted at the IEA. He has published several journal papers and frequently presents at industry conferences. He chairs IEEE and ESIG working groups related to power system operations with variable generation and Market Design, and is also involved in IEA, IEC and CIGRE.

Keith Bell – Co-Director, UK Energy Research Centre

Keith Bell holds the ScottishPower Chair in Smart Grids at the University of Strathclyde and is a co-Director of the UK Energy Research Centre (UKERC) and a Chartered Engineer. Prior to joining the university in 2005, he worked as a system development planner in the electricity supply industry in Britain. He is actively involved with the Offshore Renewable Energy Catapult, The IET Power Academy, CIGRE and the European Energy Research Alliance. In recent years, he has given advice on electricity system issues to parties including the Scottish Government, the UK government, Ofgem and the Government of Ireland, and has collaborated with various industrial and academic partners across Europe.

Session 5: **Buildings & Cities**

Mackay Miller – Director of U.S. Strategy, National Grid U.S.

Mackay Miller is Director of U.S. Strategy for National Grid U.S., an electric and gas utility serving 6 million customers in New York, Massachusetts, and Rhode Island. His work focuses on transforming the utility business model and regulatory framework to enable decarbonization. Prior to National Grid, he worked at the National Renewable Energy Laboratory and the Department of Energy. He holds an MBA from the University of Colorado at Boulder, and a Bachelor's degree from Brown University.

Sim Kwong Mian – Chairman, SP Engineering Council

Mr. Sim Kwong Mian is Chairman of Singapore Power's Engineering Council. He has been in the energy utility industry for more than 40 years. He is also Chairman of Power Automation for Singapore Power. Mr. Sim is a registered Professional Engineer with Professional Engineers Board, Singapore and Fellow of Institute of Engineers, Singapore. He holds a BEng (Electrical) degree from University of Singapore, a MSc (Technology) degree from UMIST, UK and a Diploma in Management Studies from Singapore Institute of Management. He has also completed the Advanced Management Program at Harvard Business School, U.S.

Wouter van Bolhuis, Manager of Energy Transition, City of Groningen

Wouter van Bolhuis is manager of energy transition in the city of Groningen. Energy is important in the region because of the extraction of natural gas and earthquakes that occur, which is why the local government of Groningen wants to be a frontrunner in the energy transition. Wouter studied social geography in Groningen. He works with a team of 30 people to speed up renewable energy savings in Groningen.

Ranjit Bharvirkar – Principal, Regulatory Assistance Project (RAP)

Ranjit Bharvirkar is a Principal at the Regulatory Assistance Project where he directs RAP's India program. He has more than 17 years of experience in electricity policy analysis and technical advice and assistance to state- and national-level policymakers in the U.S. and India on various topics including but not limited to renewable energy, wholesale energy markets, distributed generation, energy efficiency, demand response, dynamic pricing, program evaluation, and others. He holds a Bachelor's degree in civil engineering from the Indian Institute of Technology Bombay, a master's degree in environmental engineering from North Carolina State University, and a master's degree in public policy from the University of California at Berkeley.

Session 6: **A Global Perspective**

Pierre-Olivier Pineau – Professor, HEC Montreal

Pierre-Olivier Pineau is a professor at the Department of Decision Sciences of HEC Montréal and holds the Chair in Energy Sector Management since December 2013. He is an energy policy and management specialist, with a focus on electricity reforms. He has published many papers on the energy sector, most of them exploring the links between energy and some aspects of sustainable development. He participates regularly in the public debate on energy and has authored many reports for the government and other public organizations. He is a CIRANO Fellow, member of the CAEE, CIRODD and institute EDDEC. Before joining HEC Montreal, he was an associate professor at the School of Public Administration, University of Victoria (2001-2006).

Wang Zhongying – Acting Director General of Energy Research Institute, China National Renewable Energy Centre

Wang Zhongying is Professor and Acting Director General of Energy Research Institute of NDRC. He is the driving force behind and director for China National Renewable Energy Centre (CNREC). Mr. Zhongying has nearly 30 years of experiences on energy policy research, especially in the renewable energy sector. He provides support to central and local government sectors, mainly including National People's Congress, National Development and Reform Commission, National Energy Administration, Ministry of Science and Technology and other related government institutions regarding

renewable energy legislation, strategy, policy and planning research and drafting. He is the China representative in IEA's Renewable Energy Working Party (REWP).

John Holmes – Co-leader, Smart Villages Initiative

"Taking an integrated approach to rural electrification for development: the Smart Villages Initiative" John Holmes is Co-Leader of the 'Smart Villages Initiative' which is addressing the challenges of sustainable energy provision for rural communities in Africa, Asia and Latin America to catalyse their development. The Smart Villages Initiative has been undertaken by an interdisciplinary team of 15 researchers, many of whom are based at the University of Cambridge, and carried out in collaboration with national science academies in Europe, Africa, Asia and America.
Until recently, John Holmes was also a Senior Research Fellow in Earth Sciences at the University of Oxford in the UK where his research has addressed the challenges of making better links between science and policy making. He has a first degree in natural sciences from Cambridge University, a PhD in engineering from Imperial College, London and an MBA from Brunel University.

Mansoor Hamayun – CEO, BBOXX

Mansoor Hamayun is co-founder and Chief Executive Officer of BBOXX, a next generation utility, powering growth and transforming lives. BBOXX uses smart, solar technology alongside pioneering financing techniques to improve energy access across Africa and the developing world. Since 2010, BBOXX has sold over 180,000 solar kits and impacted nearly 1 million lives in 30 countries. Born in Pakistan, he was raised in Sweden and studied Electrical Engineering at Imperial College London. From 2008-2010 he was the founder and leader of a student charity, e.quinox, which brought electricity to 6 villages in Rwanda. Following university, Mansoor worked as a manager for Rolls-Royce Civil Aviation business, supporting the introduction of Boeing 787 Dreamliner for LAN airlines, working on corporate cost reduction in the Asian region service and overhaul business. As CEO, Mansoor leads BBOXX in all aspects of its business – from its engineering lab in London to its factory in China, to distribution from its local shops in Kenya, Rwanda, Togo and D.R. Congo.

Lunchtime Speakers

Madeleine McPherson – Assistant Professor, University of Victoria

Dr. Madeleine McPherson is an Assistant Professor in the Civil Engineering department at the University of Victoria and principal investigator of the Sustainable Energy Systems Integration & Transitions Group. Previously, Madeleine worked as a Post-Doctoral researcher in the Grid Systems Analysis group at the National Renewable Energy Laboratory (NREL). McPherson obtained her PhD in Civil Engineering from the University of Toronto in 2017. Her research focuses on integrating high penetrations of wind and solar PV onto electricity systems around the world. More recently, Madeleine has developed and applied a methodology for exploring the role of demand response for facilitating increasing renewable penetrations. She is the lead-author on numerous peer-reviewed journal articles, conference proceedings, reports, and presentations.

Agenda

Day 1: March 25, 2019

8:30	Registration & Light Refreshments
9:00	Welcoming Remarks & Opening Session
10:00	Session 1: System Operator Perspective
11:30	Break
12:00	Session 2: Demand
13:30	Lunch
14:15	Lunchtime Speaker
14:45	Session 3: Transport
16:15	Break
16:30	Session 4: Transitioning to 100%
18:00	Reception & Student Poster Session

Day 2: March 26, 2019

8:30	Light Refreshments
9:00	Session 5: Buildings & Cities
10:30	Break
10:45	Session 6: A Global Perspective
12:15	Closing Remarks
12:45	Lunch
14:30	ESI Research Roadmap - Working Session