UCD ENERGY INSTITUTE

Wednesday 16th December, 14:00

esipp
Energy Systems Integration Partnership Programme

Beyond 70% Renewable Electricity

Wednesday 16th December, 14:00 – 15:15

Register here.

The 2019 Climate Action Plan sets out a target of 70% renewable electricity for Ireland by 2030, with a view to a net carbon energy system by 2050. This webinar brings together some of Ireland's leading academics to explore some of the requirements and implications of exceeding 70% renewable electricity. These include examining the effect of increasing levels of technology uptake, such as electric vehicles and heat pumps, the impact of additional devices on the electricity system, whether these devices can provide support to the system and how the electricity system can continue to operate and a safe and efficient way as we increase renewables on the system.

Moderator

John Gibbons, environmental writer and commentator and co-author of the Routledge Handbook of Environmental Journalism

Presentations

- **Electrifying the nation: technology and policy options** - Dr Lisa Ryan, Assistant Professor, School of Economics
- **Driving towards a Distributed Grid -** Professor Andrew Keane, Head of Energy Institute, University College Dublin
- **Opportunities for system services from connected devices -** Dr Terence O'Donnell, Associate Professor, School of Electrical and Electronic Engineering
- **How non-wire solutions can support transmission system to accommodate beyond 70% RES -** Dr Alireza Soroudi, Assistant Professor, School of Electrical and Electronic Engineering

Register here.

Abstracts

Electrifying the nation: technology and policy options - *Dr Lisa Ryan, Assistant Professor, School of Economics*

The presentation will provide the policy context for the electrification of heat and transport as part of the 2030 decarbonisation strategy in Ireland and internationally. Recent results of technology uptake modelling will give an indication of the effort and associated policies needed to achieve Irish climate action targets.

Driving towards a Distributed Grid - *Professor Andrew Keane, Head of Energy Institute, University College Dublin*

The well flagged "3 Ds" of the energy transition are Decarbonisation, Decentralisation, Digitalisation. Perhaps there is a missing fourth D which follows on from these though, Democratisation. Power is increasingly in the hands of the consumer as holders of the power capacity utilities and other stakeholders want for system services, management and balancing. An open question is how this will play out against the backdrop of the traditional control centre model. This presentation will present recent research exploring the challenges that go hand in hand with unlocking flexibility and system services from a diverse set of resources spread across a large geographic area.

Opportunities for system services from connected devices - *Dr Terence O'Donnell, Associate Professor, School of Electrical and Electronic Engineering*

The plans for decarbonisation of the energy system places a large emphasis on electrification of heating and transport. At the same time increased system flexibility is required to help mitigate the variability of renewables. A key source of such flexibility potentially lies in the control of the distributed resources such as heat pumps, domestic storage and EV charging. The webinar will present work done in UCD Energy Institute which explores the technical potential to provide frequency response from distributed energy resources. It will also discuss some of the potential challenges.

How non-wire solutions can support transmission system to accommodate beyond 70% RES - *Dr Alireza Soroudi, Assistant Professor, School of Electrical and Electronic Engineering*

The existing methods for operation and planning of energy systems are designed for the energy system with a low share of renewable energy sources (RES) and are not applicable to smart future energy systems. Additionally, building new overhead transmission lines for addressing these challenges is difficult nowadays due to the public acceptance. This talk will refer to the novel methods of using non-wire solutions for accommodating beyond 70% RES in the transmission level.

Bios

John Gibbons, environmental writer and commentator

Based in Dublin, John Gibbons has been writing and campaigning on environmental and climate issues for the last decade and a half. This included a three year stint as weekly environmental columnist with the Irish Times.

He is founder of the website Climatechange.ie and he also maintains an environmental blog at ThinkOrSwim.ie. He has appeared on national broadcast media outlets, including RTE (TV and radio), Virgin TV, BBC TV and CBC (Canada), Russia Today, TodayFM and NewsTalk.

He is a regular contributor to a range of print and online media outlets, including the Irish Times, The Business Post, The Guardian (UK), Village magazine, Irish Examiner, DeSmog UK, Irish Wildlife magazine, TheJournal.ie among others.

He is also an experienced public speaker on environment and climate issues, giving regular talks in schools and universities, as well as participating as a guest speaker in a wide range of public events. He is also co-author of the 2020 Routledge Handbook of Environmental Journalism.

Dr Lisa Ryan, Assistant Professor, School of Economics

Lisa is a lecturer in energy economics in the School of Economics. Her research is in clean energy technology adoption, energy markets, and climate change economics and related policy. She is an active member of the UCD Energy Institute where she co-leads the interdisciplinary EMPowER project relating to the decarbonisation of electricity and consumer technologies in climate change mitigation policy. She was the senior energy economist in the Energy Efficiency Unit at the International Energy Agency (IEA) in Paris until summer 2013 where she led research projects relating to energy efficiency finance, transport, and cross-sectoral policy.

She subsequently worked as an independent consultant in energy and environmental economics. From 2006-2009 she was the Director of Research at Comhar Sustainable Development Council and research fellow in the School of Geography, Planning and Environmental Policy, UCD. Lisa also previously worked as policy analyst in the R&D division of Volkswagen AG in Germany.

Lisa completed a PhD in environmental economics from University College Dublin (UCD); she also holds a Masters in Economics and other postgraduate and undergraduate degrees in economics and chemical engineering from UCD and Colorado School of Mines, USA. She has published numerous journal articles and research reports in the areas of energy and climate change policy, economics, and energy efficiency. Lisa is currently a Board Member of the Sustainable Energy Authority of Ireland.

Full Research Profile

Professor Andrew Keane, Head of Energy Institute, University College Dublin

Andrew Keane is Head of the Energy Institute at University College Dublin. Andrew leads the Energy Institute with responsibility for its Scientific and Engineering strategy delivering the Institute's continued growth and success.

Andrew's research interests include the impact of new energy resources on the power system from the residential network up to the high voltage transmission system. Current research topics focus upon the impact of renewable and distributed energy resources on the network, in particular in the context of the smart grid.

Previously, he has worked with ESB Networks in the areas of renewable generation planning and smart networks and as a Senior Engineer with Smarter Grid Solutions in Glasgow. In 2014 he co-founded a UCD spin out, **NovoGrid**. NovoGrid are a new electrical grid automation company delivering control solutions which enable renewable generators to increase their energy output.

He is a Senior Member of the IEEE and past chair of the IEEE Power and Energy Society UK and Ireland Chapter. He has published over 90 peer reviewed publications, including over 40 papers in leading journals in his field.

Full Research Profile

Dr Terence O'Donnell, Associate Professor, School of Electrical and Electronic Engineering

Terence O'Donnell received his BE in Electrical Engineering UCD in 1990. In 1995 he received his PhD degree from National University of Ireland for research in the area of Finite Element Analysis of magnetic field problems. He joined PEI (Power Electronics Ireland) Technologies in the Tyndall National Institute in Cork in 1996 as a research officer, where he worked on industrial research projects mostly in the area of magnetic component design for application in power electronic converters. In 1999 he became a senior research officer and team leader for the power electronics team with a particular research focus on integrated magnetics for low power dc-dc conversion. His role involved directing the team¿s research activities in the area of integrated magnetics. He has worked on numerous research projects, both at national and international level, relating to design, modelling and fabrication of planar magnetics for power conversion and data communications, magnetic field sensors, inductive powering and energy harvesting.

From 2009 to Dec 2012 he worked with Enterprise Ireland, the Irish innovation and development agency charged with the development of indigenous Irish industry. In this role he co-ordinated Ireland¿s involvement in the Eureka network, a European programme which facilitates collaborative, industrial R&D between industry and researchers in Europe.

Terence is an author on over 50 publications in peer reviewed journals in the areas of inductor and transformer design, magnetic sensors and energy harvesting devices. He is a frequent reviewer for IEEE Transactions on Magnetics, Transactions on Power Electronics, and the Transactions on Power Systems. He currently holds three patents.

Terence joined University College Dublin in January 2013 as a senior lecturer and is a principle investigator with the Energy Institute. His current research focus is on the use of power electronics converters in power systems and in particular on the integration and interfacing of power electronics to the grid. Particular interests include the development of power electronics or solid state transformers and the application of power electronics in the interconnection of offshore renewable energy.

Full Research Profile

Dr Alireza Soroudi, Assistant Professor, School of Electrical and Electronic Engineering

Alireza completed his BSc and MSc degrees in Electrical Engineering from the Sharif University of Technology in 2003 and 2005, respectively. In 2012, he obtained a Ph.D. in Electrical Engineering from University of Grenoble, Grenoble, France. His Ph.D. thesis was titled "Multi-Criteria planning of distribution networks under various uncertainties ". He was a Senior Power Systems Researcher at UCD from 2013-2016 with research interests in optimization and uncertainty modeling of Integrated Energy Systems. Alireza has been an IEEE Senior Member since 2016. He worked at EirGrid innovation team as an SFI Industry Fellow in 2017.

Alireza started working as a Research Fellow in ESIPP project at UCD Energy Institute in Jan 2018 and is now a Funded Investigator and Assistant Professor in the School of Electrical and Electronic Engineering. He has published several journal papers and a book in the area of optimal decision making in power systems operation and planning.

Full Research Profile