IEEE
Power & Energy Society & Power Electronics Society - WA Chapter

Reliability and Resilience in Low-carbon, Low-inertia Power Systems: New concepts, models, assessment frameworks, and international case studies

23rd July 17:30- 19:00

Lecture Theatre, Central Park Building
152 St Georges Terrace, Perth

Prof. Pierluigi Mancarella, The University of Melbourne.
IEEE PES Distinguished Lecturer

Registration is essential - please contact: Michelle Kenworthy-Groen; Michelle.Kenworthy-Groen@aemo.com.au , (T) 08 9469 9977
Event fee: no charge

Pierluigi Mancarella is Chair Professor of Electrical Power Systems at the University of Melbourne, Australia, and part-time Professor of Smart Energy Systems at the University of Manchester, UK.

Pierluigi obtained the PhD degree in Electrical Energy Systems from the Politecnico di Torino, Italy, has been a Research Associate at Imperial College London, UK, and has held visiting research positions at Sintef/NTNU in Norway and NREL in Colorado, as well as visiting professorships at Ecole Centralede Lille in France and the Universidad de Chile.

Pierluigi has been involved in or led, in the last 10 years, some 50 research projects and consultancy and professional activities in the UK, Europe, Australia, and internationally, in the area of techno-economics of smart grid technologies and distributed energy systems, risk and resilience assessment of future networks, integrated multi-energy systems modelling, and energy infrastructure investment under uncertainty.

Pierluigi is author/editor of four books, several book chapters, and over 200 research papers. He is an Editor of the IEEE Transactions on Smart Grid, the IEEE Systems Journal, and the International Journal of Electrical Power and Energy Systems, as well as Guest Editor of the Philosophical Transactions of the Royal Society A.

Pierluigi is an IEEE Power and Energy Society Distinguished Lecturer, the past Chair of the Energy Working Group of the IEEE European Public Policy Initiative, and led the Melbourne Energy Institute's work "Power system security assessment of the future National Electricity Market" commissioned by the Finkel Review.

Context

Our understanding of the classical reliability concepts of security and adequacy is increasingly being challenged by: (a) growing shares of variable renewable energy sources that require new system operation approaches, particularly to deal with decreasing levels of inertia and larger balancing and reserve requirements; and (b) the more frequent occurrence of extreme events (for instance driven by climate change) with potentially catastrophic impacts. There then may be situations when these two challenges occur simultaneously, such as in the September 2016 South Australia "Black System" event.

The primary aim of this IEEE PES Distinguished Lecture is to discuss how, based on both technical and economic considerations, there is a need for introducing new analysis and modelling frameworks that are capable to securely deal with low-inertia system operation and make future low-carbon power systems more resilient to high-impact, low-probability events. The key desirable features of such frameworks will be presented, alongside a suite of modelling tools recently developed and relevant metrics that can support assessing risk and resilience of future systems.

The key question that will then be asked is whether the system should be made "bigger" (e.g., making the system more redundant or robust, through investment into new transmission and generation asset, component hardening, etc.) or "smarter". Consideration for the latter will include analysing the role of new operational strategies (e.g., frequency response-constrained optimal power flow, dynamic scheduling of the largest contingency, controlled islanding, etc.) as well as of smart grid technologies (e.g., Fast Frequency Response from various sources such as batteries and electrolysers, system integrity protection schemes, microgrids and virtual power plants, etc.).

Case study applications from UK, Australia and Chile will be used to demonstrate the concepts presented, and key recommendations to make future low-carbon, low-inertia power systems more reliable and resilient will finally be provided.

Getting There:

The link below will give you a virtual tour of the Central Park Conference Facility. Entry is either via Ground level then stairs, which lead up to the first floor foyer, and in turn the theatrette and other board/seminar rooms. Or if required there is also elevator/disabled access to the first floor from an alternative entry approx. 20m from the main entrance. The main entrance to the Conference facilities is off the arcade/courtyard located behind the main Central Park office tower. This area can be accessed from St. Georges Tce, Hay or William Streets. Several public parking areas are within easy walking distance.

http://www.central-park.com.au/Core/Content/ConferenceCentre/Content3407.aspx