

## Keynote Address 1:

### Converter Control for Integration of Renewable Energy into the Grid

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#### Abstract:

Generation of electricity using renewable sources of energy will be the only option available to us soon. This may happen within the next two decades. In the meantime, we make the transition from traditional synchronous generator driven power systems to fully renewable energy-based power systems where the energy source is integrated through power electronics converters. We must start thinking in a new way. This presentation will address the technological challenges associated with connecting renewables to the grid through converters and the options available to meet those challenges. While the ability of the converters to respond fast is an obvious advantage, unlike the synchronous generator, it does not have a rotating mass that stores kinetic energy. The short-term overcurrent rating of the converter is much less than that of a synchronous generator unless the converter is oversized. Addressing these engineering challenges will be discussed in the presentation.

#### Speaker Biography:



Dr. Annakkage is a professor in Electrical and Computer Engineering Department at the University of Manitoba. He has more than 30 years of experience in teaching, research and consulting. His main strength is in power system stability and security assessment. He received the B.Sc. (Eng.) degree from University of Moratuwa, Sri Lanka, in 1982 and the M.Sc. and Ph.D. degrees from the University of Manchester Institute of Science and Technology (UMIST), Manchester, U.K., in 1984 and 1987, respectively. He has supervised more than twenty PhD students and several MSc students at the University of Manitoba (Canada) and the University of Auckland (New Zealand). He has served on IEEE and CIGRE working groups. He was an editor of IEEE Transactions on Power Systems from 2009 – 2012, and the Head of Electrical and Computer Engineering Department at the University of Manitoba from 2008 January – 2012 December, and Acting Head from 2005 July – 2006 June and 2020 July – 2021 June. He has published over 125 articles including 60 articles in peer-reviewed journals. He was the convenor of the IEEE Task Force on “Dynamic System Equivalents” (2009-2012), the convenor of CIGRE Working Group on “Application of Phasor Measurement Units for monitoring power system dynamic performance” (2013-2017) and the Technical Committee Program Chair representing the Power System Dynamic Performance Committee of IEEE Power and Energy Society (2015-2017). Currently he is the secretary of the CIGRE Working Group on “Guidelines for Sub-synchronous Oscillation Studies in Power Electronics Dominated Power Systems” and the convenor of joint CIGRE/IEEE Working Group on “Evaluation of Voltage Stability Assessment Methodologies in Transmission Systems”.