

# Challenges with Integration of Inverter Based Solar PV Distributed Generation

**Date:** Sun. 1<sup>st</sup> Dec.

**Time:** 1:10 pm

**Location:** Building 59, Room 2016

## Speaker:

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## Abstract:

Australia is a global leader in small scale distributed generation (DG) with more than 2 million installations of solar PV systems, connected to the grid through inverters, typically in the 2-50kW range. As DG starts to have a considerable impact across all parts of the power system, its impact and the response of small-scale PV inverters cannot be ignored from a power system operation perspective.

In terms of solar PV inverter vendors, there is a great variety of manufacturers and inverter models currently used across the country. Although all inverters comply with local standards (AS 4777.3-2005 and 4777.2-2015), actual grid conditions rarely match the prescriptive tests defined in these standards. Furthermore, inverter responses to different grid disturbances exhibit great diversity for many of the common grid disturbances such as voltage sags, frequency deviations, phase jumps or re-energisation after disconnections. In this uncertain scenario, inverter bench-testing is a key process to determine inverter performance in a broad range of grid events, as well as to provide accurate inputs to load modelling.

This presentation will provide a summary of the benchmarking of solar PV inverters currently undertaken at the University of New South Wales (UNSW Sydney), as part of the "Addressing Barriers to Efficient Renewable Integration" project. It will also highlight the challenges and provide a reference concerning the needs requirements of future inverter-based generation and associated standards in Australia and around the world.

## Bio:

Dr Georgios Konstantinou is a Senior Lecturer in Energy Systems at the School of Electrical Engineering and Telecommunications, University of New South Wales (UNSW Sydney), Sydney Australia and an Australian Research Council Early Career Research Fellow. He is also the research coordinator at the Real-time Digital Simulation Laboratory at UNSW Sydney. Prior to that, he was a Senior Research Associate with the Australian Energy Research Institute at the same institution from 2013 to 2016. He received the BSc

in Electrical Engineering from Aristotle University of Thessaloniki, Greece and the PhD degree in Power Engineering from UNSW Sydney in 2012.

Dr. Konstantinou's research interests are in the areas of power electronics for high power applications including multilevel converters, HVDC systems and DC grids, energy storage systems and integration of renewable and distributed generation in the electricity grids. He has published 3 book chapters, over 55 journal articles in international journals and more than 80 papers in international conferences.

Dr Konstantinou is a Senior member of the IEEE, the IEEE NSW Power & Energy Society Chapter chair, a member of AU CIGRE B4 committee on Power Electronics. He is an Associate Editor with IEEE Transactions on Power Electronics and IET Power Electronics