

Student & Young Professionals Forum Talk 2



Performance Assessment, Degradation and Grid Integration of Photovoltaics (PV)

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Photovoltaic (PV) technology has grown at a remarkable rate over the past decade - even during difficult economic times - mainly due to successful policy measures for the promotion of the technology such as the Feed-in-Tariff scheme (FIT) and major PV system cost reduction. Already, large-scale centralized PV electricity generation is a reality on a global scale thus replacing conventional power plants. Moreover, PV has reached a stage where anyone can become an electricity producer using their own rooftop. Therefore, in addition to large PV parks, a movement towards extensive small-scale distributed generation is also underway. Today, PV represents at least 1% of the global electricity supply. Based on the trends observed, it is evident that PV technology is on its way to becoming a major source of power generation for the world covering the power supply needs for millions of households. In order to achieve this, the main challenges that remain to be overcome are the further reduction of the system cost, the improvement of the efficiency and energy yield, tackling reliability issues, achieving effective grid and market integration, whilst making PV part of our built environment.

In this presentation the work undertaken at the University of Cyprus in addressing some of the above challenges, namely energy yield improvement, reliability, grid and market integration will be outlined.

In the first part, the development of an advanced outdoor and indoor infrastructure for the performance evaluation, reliability assessment and degradation studies of a host of PV technologies at FOSS Research Centre for Sustainable Energy, University of Cyprus is presented. Following this, energy yield modelling and its comparison with actual measurements is discussed. The work, which concerns the development of an analytical framework for the reliable assessment of degradation and the validation of the developed protocols with indoor measurements is described next. In the final part of the presentation the most recent work on grid and market integration and more specifically the development of optimum time of use tariffs to enable demand side management (DSM), the benchmarking of their effectiveness in a network of 300 prosumers in Cyprus and the study and implementation of residential and social battery storage coupled with PV generation are also discussed.

George E. Georghiou is a Professor and the Director of FOSS Research Centre for Sustainable Energy, University of Cyprus. Prior to this, he was a Lecturer and the undergraduate course leader in Electrical Engineering at the University of Southampton, and a Research Fellow at the Electricity Utilization Group, University of Cambridge. Having graduated from the University of Cambridge with a BA, MEng, MA all with distinction and a PhD, Dr Georghiou continued his work at the University of Cambridge in the capacity of a Research Fellow (1999-2002). Dr Georghiou is currently a member of the CENELEC and IEC committees on PV and is acting as an expert evaluator for Horizon 2020 energy proposals as well as being a member of CIGRE and the European Solar Energy Industrial Initiative. He also represents Cyprus on the SET plan steering committee and sits on the board of the Cyprus Energy Agency. He has recently been appointed by the President of Cyprus to the National Energy Policy Council to advise the government on energy issues. Dr Georghiou has published over 300 papers in international journals and conference proceedings and his team has obtained research funding in excess of 15 million Euros from bodies such as the European Union, Industry (such as Honeywell, Q Cells etc), the National Funding Agency etc. Amongst his scholarly achievements, are five outstanding paper awards for the most significant technical scientific contributions and an innovation prize.