



Power Electronics for Distribution Grids



Professor Timothy Green

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Guest professor at Zhejiang University.

Lecture Time: 25 May, 2018, 9:30-10:30 AM.

Place: Room 408, EE Building. (电机工程楼 408)

Organizer: College of EE, Zhejiang University

Abstract of the Lecture

Power electronics is widely deployed to condition power in renewable generators and in end-use equipment. It has also gained acceptance in transmission system control. However, power electronics has found less use in local distribution systems. We need to understand why that is and how to evolve power electronics to fulfil its potential. There are potential uses, especially in heavily used urban networks, where flexible use of existing substation assets requires greater control over power flows. Using back-to-back converters as a soft-open-point to give controlled power flow between previously separate network areas is one of the ideas now seeing trial use. However, power electronics has not yet achieved the combination of power efficiency, power density, reliability and cost that makes it attractive alongside traditional AC equipment. This talk discusses some studies of how MVDC links and networks might be added to AC networks improve the overall network performance and its ability to cope with load growth. It will set out some ideas for how the control systems of power converters should be modelled and how overall system control might be achieved. It also will discuss some ideas for the improvement of multi-level converter designs for use in distribution networks.

Biography

Tim Green is Professor of Electrical Power Engineering and received a BSc (Eng) from Imperial College London and a PhD from Heriot-Watt University both in Electrical Engineering. He was a Lecturer at Heriot Watt University until 1994 when he moved back to Imperial College. Since February 2014 Tim has been the Director of the Energy Futures Lab, an institute of Imperial College that promotes and stimulates multi-disciplinary research, education and translation in all aspects of the energy transition. The Energy Futures Lab has several strategic industrial partners such as Shell, ABB, EDF Energy and National Grid.

Tim's research interest is in formulating the future form of the electricity network to support low carbon futures. A particular theme is how the flexibility of power electronics and control systems can be used to accommodate new generation patterns and new types of load, such as EV charging, as part of the emerging smart grid. He and his team have pioneered new designs of HVDC converters such as the Alternate Arm Converter and the Power-Group concept. He has also made contributions in fault management and the dynamics of combined AC and DC networks. He also has interests in power electronics for the management voltage and power flow in distribution networks and the use of microgrids to aid resilience. He has highly cited work in the field of stability of networks rich in power electronics and has led the advancement of the soft-open-point concept.