

Department of Electrical and Computer Engineering

Title: «Power Electronics – The Key Technology for Renewable Energy System Integration»

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Abstract:

The energy paradigms in many countries (e.g. Germany and Denmark) have experienced a significant change from fossil-based resources to clean renewables (e.g. wind turbines and photovoltaics) in the past few decades. The scenario of highly penetrated renewables is going to be further enhanced – Denmark expects to be 100 % fossil-free by 2050. Consequently, it is required that the production, distribution and use of the energy should be as technologically efficient as possible and incentives to save energy at the end-user should also be strengthened. In order to realize the transition smoothly and effectively, energy conversion systems, currently based on power electronics technology, will again play an essential role in this energy paradigm shift. Using highly efficient power electronics in power generation, power transmission-distribution and end-user applications, together with advanced control solutions makes the way for renewable energies. In light of this, some of the most emerging renewable energies, e.g. wind energy and photovoltaics, which by means of power electronics are changing character as a major part in the electricity generation, are explored in this presentation. Issues like technology development, implementation, power converter technologies, control of the systems, and synchronization are addressed. Special focuses are paid on the future trends in power electronics for those systems like how to lower the cost of energy and to develop emerging power devices and better reliability tools.

Biography:

Frede Blaabjerg (S'86–M'88–SM'97–F'03) was with ABB-Scandia, Randers, Denmark, from 1987 to 1988. From 1988 to 1992, he was a Ph.D. Student with Aalborg University, Aalborg, Denmark. He became an Assistant Professor in 1992, an Associate Professor in 1996, and a Full Professor of power electronics and drives in 1998. His current research interests include power electronics and its applications such as in wind turbines, PV systems, reliability, harmonics and adjustable speed drives. He has received 15 IEEE Prize Paper Awards, the IEEE PELS Distinguished Service Award in 2009, the EPE-PEMC Council Award in 2010, the IEEE William E. Newell Power Electronics Award 2014 and the Villum Kann Rasmussen Research Award 2014. He was an Editor-in-Chief of the IEEE TRANSACTIONS ON POWER ELECTRONICS from 2006 to 2012. He has been a Distinguished Lecturer for the IEEE Power Electronics Society from 2005 to 2007 and for the IEEE Industry Applications Society from 2010 to 2011. He was nominated in 2014 by Thomson Reuters to be between the 250 most cited researchers in Engineering in the world.