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“Distributed Generation and Micro-grids”

The Theme: Driven by economic, technical and environmental reasons, the energy sector is moving into an era where large portions of increases in electrical energy demand will be met through widespread installation of distributed resources or what is known as distributed generation (DG). DG units can operate individually or in a micro-grid mode. The latter is formed by a cluster of DG units connected to a distribution network to serve local and distributed loads in a systematic manner. Micro-grids can operate in grid-connected mode or in an islanded operation mode to boost the service reliability. The majority of distributed resources are interfaced to the grid via power electronic converters. On the other hand, driven by the urgent need to improve the reliability and efficiency, power distribution systems are moving towards an extensive use of electronic distribution system control devices, such as power-quality control devices, solid-state switchgear, smart capacitor banks and grid reconfiguration systems. With high penetration of these newly emerging devices, future distribution systems can be seen as converter-dominated distributed power grids with hybrid continuous-discrete control devices.

Large-scale integration of DG units, short- and long-term energy storage and electronic control devices will be of significant impact on the structure, performance, planning, design and operation practices of future power grids. Significant research efforts are needed to overcome integration barriers and help sustainable and clean DG technologies make their contribution to our energy system in a way that enhances the overall grid performance. This Special Section aims to collect recent contributions that offer timely solutions to such challenging integration issues. Topics of interest of this Special Section include, but are not limited to,

- Distributed generation and energy storage systems
- Modeling and software analytical tools for the study of distributed power grids
- Grid interfacing topologies and control techniques for robust and flexible DG integration
- Innovative topologies and functions of power electronic converters in distributed power grids
- Distributed power grid design, planning and operation
- Micro-grid modeling, dynamics and hierarchical control
- Ac and dc micro-grid configuration, power and energy management
- Fault-tolerance in micro-grids
- Integration of renewable energy systems
- Intelligent distributed monitoring and control
- Protection coordination and design

Manuscript Preparation and Submission

Follow the guidelines in “Information for Authors” in the IEEE Transaction on Industrial Electronics <http://tie.ieee-ies.org/tie/>
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Timetable

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Guest Editors

Frede Blaabjerg (F' 03) was employed at ABB-Scandia, Randers, from 1987-1988. During 1988-1992 he was a PhD. student at Aalborg University. He became an Assistant Professor in 1992 at Aalborg University, in 1996 Associate Professor and in 1998 full professor in power electronics and drives. In 2000 he was visiting professor in University of Padova, Italy as well as becoming the part-time programme research leader at Research Center Risoe in wind turbines.

Since 2006 he has been Dean of the Faculties of Engineering, Science and Medicine at Aalborg University, Denmark. In 2002 he was visiting professor at Curtin University of Technology, Perth, Australia. His research areas are in power electronics, static power converters, ac drives, switched reluctance drives, modelling, characterization of power semiconductor devices and simulation, power quality, wind turbines, custom power systems and green power inverter. He is involved in more than fifteen research projects with the industry. Among them has been the Danfoss Professor Programme in Power Electronics and Drives. He is the author or co-author of more than 600 publications in his research fields including the book "Control in Power Electronics" (Eds. M.P. Kazmierkowski, R. Krishnan, F. Blaabjerg) 2002, Academic Press. Out of those +400 papers are registered in IEEEExplore with more than 140 ISI-registered journal papers.

Dr. Blaabjerg is a member of the European Power Electronics and Drives Association and the IEEE Industry Applications Society Industrial Drives Committee. He is also a member of the Industrial Power Converter Committee and the Power Electronics Devices and Components Committee in the IEEE Industry Application Society. He is associated editor of the IEEE Transactions on Industry Applications, IEEE Transactions on Power Electronics, Journal of Power Electronics and of the Danish journal Elteknik. Since 2006 he has been Editor-in-Chief of the IEEE Transactions on Power Electronic. He has also been a Distinguished Lecturer for the IEEE Power Electronics Society from 2005 to 2008.

He has served as member of the Danish Technical Research Council in Denmark 1997-2003 and from 2001-2003 he was chairman. He has also been chairman of the Danish Small Satellite programme and the Center Contract Committee which supports collaboration between universities and industry. He became a member of the Danish Academy of Technical Science in 2001 and in 2003 he became a member of the academic council. From 2002-2003 he became a member of the Board of the Danish Research Councils. In 2004-2006 he was chairman of the programme committee Energy and Environment. In 2007 he became a member of board of the Danish High Technology Foundation and 2008 member of the board of the Danish Strategic Research Council. Finally he is also member of a number of international research councils.

He received the 1995 Angelos Award for his contribution in modulation techniques and control of electric drives, and an Annual Teacher prize at Aalborg University. In 1998 he received the Outstanding Young Power Electronics Engineer Award from the IEEE Power Electronics Society. He has received nine IEEE Prize paper awards during the last ten years (the last one in 2008) and another prize paper award at PELINCEC Poland 2005. In 2002 he received the C.Y. O'Connor fellowship from Perth, Australia, in 2003 the Statoil-prize for his contributions in Power Electronics and in 2004 the Grundfos Prize in acknowledgement of his international scientific research in power electronics. He became IEEE Fellow in 2003.

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Josep M. Guerrero (S'01-M'03) received the B.S. in telecommunications engineering, the M.S. in electronics engineering, and the Ph.D. in power electronics, from the Universitat Politècnica de Catalunya, Barcelona, Spain, in 1997, 2000, and 2003, respectively. From 1998 to 2004, he was an Assistant Professor in the Department of Automatic Control Systems and Computer Engineering, Universitat Politècnica de Catalunya. In 2004 he became a Senior Lecturer at the same university, where he teaches digital signal processing, control theory, and microprocessors. Since 2004 he has been the responsible of the Sustainable Distributed Generation and Renewable Energy research group at the Escola Industrial de Barcelona. His research interests include DSP/FPGA-based control, uninterruptible power systems, inverters for photovoltaic applications and wind energy conversion in microgrids. Dr. Guerrero is an Associate Editor of the IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS. He is the guest editor of the Special Issue of IEEE TRANSACTIONS ON POWER ELECTRONICS "Power Electronics for Wind Energy" and the Special Section of IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS "Uninterruptible Power Supply (UPS) systems". He organized and chaired sessions at several IEEE IECON, APEC, and PESC Conferences. He is listed in Marquis Who's Who in the World and Marquis Who's Who in Science and Engineering.

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Yun Wei Li received the Bachelor of Science in Engineering degree from Tianjin University, China, in 2002, and the Ph.D. degree from the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, in 2006. His PhD research was in the field of power electronics interfaced distributed generation (DG) systems and microgrids.

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Professor Salama is the author or co-author of 169 Journal Publications, 193 International Conference Papers (a total of 362 publications) and 16 Technical Reports. He has the membership of Registered Professional Engineer in the Province of Ontario (P.Eng.), Registered Professional Engineer in Egypt, and Fellow of the Institute of Electrical and Electronics Engineers (IEEE).

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